

TI-34 MultiView™

A Guide for Teachers

Developed by
Texas Instruments Incorporated

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About the teacher guide



How the teacher guide is organized

This guide consists of two sections: **Activities** and **How to use the TI-34 MultiView™ calculator**. The **Activities** section is a collection of activities for integrating the TI-34 MultiView into mathematics instruction. The **How to use the TI-34 MultiView calculator** section is designed to help you teach students how to use the calculator.

Each section uses the default settings, including the MathPrint™ mode, unless indicated otherwise.

Activities

Each activity is self-contained and includes the following:

- An overview of the mathematical purpose of the activity.
- The mathematical concepts being developed.
- The materials needed to perform the activity.
- The detailed procedure, including step-by-step TI-34 MultiView key presses.
- A student activity sheet.

How to use the TI-34 MultiView

This section contains examples on transparency masters. Chapters are numbered and include the following.

- An introductory page describing the calculator keys presented in the example, the

location of those keys on the TI-34 MultiView, and any pertinent notes about their functions.

- Transparency masters following the introductory page provide examples of practical applications of the key(s) being discussed. The key(s) being discussed are shown in black on the TI-34 MultiView keyboard. The mode settings are also shown for examples with mode setting changes.

Reset the TI-34 MultiView

- You can ensure that everyone starts at the same point by having students reset the calculator: Press **2nd**[reset] and then select 2 (Yes).

Conventions used in the teacher guide

- In the text, brackets [] around a key's symbol/name indicate that the key is a second, or alternate, function.
For example: **2nd**[x[√]]
- In the text, n is assumed to be an integer and x a real number, unless otherwise specified.

How to order additional teacher guides

To place an order or to request information about Texas Instruments (TI) calculators, use our e-mail address: ti-cares@ti.com, visit our home page: education.ti.com, or call our toll-free number: 1-800-TI-CARES (1-800-842-2737)



About the TI-34 MultiView™ calculator

Home screen

On the Home screen, you can enter mathematical expressions and functions, along with other instructions. The answers are displayed on the Home screen. The TI-34 MultiView screen can display a maximum of four lines with a maximum of 16 characters per line. For entries and expressions of more than 16 characters, you can scroll left and right (◀ and ▶) to view the entire entry or expression.

When you press **2nd**[quit], the TI-34 MultiView calculator returns you to a blank Home screen. Press ◀ and ▶ to view and reuse previous entries.

In the MathPrint™ mode, you can enter up to four levels of consecutive nested functions and expressions, which include fractions, square roots, exponents with $^$, \sqrt{x} and x^2 . If you attempt to enter more than four levels, the TI-34 MultiView calculator temporarily displays the “full” cursor (⊞), and does not allow any extra entries.

When you calculate an entry on the Home screen, depending upon space, the answer is displayed either directly to the right of the entry or on the right side of the next line.

Display contrast

The brightness and contrast of the display can depend on room lighting, battery freshness, and viewing angle.

To adjust the contrast:

1. Press and release the **2nd** key.
2. Press **+** (to darken the screen) or **-** (to lighten the screen).

Display indicators

Refer to Appendix B for a list of the display indicators.

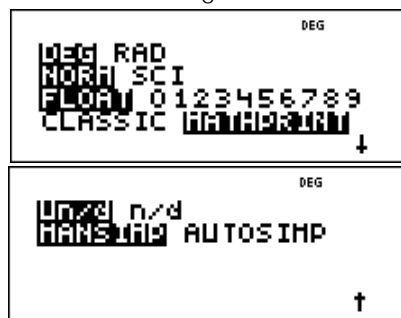
Order of operations

The TI-34 MultiView uses the Equation Operating System (EOS™) to evaluate expressions. The operation priorities are listed on the transparency master in Chapter 4, Order of operations and parentheses.

Because operations inside parentheses are performed first, you can use **(** **)** to change the order of operations and, therefore, change the result.

Mode

Use **mode** to choose modes. Press ◀ ▶ ▶ ▶ to choose a mode, and **enter** to select it. Press **clear** or **2nd**[quit] to return to the Home screen and perform your work using the chosen mode settings. Default settings are shown.



Classic mode displays inputs and outputs in a single line.

MathPrint mode displays most inputs and outputs in textbook format. Use MathPrint mode for better visual confirmation that math expressions have been entered correctly and to better reinforce the correct math notation.

Note: Switching the mode between Classic and MathPrint clears calculator history and stored operations (op1 and op2).

About the TI-34 MultiView™ calculator (Continued)

2nd functions

Pressing **2nd** displays the **2ND** indicator, and then accesses the function printed above the next key pressed. For example, 3 **2nd****[$\sqrt[3]{}$]** 125 **enter** calculates the cube root of 125 and returns the result, 5.

Menus

Certain keys display menus: **prb**, **2nd****[angle]**, **2nd****[log]**, **2nd****[trig]**, **math**, **data** **data**, **2nd****[stat]**, **2nd****[reset]**, **2nd****[recall]**, and **2nd****[clear var]**.

Press **⬇** or **⬆** to scroll and select a menu item, or press the corresponding number next to the menu item. To return to the previous screen without selecting the item, press **clear**. To exit a menu or application and return to the Home screen, press **2nd****[quit]**.

Previous entries **⬆** **⬇**

After an expression is evaluated, use **⬆** and **⬇** to scroll through previous entries, which are stored in the TI-34 MultiView history. You can reuse a previous entry by pressing **enter** to paste it on the bottom line, and then editing and evaluating a new expression.

Answer toggle **⬅**

The toggle key displays the last calculated result into different output formats, where possible. Press **⬅** to toggle between fraction and decimal answers, and exact pi and decimal.

Last answer (ans)

The most recently calculated result is stored to the variable **ans**. **ans** is retained in memory, even after the TI-34 MultiView is turned off. To recall the value of **ans**:

- Press **2nd****[ans]** (**ans** displays on the screen), or

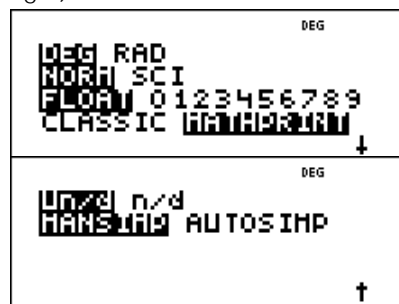
- Press any operation key (**+**, **-**, and so forth) as the first part of an entry. **ans** and the operator are both displayed.

Resetting the TI-34 MultiView

Pressing **2nd****[reset]** and then selecting 2 (Yes) resets the calculator.

Resetting the calculator:

- Returns mode settings to their defaults, as shown. (See Chapter 1, TI-34 MultiView basic operations, for more information on the mode settings.)



- Clears memory variables, pending operations, entries in history, statistical data, stored operations (**op1** and **op2**), and **ans** (last answer).

Note: The examples on the transparency masters assume all default settings.

Automatic Power Down™ (APD™)

If the TI-34 MultiView remains inactive for about 5 minutes, the APD feature turns it off automatically. Press **on** to restore power. The display, pending operations, settings, and memory are retained.

Error messages

Refer to Appendix C for a listing of the error messages.



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Star voyage — scientific notation

Overview

Students investigate scientific notation by changing numbers into scientific notation, and then using them in calculations.

Math Concepts Materials

- scientific notation
- addition
- division
- TI-34 MultiView™
- pencil
- student activity

Introduction

Set up the activity by telling your students:

The standard form for scientific notation is $a \times 10^n$, where a is greater than or equal to 1 and less than 10, and n is an integer.

1. Have students practice writing the following numbers in scientific notation using pencil and paper.

- | | |
|---------------------|------------------------|
| a. 93 000 000 | 9.3×10^7 |
| b. 384 000 000 000 | 3.84×10^{11} |
| c. 0.00000000000234 | 2.34×10^{-12} |
| d. 0.0000000157 | 1.57×10^{-8} |

2. Have students change the following numbers into scientific notation (SCI) using the TI-34 MultiView scientific calculator.


- | | |
|----------------|----------------------|
| a. 12 000 000 | 1.2×10^7 |
| b. 974 000 000 | 9.74×10^8 |
| c. 0.0000034 | 3.4×10^{-6} |
| d. 0.000000004 | 4×10^{-9} |

Note: Answers assume the default floating decimal setting.

3. Have students change the following numbers into standard (NORM) notation.


- | | |
|-------------------------|------------|
| a. 5.8×10^7 | 58 000 000 |
| b. 7.32×10^5 | 732 000 |
| c. 6.2×10^{-6} | 0.0000062 |
| d. 3×10^{-8} | 0.00000003 |

Note: To enter a negative number, press $(-)$ and then enter the number.

-  Follow these steps:

1. Enter the first number, 12000000.
2. Press **mode**.
3. Press \leftarrow \rightarrow **enter** **clear** **enter** to display the number in scientific notation.

1.2×10^7

-  Follow these steps:

1. Enter 5.8; press **x10^n**.
2. Enter 7; press **mode**.
3. Press \leftarrow **enter** **clear** **enter**.

58000000

Star voyage — scientific notation (Continued)

Activity

Present the following problem to students:

You are a captain of a starship in the distant future. You have been assigned to go to Alpha Centauri and you have 5 years to get there. The distance from our sun to Alpha Centauri is 2.5×10^{13} miles. The distance from the earth to our sun is approximately 9.3×10^7 miles.

Although we have not yet discovered how to travel at the speed of light, you live in a time where your ship can travel at the speed of light.

Light travels the approximate distance of 6×10^{12} miles in 1 light year. You will take a path from earth by our sun and then on to Alpha Centauri. Will you be able to get to Alpha Centauri on time?

Procedure

1. Using the TI-34 MultiView™ calculator, find the total distance you need to travel.

$$2.5 \times 10^{13} + 9.3 \times 10^7 = 2.5000093 \times 10^{13} \text{ miles}$$

2. Next, find out how long it will take you to travel the distance. (distance traveled \div 1 light year)

$$\frac{2.5000093 \times 10^{13}}{6 \times 10^{12}} = 4.1666821672 \text{ years}$$

3. Can you make the trip in the allotted time of 5 years?

Yes, if your ship really could travel at the speed of light.


Extension

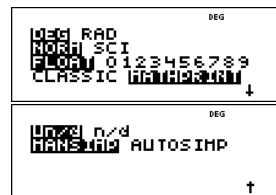
Light travels at 186,000 miles per second. A light year is the distance that light can travel in a year. Have students convert one light year to miles traveled per light year.

$$\frac{186,000 \text{ miles}}{1 \text{ sec}} \times \frac{60 \text{ sec}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hour}} \times \frac{24 \text{ hrs}}{1 \text{ day}} \times \frac{365 \text{ days}}{1 \text{ year}} \approx \frac{5.87 \times 10^{12} \text{ miles}}{\text{year}}$$


We approximate this value using 6×10^{12} miles in 1 light year in this activity.

Answer to student extension: It will take the starship approximately 15 years to get to Delta Centauri.

 **Hint:** Before you begin, make sure that the TI-34 MultiView calculator is in MathPrint™ mode to work this problem.



Hint: The Earth is approximately 9.3×10^7 miles from the Sun.


 Follow these steps:

1. Press 2.5 $\times 10^x$ 13 \rightarrow $+$ 9.3 $\times 10^x$ 7 \rightarrow enter .


$$2.5000093 \times 10^{13}$$

2. Press 2nd $[\text{ans}]$ $\frac{\square}{\square}$ 6 $\times 10^x$ 12 \rightarrow enter .

$$4.166682167$$

 Depending on the problem, remind students to include parentheses where needed to ensure the intended order of operations.

Example: In Classic mode, $(2.5000093 \times 10^{13}) \div (6 \times 10^{12})$ must include the parentheses in order to get the correct result.

 Students can learn more about this topic by visiting NASA web sites on the Internet.

Star voyage — scientific notation

Name _____

Date _____



Problems

1. Write the following numbers in scientific notation.

Standard Notation	Scientific Notation
a. 93 000 000	_____
b. 384 000 000 000	_____
c. 0.00000000000234	_____
d. 0.0000000157	_____

2. Using the TI-34 MultiView™ calculator, change the following numbers into scientific notation using SCI mode.

Standard Notation	Scientific Notation
a. 12 000 000	_____
b. 974 000 000	_____
c. 0.0000034	_____
d. 0.000000004	_____

3. Using the TI-34 MultiView calculator, change the following numbers into standard decimal notation using NORM mode.

Scientific Notation	Standard Notation
a. 5.8×10^7	_____
b. 7.32×10^5	_____
c. 6.2×10^{-6}	_____
d. 3×10^{-8}	_____

Star voyage — scientific notation

Name _____

Date _____



Problem

You are a captain of a starship in the distant future. You have been assigned to go to Alpha Centauri and you have 5 years to get there. The distance from our sun to Alpha Centauri is 2.5×10^{13} miles. The distance from the earth to our sun is approximately 9.3×10^7 miles.

Although we have not yet discovered how to travel at the speed of light, you live in a time where your ship can travel at the speed of light.

Light travels the approximate distance of 6×10^{12} miles in 1 light year. You will take a path from earth by our sun and then on to Alpha Centauri. Will you be able to get to Alpha Centauri on time?

Procedure

1. Using the TI-34 MultiView™ calculator, find the total distance that you need to travel. For this rough estimate, assume that you are measuring the distance as a straight line from the earth to our sun and then on to Alpha Centauri.

Hint: Make sure your calculator is in scientific notation mode before you begin addition.

Next, find out how long it will take you to travel the distance.
(Distance traveled \div 1 light year)

Hint: Make sure you use parentheses if needed in order to get the correct result for this division problem.

2. Can you make the trip in the allotted time of 5 years?
- _____

Extension

Now that you have been successful, you have been asked to make another trip. The distance from the Sun to Delta Centauri is 9×10^{13} miles. How long will it take you to get there from Earth?

Hint: The Earth is approximately 9.3×10^7 miles from the Sun.

Your trip on this starship is fictitious. If you are interested in finding out more about the nearest star and cosmic distances, visit NASA web sites on the Internet.



Heart rates — 1-variable statistics

Overview

Students use the data editor and statistics function of the TI-34 MultiView™ calculator to investigate the effect of exercise on heart rate.

Math Concepts

- mean, minimum, maximum, and range

Materials

- TI-34 MultiView
- stopwatch or a watch with a second hand
- student activity

Introduction

Students may be placed in smaller groups for this activity to minimize the amount of data to be entered. Ask students:


- *What do you think the average heart rate is for someone your age?*
- *What about after exercising?*

Activity

Have students complete the following investigation to check their estimations.

1. Have students check their resting heart rate by timing their pulse for 1 minute. (You could have them time for 10 seconds and then multiply by 6, but this could be the quietest minute of your day!)
2. Collect data on the chart. Enter each student's heart rate and a mark in the frequency column. As other students have the same heart rate, add another tally mark in the frequency column.
3. Enter the heart rate data into the TI-34 MultiView scientific calculator.
 - a. Enter the first heart rate on the chart in L1, and the number of tallies for that heart rate in L2. You will use L2 as the frequency.
 - b. You must press \ominus between entries. For example, enter the first heart rate, and then press \ominus .
 - c. For example, assume a class of 22 students:

Rate	Students	Rate	Students
60	3	63	3
61	5	64	1
62	6	65	4

 Follow these steps:

1. Press **data** to enter the heart rates and frequencies. Enter the heart rates in L1 and the frequencies in L2. Press \ominus between entries, and \triangleright to get from L1 to L2.
2. Continue entering until you have entered all the heart rates and frequencies.
3. Press **2nd**[stat].
4. Press 1 to choose 1-Var stats.
5. Choose L1 for the data, and L2 for the frequency.
6. Press **enter** to view the 1-Var stats.

Heart rates — 1-variable statistics (Cont.)

4. Check the statistics calculations. After students display Σx (Sigma x), explain that Σx is the sum of all the heart rates. Ask students:

- *How many heartbeats were entered from all of the student in one minute? This is Σx .*
- *How many students were entered? This is n .*
- *How can we calculate the average heart rate?*

This is \bar{x} . $\frac{\Sigma x}{n} = 62.27272727$

- *Is the average heart rate higher or lower than you expected?*

5. Now we will see the effect of some exercise on heart rate. To accommodate various student's needs, pair students with other students who will be able to complete the task. Also consider designing some task that an individual student can safely undertake to raise their heart rate. Tell students:

If at any point during this portion of the activity you experience pain, weakness, or shortness of breath, stop immediately.


6. Have the students run in place for 2 minutes and then give them these instructions:

- Time your pulse for 1 minute.*
- Record your heart rate as before.*
- Enter the data into the calculator.*
- Compare the average heart rate after running with the resting heart rate.*

7. Now have the students do jumping jacks for 2 minutes. Instruct them to time their pulse for 1 minute again and record as before. Have them enter the data into the calculator again and calculate the average heart rate after jumping jacks. Compare to the other 2 averages.

8. Instruct students to make a bar graph of the 3 sets of data they collected. Ask students:

- *How are the bar graphs the same?*
- *How are they different?*
- *Is the data grouped the same, or is it more spread out in one graph compared to another?*

 Follow these steps:

1. View the statistical data.
n should equal the total number of students sampled. For this example, $n = 22$.
2. Press \odot to \bar{x} to see the average heart rate.
 $\bar{x} = 62.27272727$
3. Press \odot until you see Σx .
 $\Sigma x = 1370$

Note: The numbers show the results for the example described in this activity. Your students' results will vary depending on the size of the group and the heart rate readings.

Heart rates — 1-variable statistics

Name _____

Date _____



Problem

What do you think the average resting heart rate is for someone your age? What about after exercising?

Procedure

1. Use this table to record your class or group data (resting).

Heartbeats per minute (resting)	Frequency

2. What is the class (group) average? _____
3. Answer the following questions from the data:
 - a. What is the total number of heartbeats for the minute? Write the symbol and the number from the calculator. _____
 - b. What is the total number of student's heartbeats entered? Write the symbol and the number from the calculator. _____
 - c. How would you compute the average heart rate? _____
Is your answer the same as in question 2? _____

Heart rates — 1-variable statistics

Name _____

Date _____



4. Use this table to record your class or group data (running).

Heartbeats per minute (running)	Frequency

5. What is the class (group) average? _____

6. Answer the following questions from the data:

a. What is the total number of heartbeats for the minute? Write the symbol and the number from the calculator. _____

b. What is the total number of student's heartbeats entered? Write the symbol and the number from the calculator.

c. How would you compute the average heart rate?

Is your answer the same as in question 5? _____



Heart rates — 1-variable statistics

Name _____

Date _____



7. Use this table to record your class or group data (jumping).

Heartbeats per minute (jumping)	Frequency

8. What is the class (group) average? _____

9. What is the total number of heartbeats for the minute? _____

10. Answer the following questions from the data:

- What is the total number of heartbeats for the minute? Write the symbol and the number from the calculator. _____
- What is the total number of student's heartbeats entered? Write the symbol and the number from the calculator. _____
- How would you compute the average heart rate? _____
Is your answer the same as in question 8? _____

Heart rates — 1-variable statistics

Name _____

Date _____



11. Make a bar graph for each of the 3 sets of data you collected.

Resting

Running

Jumping

12. How are the bar graphs the same? How are they different? _____

13. Is the data grouped the same or is it more spread out in one graph compared to another? _____

My favorite recipe — fractions

Overview

Students add the volume of ingredients in a cookie recipe to determine the size bowl they need before starting the recipe.

Math Concepts

- adding fractions
- simplifying fractions

Materials

- TI-34 MultiView™
- pencils
- student activity

Introduction

Set up the activity by showing the students how to enter mixed numbers into the calculator, add and simplify them.

1. Have students practice adding mixed numbers.

a. $4\frac{5}{8} + 3\frac{4}{5}$ $8\frac{17}{40}$

b. $9\frac{7}{8} + 6\frac{4}{5}$ $16\frac{27}{40}$

c. $5\frac{5}{6} + 3\frac{1}{9}$ $8\frac{17}{18}$

d. $8\frac{1}{3} + 7\frac{4}{7}$ $15\frac{19}{21}$


2. Have students practice simplifying fractions and mixed numbers.

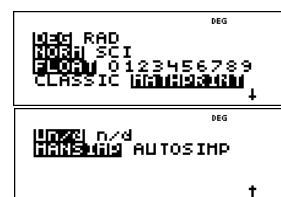
a. $\frac{9}{12}$ $\frac{3}{4}$


b. $9\frac{6}{8}$ $9\frac{3}{4}$

c. $\frac{4}{6}$ $\frac{2}{3}$

d. $8\frac{4}{24}$ $8\frac{1}{6}$

-  **Hint:** Before you begin, make sure that the TI-34 MultiView calculator is in MathPrint™, Un/d, and Mansimp modes.



-  To simplify a fraction or a mixed number, enter the number. There are two options for simplifying a fraction.
1. Press **▸simp**, enter a factor that is common to both the numerator and denominator, then press **enter**. This allows students to use mental math to simplify the fraction. Students repeat this process until the fraction is simplified. (No down arrow is displayed.)
 2. Press **▸simp** **enter**. The simplified fraction and the factor used for the simplification are displayed. Students may need to press **▸simp** **enter** more than once to get the fraction to its lowest terms. Students can write down all factors used in the simplification to find the greatest common factor of the numerator and denominator.

My favorite recipe — fractions (Continued)

Activity

Present the following problem to students:

You are about to make your favorite cookie recipe. You check the bowls in the kitchen and the only one you can find is a 5-quart bowl. Will you be able to make the cookies in that bowl? Here is the recipe:

$2\frac{1}{4}$ cups brown sugar 2 teaspoons baking powder

$2\frac{1}{2}$ cups white sugar 2 teaspoons baking soda

$1\frac{1}{2}$ cups butter 1 teaspoon vanilla

$\frac{3}{4}$ cups shortening $4\frac{1}{3}$ cups flour

5 eggs $5\frac{3}{8}$ cups oatmeal

1 teaspoon salt

What is the total volume of the recipe ingredients in cups? In quarts?

Procedure

1. Before starting on the problem, have the students look at the recipe to find ingredients where the measurement is not given in cups, and prepare them to convert these measurements into cups.

Measurements: 5 eggs = $1\frac{1}{4}$ C

Other ingredients = $1\frac{3}{8}$.

2. Using the TI-34 MultiView calculator, find the total volume of the recipe ingredients in cups.

$18\frac{1}{12}$ cups


3. Next, convert the total number of cups into quarts.

$4\frac{25}{48}$ quarts

4. Would the ingredients fit in the 5-quart bowl?
Yes

Extension

Ask the students to find other recipes at home and add up the list of ingredients to determine how large the bowl would need to be.

-  Some measurement conversions:
- 3 teaspoons (tsp.) = 1 tablespoon (Tbsp.)
 - 16 Tbsp. = 1 cup (C)
 - 1 egg = $\frac{1}{4}$ C
 - 4 C = 1 quart (qt)

My favorite recipe — Name _____

fractions Date _____



Problem

You are about to make your favorite cookie recipe. You check the bowls in the kitchen, and the only one you can find is a 5-quart bowl. Will you be able to make the cookies in that bowl?

The recipe is:

$2\frac{1}{4}$ cups brown sugar

$2\frac{1}{2}$ cups white sugar

$1\frac{1}{2}$ cups butter

$\frac{3}{4}$ cups shortening

5 eggs

1 teaspoon salt

2 teaspoons baking powder

2 teaspoons baking soda

1 teaspoon vanilla

$4\frac{1}{3}$ cups flour

$5\frac{3}{8}$ cups oatmeal

Procedure

- Using pencil and paper, convert eggs and teaspoon measurements into tablespoons and then into cups.

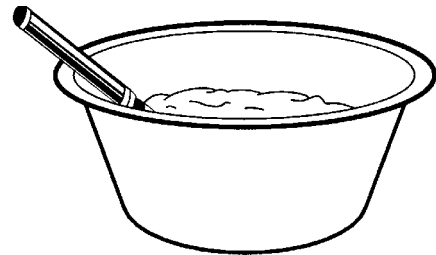
Hint: 3 teaspoons (tsp.) = 1 tablespoon (Tbsp.)

16 Tbsp. = 1 cup (C)

4 C = 1 quart (qt)

1 egg = $\frac{1}{4}$ C

- | Ingredient | Cup Measurement |
|--|-----------------|
| a 5 eggs | _____ cups |
| b Other ingredients
(Salt, baking powder, baking soda, vanilla) | _____ cups |



My favorite recipe — Name _____

fractions Date _____



2. Using the TI-34 MultiView™ calculator, add all the measurements in the recipe.

Amount (in cups)	Ingredient
$2\frac{1}{4}$ C	brown sugar
$2\frac{1}{2}$ C	white sugar
$1\frac{1}{2}$ C	butter
$\frac{3}{4}$ C	shortening
	5 eggs (Enter your answer from #1)
	Salt, baking powder, baking soda, vanilla (Enter your answer from #1)
$4\frac{1}{3}$ C	flour
$5\frac{3}{8}$ C	oatmeal
	Total

3. Using the TI-34 MultiView calculator, convert the total number of cups into number of quarts.

_____ cups = _____ quarts

4. Would all the ingredients fit in the 5-quart bowl?

5. If the ingredients would fit, would you be able to stir?

Extension

Find other recipes at home and add up the list of ingredients to determine how large the bowl would need to be.

Next stop — fraction terminal

Overview

Students investigate fraction and decimal representations to determine when a base-ten fraction will be represented as a terminating or repeating decimal. Students use **data** on the calculator to enter fraction families and observe patterns.

Math Concepts

- fraction and decimal representations
- base ten system
- factors

Materials

- TI-34 MultiView
- student activity


Introduction

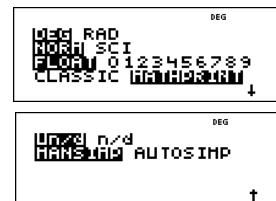
Students will change fractions into decimals by creating equivalent fractions using their understanding of factors and multiples of powers of 10. The first part of the activity should be done by hand. If students of various learning styles need support with this investigation, allow calculator use, but only if they are not reasonably able to think of the necessary calculation. Later, they will use the calculator to validate their work, continue the investigation, and look for patterns.

Activity

The first set of fraction families has denominators whose factors include only powers of 2, powers of 5, or some combination of these factors of 10. The students will build tables by hand to see the decimal representation of the fractions. They should notice that these fractions are also represented by terminating decimals.

The second set of fraction families has denominators that do not have 2 or 5 as a factor. They notice that these fractions can not be written in a terminating decimal representation. The activity uses the calculator display to help them see patterns and investigate repeating decimal representations.

-  **Hint:** Before you begin, press **mode** and make sure that the TI-34 MultiView™ calculator is set to the default mode settings.



Press **clear** to return to the Home screen.

Next stop — fraction terminal (Continued)

Have the students work in groups to promote discussion. Have them enter a table of data from the student activity sheet into the data editor by using **[data]**.

Notice there are three lists available: L1, L2, and L3. Discuss that they will enter fractions using the $\frac{n}{d}$ key. Shown is an example of entering the family of fractions with the denominator of 8.

Have students enter the conversion of fraction to decimal to validate their work. With the highlighted area in L2, press **[data]** to see a menu. Add the conversion L1 \blacktriangleright f \blacktriangleleft d to define L2 as the decimal representation of L1.

Add input to L1 to see L2 update automatically with the output value of the conversion. Scroll to an open entry space in L1. Students can enter more fractions as a time saver. The students can create a running list of all fractions in the activity instead of setting up the calculator separately for each table.

To see the conversion again, scroll to L2 and press **[data]** \downarrow 1.

Before starting the group investigation on the student activity sheet, have the students clear any data in the lists from previous use.

Procedure

1. Table A: $\frac{1}{2} = \frac{5}{10} = 0.5$

Table B: $\frac{1}{4} = \frac{25}{100} = 0.25$

$\frac{2}{4} = \frac{50}{100} = 0.5$

$\frac{3}{4} = \frac{75}{100} = 0.75$

Table C: $\frac{1}{5} = \frac{2}{10} = 0.2$

$\frac{2}{5} = \frac{4}{10} = 0.4$

$\frac{3}{5} = \frac{6}{10} = 0.6$

$\frac{4}{5} = \frac{8}{10} = 0.8$

Follow these steps to enter data in the data editor:

1. Press **[data]** to start the data editor.
2. Enter:
1 $\frac{n}{d}$ 8 \downarrow 2 $\frac{n}{d}$ 8 \downarrow 3 $\frac{n}{d}$ 8 \downarrow
3. Continue entering data into the table.

Follow these steps to enter a conversion from fraction to decimal:

1. Press \downarrow to go to L2.
2. Press **[data]** \downarrow 1 to add a conversion.
3. Press **[data]** 1 to choose L1.
4. Press **[2nd]**[f \blacktriangleleft d] **[enter]**.

Fraction	Decimal
1/8	0.125
2/8	0.25
3/8	0.375
4/8	0.5

Follow these steps to add data to L1 and observe L2 automatically update:

1. Press \uparrow \downarrow \downarrow \downarrow .
2. Enter another fraction.
The table automatically updates.

To clear data, press **[data]** \downarrow \downarrow \downarrow **[enter]**.

The students can create a running list of all fractions in the activity instead of setting up the calculator separately for each table.

Hint: Press **[clear]** or **[2nd]**[quit] to return to the Home screen.

Next step — fraction terminal (Continued)

2. Table D:

$$\frac{1}{8} = 0.125$$

$$\frac{2}{8} = 0.25$$

$$\frac{3}{8} = 0.375$$

$$\frac{4}{8} = 0.50$$

$$\frac{5}{8} = 0.625$$

$$\frac{6}{8} = 0.75$$

$$\frac{7}{8} = 0.875$$

Table E:

$$\frac{1}{25} = 0.04$$

$$\frac{2}{25} = 0.08$$

$$\frac{3}{25} = 0.12$$

$$\frac{4}{25} = 0.16$$

$$\frac{5}{25} = 0.2$$

$$\frac{6}{25} = 0.24$$

$$\frac{7}{25} = 0.28$$

$$\frac{8}{25} = 0.32$$

3. The decimal representations for the fractions are:

$$\frac{9}{25} = 0.36, \frac{10}{25} = 0.4, \frac{15}{25} = 0.6, \frac{20}{25} = 0.8$$

4. Answers will vary. Students should notice that all denominators have at least factors of either 2 or 5 or both 2 and 5 only in their prime factorization. Notice that 2 and 5 are factors of 10 (base 10).

5. Table F: $\frac{1}{3} = 0.\overline{3}$, $\frac{2}{3} = 0.\overline{6}$

$$\text{Table G: } \frac{1}{6} = 0.1\overline{6}, \frac{2}{6} = 0.3\overline{3}, \frac{3}{6} = 0.5, \frac{4}{6} = 0.6\overline{6}, \frac{5}{6} = 0.8\overline{3}$$

6. Answers will vary. The decimals in Tables F and G repeat except for $\frac{3}{6} = \frac{1}{2} = 0.5$. Guide students to discover that the prime factorization of 3 and 6 does not contain a factor of 2 and/or 5. The fractions in Tables F and G cannot be written as a fraction with a denominator that is a power of 10 except $\frac{3}{6}$ which simplifies to $\frac{1}{2}$. This will help

Next stop — fraction terminal (Continued)

them later formulate a rule about when a fraction will be expressed as a terminating or repeating decimal.

7. These fractions will be represented as a repeating decimal number.

8, 9, 10. Students will identify terminating and repeating decimals from their tables. Guide them to see that if the prime factorization of the denominator of the fractions, when in simplest form, have only factors of 2 and/or 5, then the fraction will be represented as a terminating decimal. Otherwise, the fractions will be represented by a repeating decimal.

Next stop — fraction terminal

Name _____

Date _____



Problem

In this activity you will explore the decimal forms for familiar fractions. Fill in the tables below and see if you can write a rule to predict the type of decimal number that is the same as your fraction.

Procedure

1. Fill in the following tables. Using mental math or pencil and paper, change each fraction to its decimal representation.

TABLE A

Fraction	Decimal
$\frac{1}{2} = \frac{\quad}{10}$	

TABLE B

Fraction	Decimal
$\frac{1}{4} = \frac{\quad}{100}$	
$\frac{2}{4} = \frac{\quad}{100}$	
$\frac{3}{4} = \frac{\quad}{100}$	

TABLE C

Fraction	Decimal
$\frac{1}{5} = \frac{\quad}{10}$	
$\frac{2}{5} = \frac{\quad}{10}$	
$\frac{3}{5} = \frac{\quad}{10}$	
$\frac{4}{5} = \frac{\quad}{10}$	



Next step — fraction terminal

Name _____

Date _____



2. Use **[data]** on the TI-34 MultiView™ calculator to fill in the following tables. Change each fraction to its decimal representation. Your teacher will give you details on how to use the calculator to fill in the table. Remember to try to beat the calculator with your own calculations. You can check your work with the calculator!

TABLE D

Fraction	Decimal
$\frac{1}{8}$	
$\frac{2}{8}$	
$\frac{3}{8}$	
$\frac{4}{8}$	
$\frac{5}{8}$	
$\frac{6}{8}$	
$\frac{7}{8}$	

TABLE E

Fraction	Decimal
$\frac{1}{25}$	
$\frac{2}{25}$	
$\frac{3}{25}$	
$\frac{4}{25}$	
$\frac{5}{25}$	
$\frac{6}{25}$	
$\frac{7}{25}$	
$\frac{8}{25}$	

3. From the pattern you observed in table E, fill in the decimal representations for the following fractions.

$$\frac{9}{25} =$$

$$\frac{10}{25} =$$

$$\frac{15}{25} =$$

$$\frac{20}{25} =$$

4. With your group, look at the fractions and decimals in tables A - E. Write the prime factorization of each denominator, 2, 4, 5, 8 and 25, and then look at the decimal representations. Write a paragraph about any patterns you see. Are the fractions in tables A - E represented by a terminating decimal? How do you know?

Prime Factorization
2 = _____
4 = _____
5 = _____
9 = _____
25 = _____

Next stop — fraction terminal

Name _____

Date _____



5. Mathematicians are like detectives. They investigate numbers! Observe the fractions in tables F and G, and find their decimal representation using **data** on the TI-34 MultiView™ calculator.

TABLE F

Fraction	Decimal
$\frac{1}{3}$	
$\frac{2}{3}$	

TABLE G

Fraction	Decimal
$\frac{1}{6}$	
$\frac{2}{6}$	
$\frac{3}{6}$	
$\frac{4}{6}$	
$\frac{5}{6}$	

6. What do you notice about the fractions in tables F and G? How does the decimal representation compare to tables A through E?

7. Create similar tables to find the decimal representation of the fractions with the denominators 9 and 11. Write your tables and results here. What do you notice?

Next stop — fraction terminal

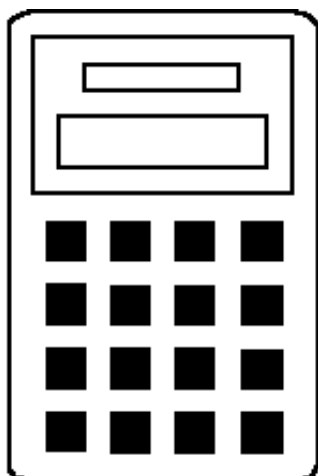
Name _____

Date _____



8. A decimal number is called a *repeating decimal* if it consists of a number or set of numbers that keep repeating in a regular pattern. Did you see a repeating decimal in your work? If so, write an example of a repeating decimal. Ask your teacher for the correct notation.
9. A decimal number is called a *terminating decimal* if the decimal representation becomes all zeros after a certain number of digits. Did you see a terminating decimal in your work above? If so, write an example of a terminating decimal. Ask your teacher for the correct notation.
10. Can you tell when a fraction will have a terminating decimal representation? Can you tell when a fraction will have a repeating decimal representation? Investigate to find out! Fill in the following table for the clue to this puzzle! These are the denominators of the fractions in this activity. Write a rule about when a fraction will be a terminating decimal or a repeating decimal.

Denominator	Prime factorization	Did the fractions terminate?
2		
4		
5		
6		
8		
9		
11		
25		



How to use the TI-34 MultiView™ calculator

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Keys

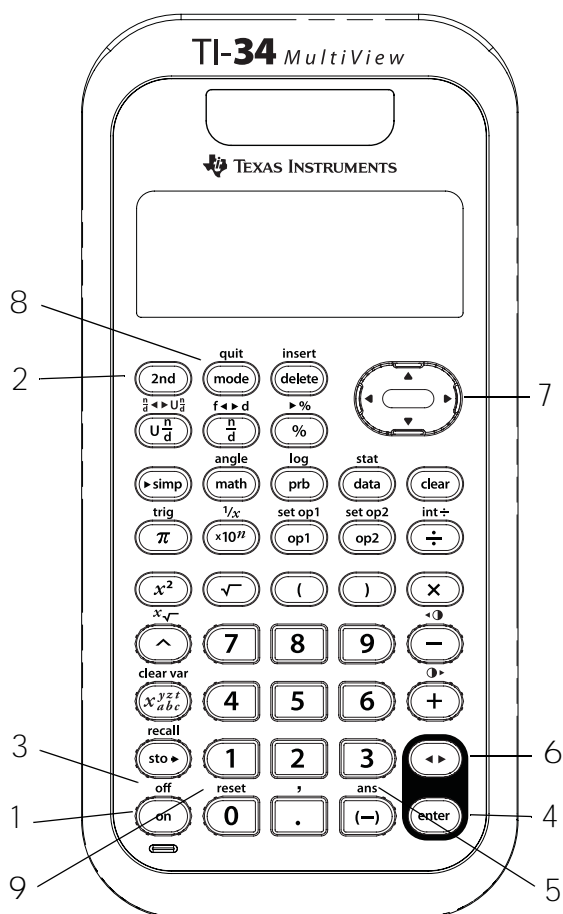
1. **on** turns on the calculator.
2. **2nd** turns on the **2ND** indicator and accesses the function shown above the next key you press.
3. **2nd**[off] turns off the calculator and clears the display.
4. **enter** completes the operation or executes the command.
5. **2nd**[ans] recalls the most recently calculated result and displays it as **ans**.
6. **↔** toggles the answer between fraction and decimal, and exact pi and decimal.

7. **←** and **→** move the cursor left and right to scroll entries on the Home screen and to navigate in menus.
2nd **←** or **2nd** **→** scrolls to the beginning or end of a current entry.
↑ and **↓** move the cursor up and down through menu items, previous entries on the Home screen, and entries in the Data editor.
2nd **↑** moves the cursor to the top entry of the active column in Data editor, or to the previous entry on the Home screen. Press **2nd** **↑** again to move the cursor to the oldest entry on the Home screen.
 In fractions, press **2nd** **↑** **enter** to paste a previous entry to the denominator. (See Chapter 6, Fractions, for more information.)
2nd **↓** moves the cursor to the first blank row of the active column in Data editor, or below the last entry on the Home screen.
8. **mode** lets you set the angle, numeric, decimal, display, and fraction modes. Press **↓** **←** **→** **↓** to choose a mode, and **enter** to select it. Press **clear** or **2nd**[quit] to exit the mode menu.

The default mode settings are shown:














9. **2nd**[reset] displays the **Reset** menu.
 - Press 1 (No) to return to the previous screen without resetting the calculator.
 - Press 2 (Yes) to reset the calculator. The message **MEMORY CLEARED** is displayed.



TI-34 MultiView™ basic operations (Continued)

- Resetting the calculator:
 - Returns mode settings to their defaults: degree angle mode (**DEG**), normal numeric notation (**NORM**), floating decimal notation (**FLOAT**), MathPrint™ display mode, and fraction modes (**Un/d** and **MANSIMP**).
 - Clears memory variables, pending operations, entries in history, statistical data, stored operations, and **ans** (Last answer).

Notes

- The examples on the transparency masters assume all default settings.
-  can be used in an entry before pressing . Pressing  more than once in a current entry may result in a Syntax error. To achieve the desired result, you can:
 - Enter the expression, press  , and then press  again after the result is displayed.
 - Enter the expression and press , and then press  as many times as desired to toggle the display and view the alternate format of the answer.
- When  or  appears in the display, the entry line contains more characters to the left or right.
- Press  after the Automatic Power Down™ (APD™) feature activates to restore power. The display, pending operations, settings, and memory are retained.

Reset

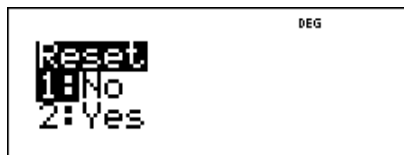
Reset the calculator.

2nd [reset]

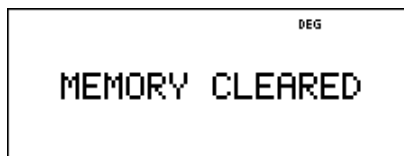
Press

Display

2nd [reset]



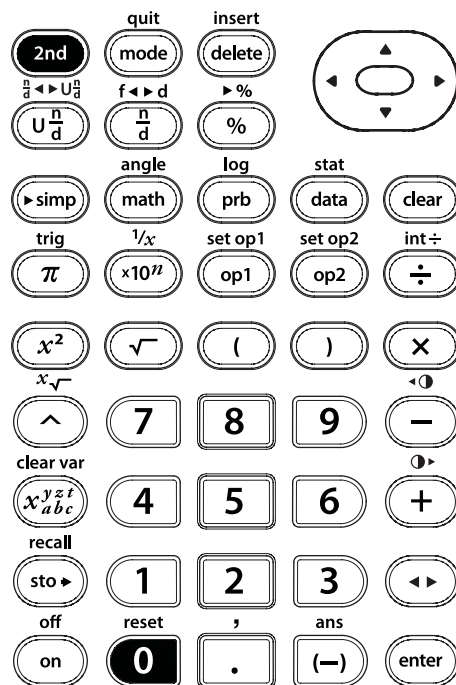
2



clear







Using **2nd** [reset] returns all settings to their defaults and clears the memory.



Mode

mode

Use **mode** to choose modes. Press     to choose a mode, and **enter** to select it. Press **clear** or **2nd****[quit]** to return to the Home screen and perform your work using the chosen mode settings.

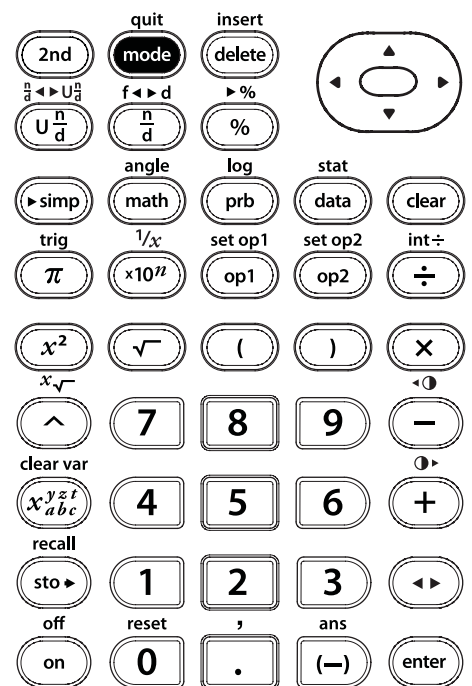
Default mode settings are shown highlighted.



DEG RAD Sets the angle mode to degrees or radians.

NORM SCI Sets the numeric notation mode. Numeric notation modes affect only the display of results, and not the accuracy of the values stored in the calculator, which remain maximal.

mode



Mode (continued)

NORM displays results with digits to the left and right of the decimal, as in 123456.78.

SCI expresses numbers with one digit to the left of the decimal and the appropriate power of 10, as in 1.2345678×10^5 (which is the same as 123456.78).

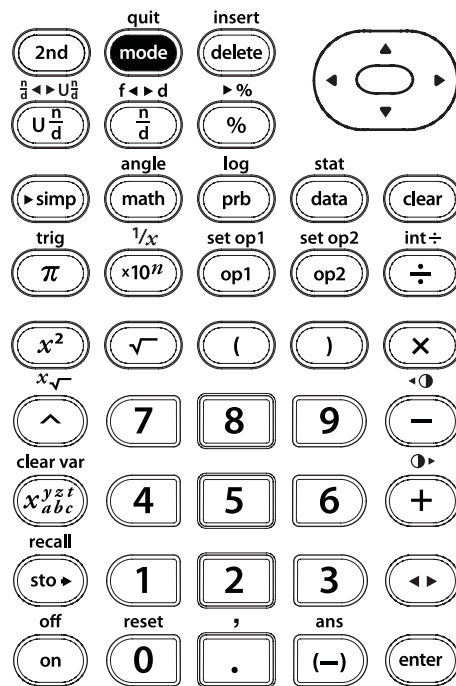
Note: $\boxed{\times 10^n}$ is a shortcut key to enter a number in scientific notation format. The result displays in the numeric notation format set in mode.

FLOAT 0 1 2 3 4 5 6 7 8 9 Sets the decimal notation mode.

FLOAT (floating decimal point) displays up to 10 digits, plus the sign and decimal.

0 1 2 3 4 5 6 7 8 9 (fixed decimal point) specifies the number of digits (0 through 9) to display to the right of the decimal.

mode



Mode (continued)

CLASSIC MATHPRINT sets the display input and output.

CLASSIC displays inputs and outputs in a single line.

The **MATHPRINT** mode displays most inputs and outputs in textbook format. Use MathPrint™ mode for better visual confirmation that math expressions have been entered correctly and to better reinforce the correct math notation.

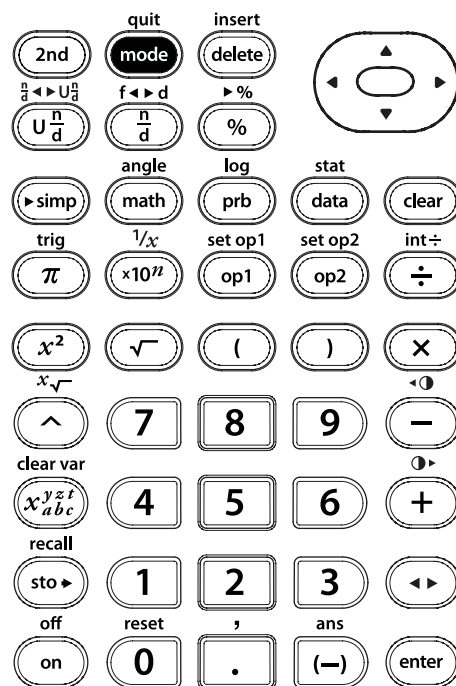
Note: Switching the mode between Classic and MathPrint clears calculator history and the stored operations (op1 or op2) values.

Un/d n/d Determines how fractional results are displayed.

Un/d displays results as a mixed number, if applicable.

n/d displays results as a simple fraction.

mode



Menus

Certain keys display menus: **prb** ,
2nd[angle] , **2nd**[log] , **2nd**[trig] , **math** ,
2nd[reset] , **2nd**[recall] , **2nd**[clear var] ,
data **data** , and **2nd**[stat] .

Press **▶** and **▼** to scroll and select a menu item, or press the corresponding number next to the menu item. To return to the previous screen without selecting the item, press **clear** . To exit a menu or application and return to the Home screen, press **2nd**[quit] . The Home screen is blank; scroll up to view history.

Sample menus:

prb		2nd [angle]	
PRB	RAND	DMS	R↔P
1: nPr	1: rand	1: °	1: R▶Pr(
2: nCr	2: randint(2: '	2: R▶Pθ(
3: !		3: "	3: P▶Rx(
		4: r	4: P▶Ry(
		5: ▶DMS	

Menus (continued)

2nd [log]

LOG LN
1: log(1: ln(
2: 10^(2: e^(

2nd [trig]

TRIG
1: sin(
2: cos(
3: tan(
4: \sin^{-1} (
5: \cos^{-1} (
6: \tan^{-1} (

math

MATH NUM
1: lcm(1: abs(
2: gcd(2: round(
3: 3 3: iPart(
4: $^3\sqrt{}$ 4: fPart(
5: min(
6: max(
7: remainder(

2nd [reset]

Reset
1: No
2: Yes

2nd [recall]

Recall Var
1: x =
2: y =
3: z =
4: t =
5: a =
6: b =
7: c =

2nd [clear var]

Clear Var
1: Yes
2: No

Menus (continued)

data **data**

(Press **data** once to display the Data editor screen. Press again to display the menu.)

CLEAR	CNVRSN
1: Clear L1	1: Add/Edit Cnvrs
2: Clear L2	2: Clear L1 Cnvrs
3: Clear L3	3: Clear L2 Cnvrs
4: Clear ALL	4: Clear L3 Cnvrs
	5: Clear ALL

Press **data** while you are in the Add/Edit Cnvrs option of the CONVERSION menu to display this menu:

Ls
1: L1
2: L2
3: L3

2nd **[stat]**

STATS

1: 1-Var Stats	
2: 2-Var Stats	
3: StatVars	This menu option displays after you calculate 1-Var or 2-Var stats. StatVars menu: 1: n 2: \bar{x} 3: Sx Etc. See Chapter 13, Statistics, for a full list.

Last answer (ans)

Use Last answer (ans) to calculate

$$\sqrt{5^2 + 12^2}$$

Press

Display

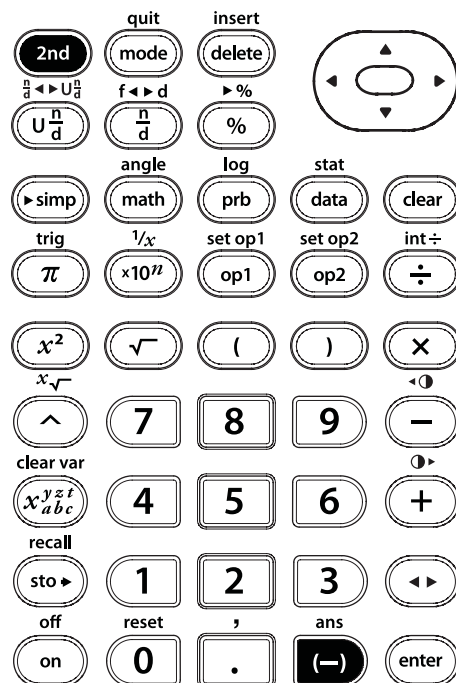
5 x^2 + 12
 x^2 enter

5²+12² 169


$\sqrt{}$ 2nd [ans]
 enter

5²+12² 169
 $\sqrt{\text{ans}}$ 13






2nd [ans]

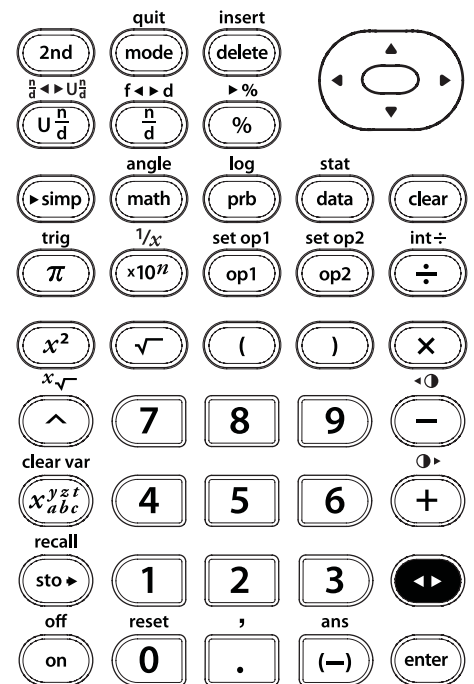


Answer toggle

Press  to toggle the display result between fraction and decimal answers, and exact pi and decimal.



Press	Display
2  + 3  	$2\pi+3\pi$ DEG \leftrightarrow 5π
	$2\pi+3\pi$ DEG \leftrightarrow 5π \leftrightarrow 15.70796327
	$2\pi+3\pi$ DEG \leftrightarrow 5π \leftrightarrow 15.70796327 15.70796326795 \leftrightarrow 5π

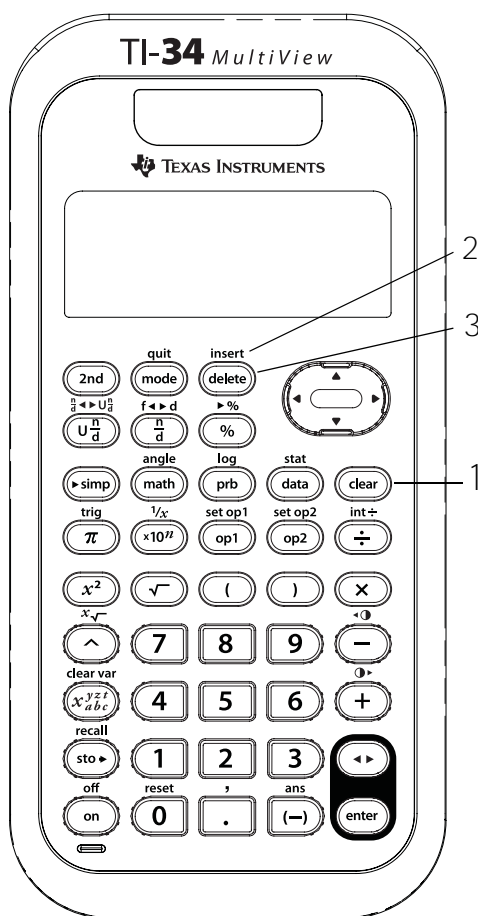


Keys

1. **clear** clears characters and error messages. Press **clear** once to clear an uncompleted entry; press it again to clear the display. You can scroll up and use **clear** to clear entries in history. **clear** backs up one screen in applications.
2. **2nd**[**insert**] lets you insert a character at the cursor.
3. **delete** deletes the character at the cursor. Then, each time you press **delete**, it deletes 1 character to the left of the cursor.

Notes

- The examples on the transparency masters assume all default settings.
- Pressing **clear** does not affect the memory, statistical registers, angle units, or numeric notation.



Delete and insert

Enter $4569 + 285$, and then change it to $459 + 2865$. Complete the problem.

Press

4569 $\boxed{+}$ 285

Display

4569+285

$\leftarrow \leftarrow \leftarrow \leftarrow \leftarrow$
 \leftarrow $\boxed{\text{delete}}$

459+285

$\rightarrow \rightarrow \rightarrow \rightarrow$
 $\boxed{2\text{nd}}$ $\boxed{[\text{insert}]}$ 6

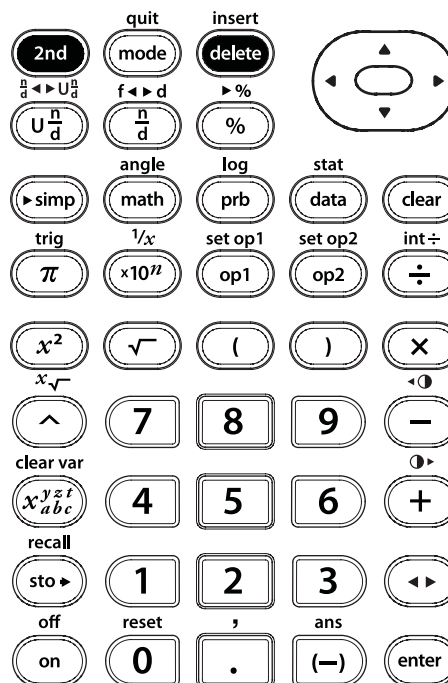
459+2865

$\boxed{\text{enter}}$

459+2865 3324

$\boxed{\text{delete}}$

$\boxed{2\text{nd}}$ $\boxed{[\text{insert}]}$

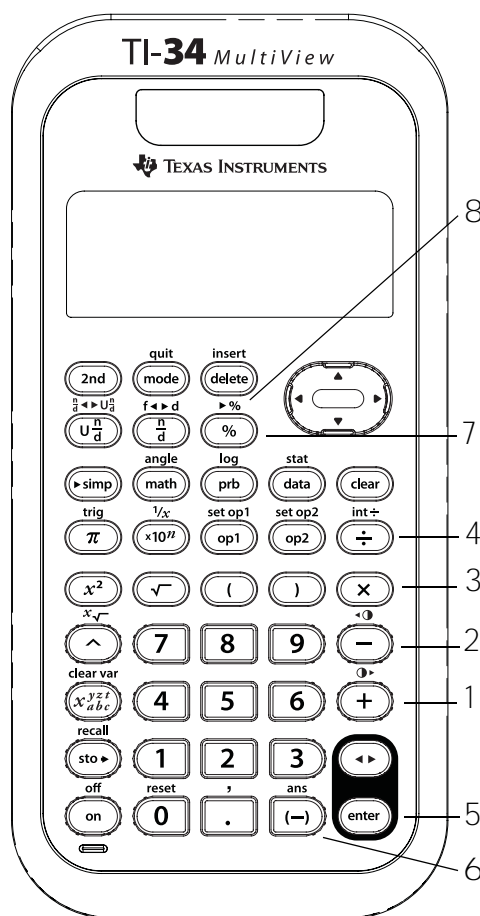


Keys

1. $\boxed{+}$ adds.
2. $\boxed{-}$ subtracts.
3. $\boxed{\times}$ multiplies.
4. $\boxed{\div}$ divides.
5. $\boxed{\text{enter}}$ completes the operation or executes the command.
6. $\boxed{(-)}$ lets you enter a negative number.
7. $\boxed{\%}$ appends the % sign to a number.
8. $\boxed{2\text{nd}}\boxed{\blacktriangleright\%}$ changes a number to a percentage.

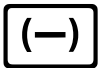
Notes

- The examples on the transparency masters assume all default settings.
- The TI-34 MultiView™ calculator allows implied multiplication.
Example: $3(4+3) = 21$
- Do not confuse $\boxed{(-)}$ with $\boxed{-}$. $\boxed{-}$ allows subtraction.
- Use parentheses to group the negation sign with the number, if needed.
Example: $-2^2 = -4$, and $(-2)^2 = 4$.
- Results of percent calculations display according to the decimal notation mode setting.



Negative numbers

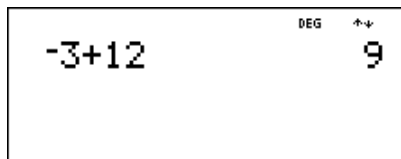
The temperature in Utah was -3°C at 6:00 a.m. By 10:00 a.m. the temperature had risen 12°C . What was the temperature at 10:00 a.m.?



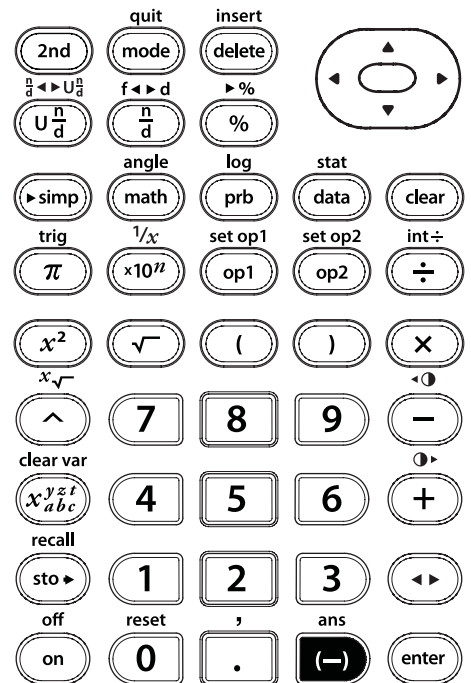
Press

Display

(-) 3 **+** 12
enter

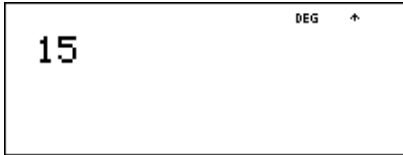
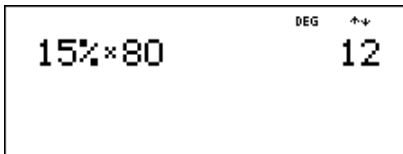


The temperature at 10:00 a.m. was 9°C .



Percent

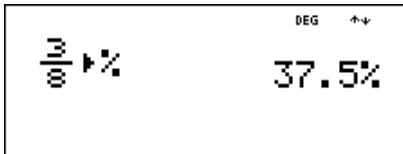
Mike makes \$80 per week. He saves 15% of his earnings. How much does Mike save per week?

Press	Display
15	
$\%$ \times 80 enter	

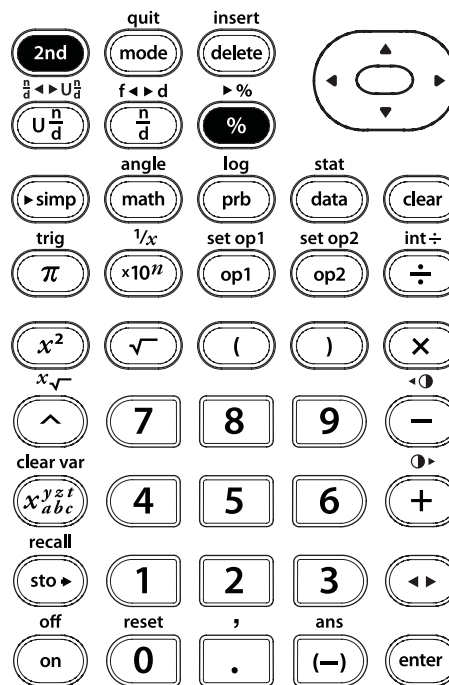
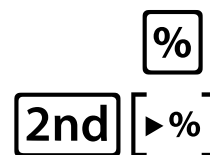
Mike saves \$12 per week.

Crystal saved $\frac{3}{8}$ of her last paycheck.

What per cent of her paycheck did she save?

Press	Display
3 $\frac{n}{d}$ 8 \blacktriangleright 2nd $\blacktriangleright\%$ enter	

Crystal saved 37.5% of her last paycheck.



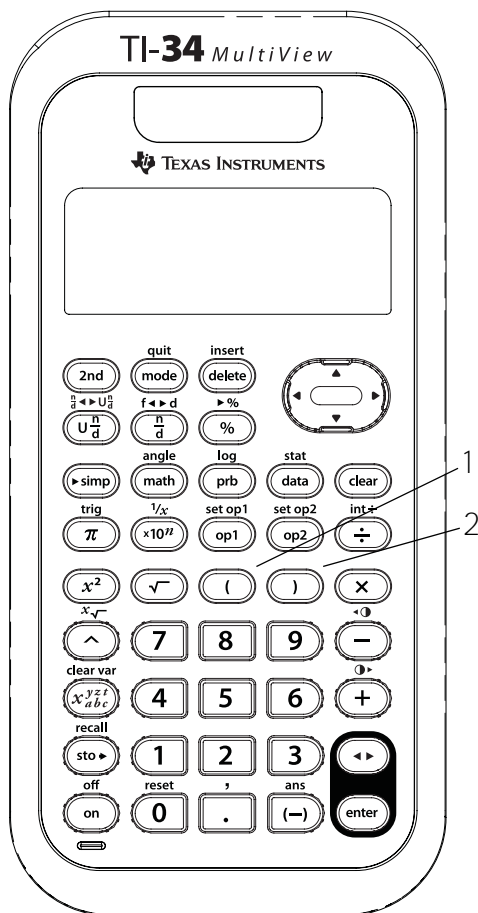
Keys

1. $\left[\right]$ opens a parenthetical expression.
2. $\left) \right]$ closes a parenthetical expression.

Notes

- The examples on the transparency masters assume all default settings.
- The transparency master showing the Equation Operating System (EOS™) demonstrates the order in which the TI-34 MultiView™ calculator completes calculations.
- Operations inside parentheses are performed first. Use $\left[\right]$ $\left) \right]$ to change the order of operations and, therefore, change the result.

Example: $1 + 2 \times 3 = 7$
 $(1 + 2) \times 3 = 9$



Equation operating system (EOS™)

1 (first)	Expressions inside $()$
2	Functions that need a $()$ and precede the expression, such as in, $\boxed{2\text{nd}}[\text{trig}]$, $\boxed{2\text{nd}}[\text{log}]$, and some menu items.
3	Fractions
4	Functions entered after the expression, such as $\boxed{x^2}$ and angle unit modifiers ($^\circ$, $'$, $''$, r)
5	<p>Exponentiation (\wedge) and roots ($\boxed{2\text{nd}}[x\sqrt{\quad}]$)</p> <p>Note: In Classic mode, exponentiation using the \wedge key is evaluated from left to right. The expression 2^3^2 is evaluated as $(2^3)^2$, with a result of 64.</p> <p>In MathPrint™ mode, exponentiation using the \wedge key is evaluated from right to left. Pressing $2 \wedge 3 \wedge 2$ is displayed as 2^{3^2}, with the result of 512.</p> <p>The TI-34 MultiView™ scientific calculator evaluates expressions entered with $\boxed{x^2}$ from left to right in both Classic and MathPrint modes. Pressing $3 \boxed{x^2} \boxed{x^2}$ calculates as $(3^2)^2 = 81$.</p>
6	Negation ($\boxed{(-)}$)

Equation operating system (Continued)

7	Permutations (nPr) and combinations (nCr)
8	Multiplication, implied multiplication, and division
9	Addition and subtraction
10	Conversions (2nd [a ⁿ ↔ U _a ⁿ], 2nd [f ↔ d], 2nd [↔ %], ▶simp and ▶DMS)
11 (last)	enter completes all operations and closes all open parentheses

Order of operations

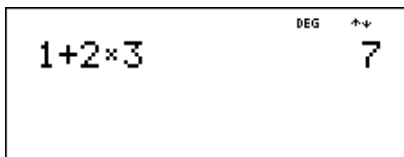
$$1 + 2 \times 3 =$$



Press

Display

1 **+** 2 **x** 3
enter

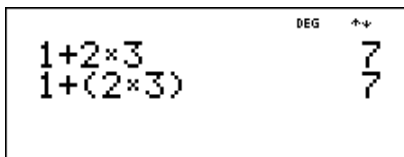


$$1 + (2 \times 3) =$$

Press

Display

1 **+** **(** 2 **x** 3
) **enter**

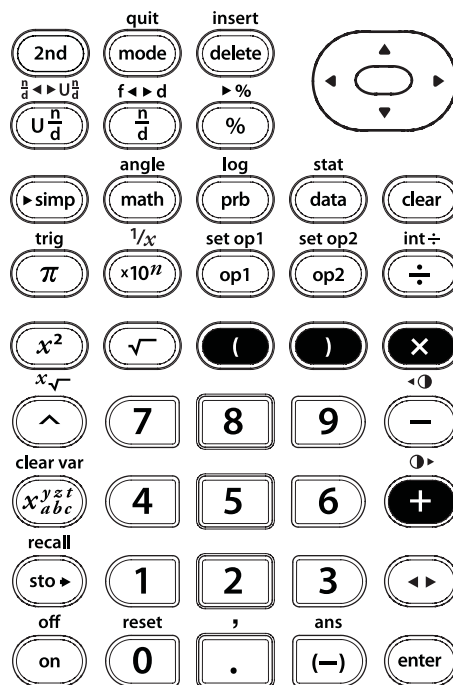
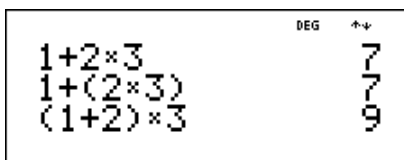


$$(1 + 2) \times 3 =$$

Press

Display

(1 **+** 2 **)**
x 3 **enter**



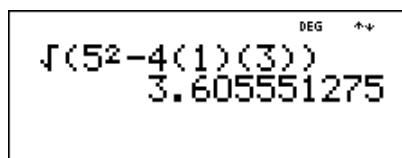
Order of operations (Continued)

$$\sqrt{5^2 - 4(1)(3)} = \text{(Classic mode)}$$

Press

Display

mode \blacktriangledown \blacktriangledown \blacktriangledown
enter **clear**
 $\sqrt{}$ 5 x^2 $-$
4 $($ 1 $)$ $($ 3
 $)$ $)$ **enter**



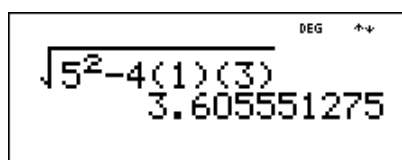
DEG \leftrightarrow
 $\sqrt{(5^2-4(1)(3))}$
3.605551275

$$\sqrt{5^2 - 4(1)(3)} = \text{(MathPrint™ mode)}$$

Press

Display

mode \blacktriangledown \blacktriangledown \blacktriangledown
 \blacktriangleright **enter** **clear**
 $\sqrt{}$ 5 x^2 $-$
4 $($ 1 $)$ $($ 3
 $)$ **enter**



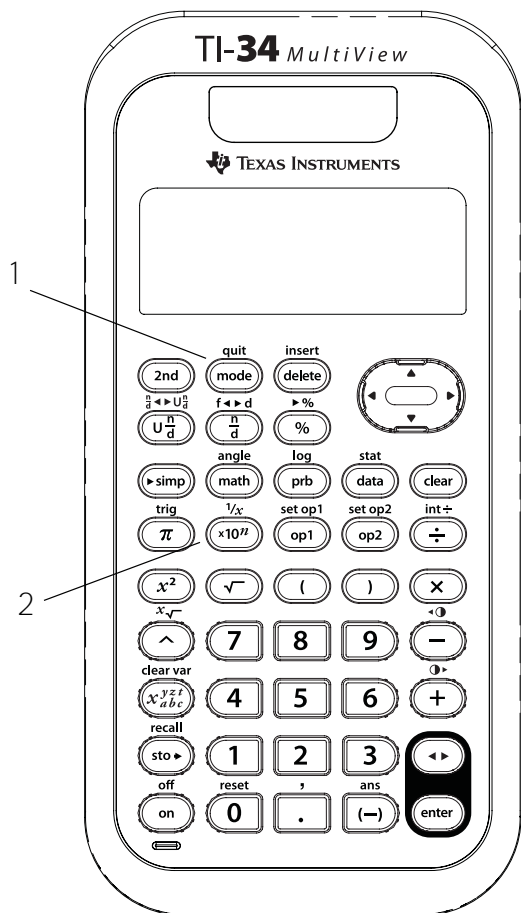
DEG \leftrightarrow
 $\sqrt{5^2-4(1)(3)}$
3.605551275

Keys

1. **mode** lets you choose from the following numeric notation menu.
 - NORM** Restores standard mode (floating decimal).
 - SCI** Turns on scientific mode and displays results as a number from 1 to 10 ($1 \leq n < 10$) times 10 to an integer power.
2. **$\times 10^n$** is a shortcut key to enter a number in scientific notation format.

Notes

- The examples on the transparency masters assume all default settings.
- You can enter a value in scientific notation regardless of the numeric notation mode setting. For a negative exponent, press **(-)** before entering it.
- Results requiring more than 10 digits are automatically displayed in scientific notation.
- For the decimal notation mode, refer to Chapter 8, Decimals and decimal places.
- These modes (**NORM** and **SCI**) affect only the display of results.

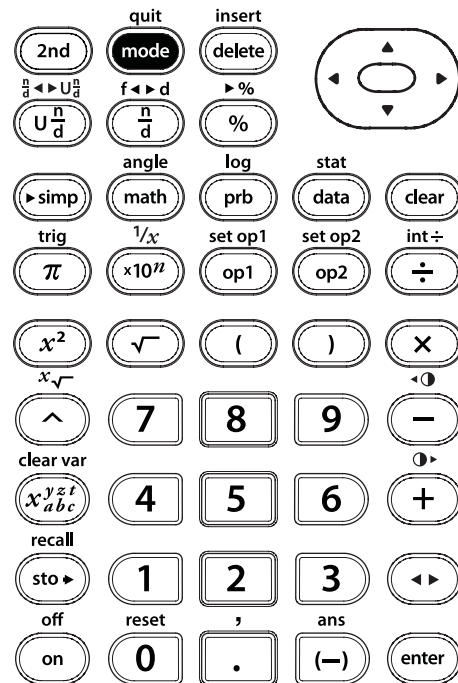


Floating decimal and scientific

Enter 12543, which will be in floating decimal notation and normal numeric notation (both default settings in **mode**). Alternate the display result between normal and scientific notations by changing settings on the mode screen.

mode

Press	Display
12543 enter	
mode \downarrow \rightarrow enter	
clear enter	
mode \downarrow enter clear enter	



Scientific notation

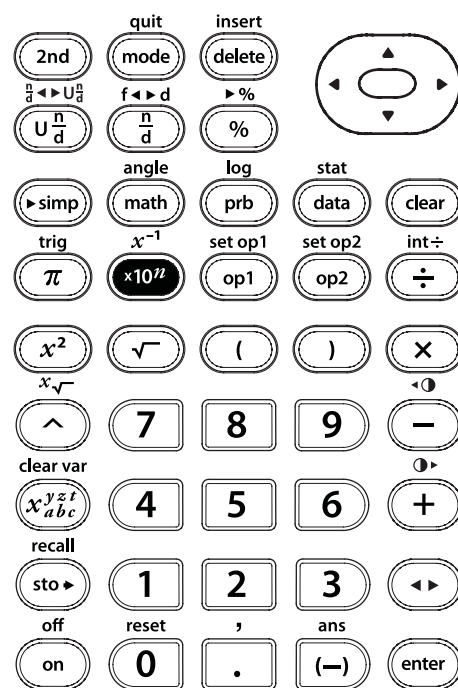
With the TI-34 MultiView™ calculator in Norm and MathPrint™ modes (both defaults), enter the following problem in scientific notation using the $\times 10^n$ key.

$\times 10^n$

The Earth is approximately 1.5×10^8 kilometers from the Sun. Jupiter is approximately 7.8×10^8 kilometers from the Sun. Assuming the orbits of the planets are circular and the planets are on the same side of the sun, how close will Jupiter come to Earth?

Press	Display
7 \square 8 $\times 10^n$ 8 \rightarrow \square 1 \square 5 $\times 10^n$ 8 \rightarrow	
mode \downarrow \rightarrow \rightarrow clear \rightarrow	

Jupiter and Earth could be approximately 630,000,000 = 6.3×10^8 kilometers apart.



Keys

1. $\text{U}\frac{n}{d}$ lets you enter mixed numbers and fractions. All entries must be an integers and the denominator can not be zero.

To enter a mixed number, enter an integer for the unit, and then press $\text{U}\frac{n}{d}$ to enter a numerator.

In MathPrint™ mode, pressing $\text{U}\frac{n}{d}$ before entering an integer displays a fraction template.

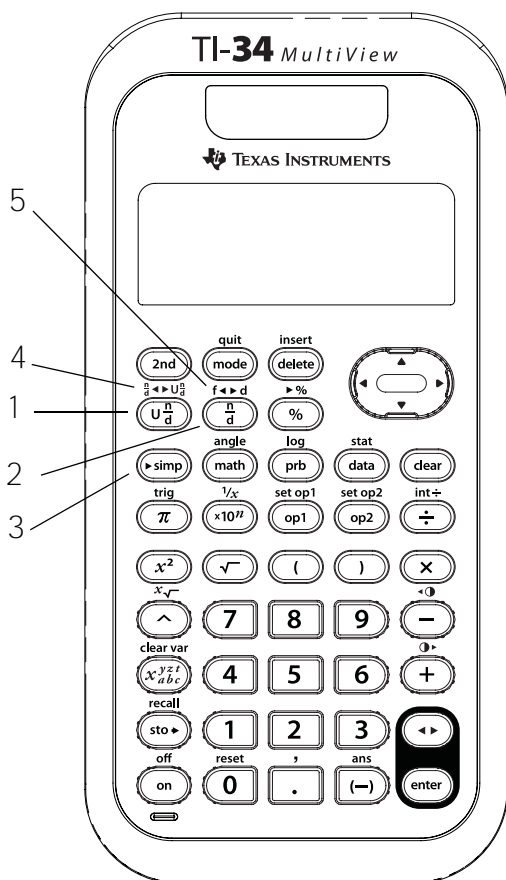
2. $\frac{n}{d}$ lets you enter a simple fraction.

Pressing $\frac{n}{d}$ before or after a number can result in differing behavior. In MathPrint™ mode, entering a number before pressing $\frac{n}{d}$ usually makes that number the numerator.

$\frac{n}{d}$ in MathPrint mode can also be used for more complex fractional computations that include operators and other functions by pressing $\frac{n}{d}$ before you enter the numerator.

In MathPrint mode, press \ominus between the entry of the numerator and the denominator. In Classic mode, press $\frac{n}{d}$ between the entry of the numerator and the denominator.

3. ▶simp simplifies a fraction using the smallest common prime factor. The factor shows on the display. If you want to choose the factor (instead of letting calculator choose it), press ▶simp , enter the factor (a positive integer), and then press enter .
4. $2\text{nd}[\frac{n}{d} \leftarrow \text{U}\frac{n}{d}]$ converts between a mixed number and a simple fraction.
5. $2\text{nd}[\text{f} \leftrightarrow \text{d}]$ converts a fraction to its decimal equivalent or changes a decimal to its fractional equivalent, if possible.



Notes

- The examples on the transparency masters assume all default settings.
- mode lets you choose how fractional results are displayed, and whether or not a fractional result will be simplified automatically.

Un/d (default) displays results as a mixed number, if applicable.

n/d displays results as a simple fraction.

MANSIMP (default) The user simplifies fractions manually step-by-step. \downarrow next to the resulting fraction signifies that the fraction is not yet in simplest form.

AUTOSIMP The calculator automatically simplifies fractional results to the lowest terms.

(continued)

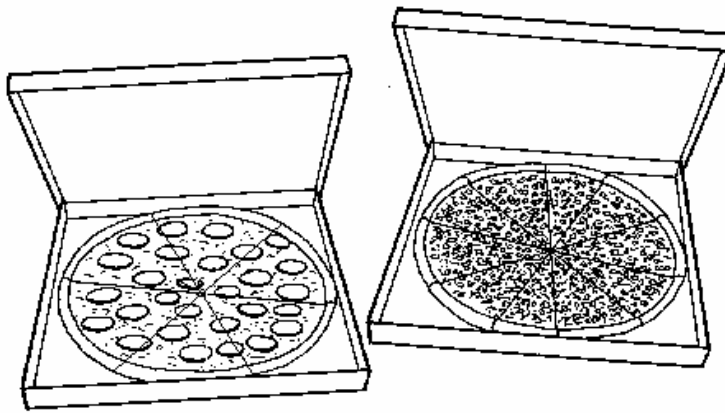
Fractions (continued)

Notes (continued)

- Calculations using fractions can display fraction or decimal results, depending on input.
- In MathPrint mode, fractions with $\frac{n}{d}$ can include operation keys ($+$, \times , etc.) and most function keys (x^2 , $\%$, etc.). In Classic mode, fractions with $\frac{n}{d}$ do not allow operation keys, functions, or complex fractions in the numerator or denominator.
- In MathPrint mode, you can enter variables (x, y, z, t, a, b, and c) in the numerator and denominator of a fraction. In Classic mode, fractions with $\frac{n}{d}$ do not allow variables.
- In Classic mode and Data editor, use \div along with $($ and $)$ to perform complex division problems.
- To paste a previous entry in the denominator, place the cursor in the denominator, press **2nd** \leftarrow to move the cursor to the history, scroll to the desired entry, and then press **enter** to paste the entry to the denominator. Entries pasted in the denominator must be valid entries for fractions.
- To paste a previous entry in the numerator or unit, place the cursor in the numerator or unit, press \leftarrow to scroll to the desired entry, and then press **enter** to paste the entry to the numerator or unit. Entries pasted in the numerator or unit must be valid entries for fractions.

Fractions

At the party, you ate $\frac{5}{6}$ of the pepperoni pizza and $\frac{1}{10}$ of the sausage pizza. The pizzas are the same size. If you put the pieces together, how much of one whole pizza did you eat?



Press
 $5 \left[\frac{n}{d} \right] 6 \left[\rightarrow \right] \left[+ \right]$
 $1 \left[\frac{n}{d} \right] 10 \left[\text{enter} \right]$

Display

$$\frac{5}{6} + \frac{1}{10} \quad \text{DEG} \quad \uparrow \downarrow$$

$$\frac{28}{30}$$

$\left[\rightarrow \text{simp} \right] \left[\text{enter} \right]$

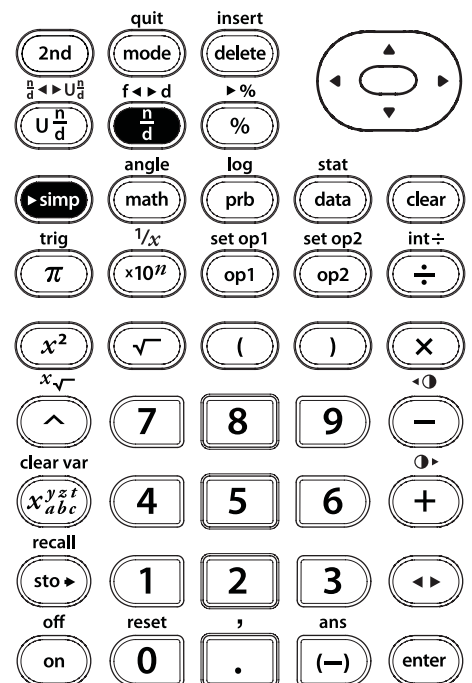
$$\frac{5}{6} + \frac{1}{10} \quad \text{DEG} \quad \uparrow \downarrow$$

$$\frac{28}{30} \rightarrow \text{simp}$$

$$\frac{14}{15}$$

Flag=2

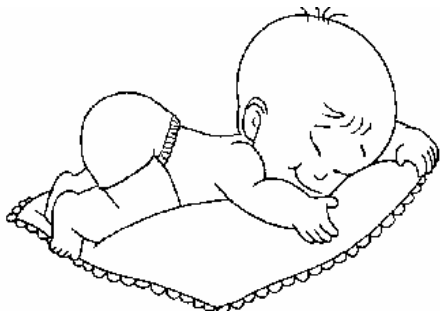
You ate $\frac{14}{15}$ of the size of one whole pizza. That is almost an entire pizza!



Mixed numbers

A baby weighed $4\frac{3}{8}$ pounds at birth.

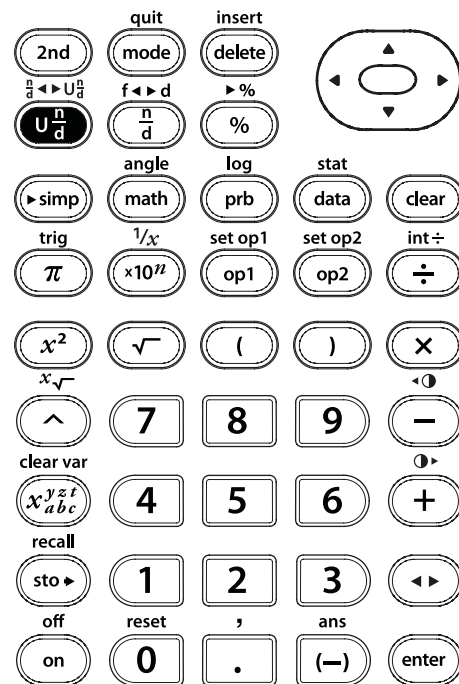
In the next 6 months, she gained $2\frac{3}{4}$ pounds. How much does she weigh?



Mode setting Un/d:

Press	Display
4 3 8	
2 3	
4	

(Continued)



Mixed numbers (Continued)

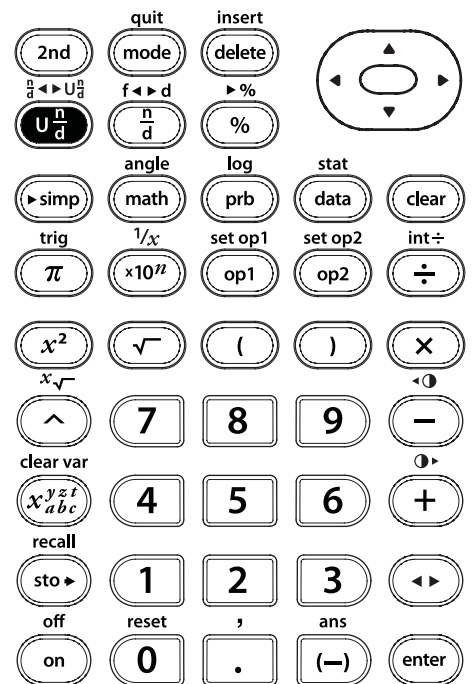
Mode setting n/d:



Press	Display
4 3 8	$4\frac{3}{8} + 2\frac{3}{4} \quad \text{DEG} \quad \frac{57}{8}$
2 3	
4	

After 6 months, the baby weighs

$7\frac{1}{8}$ pounds.



Converting fractions and decimals

Juan swims 20 laps in 5.72 minutes.

Mary swims 20 laps in $5\frac{3}{4}$ minutes.

Change Mary's time to a decimal to determine who swims faster.

Mode setting Un/d:

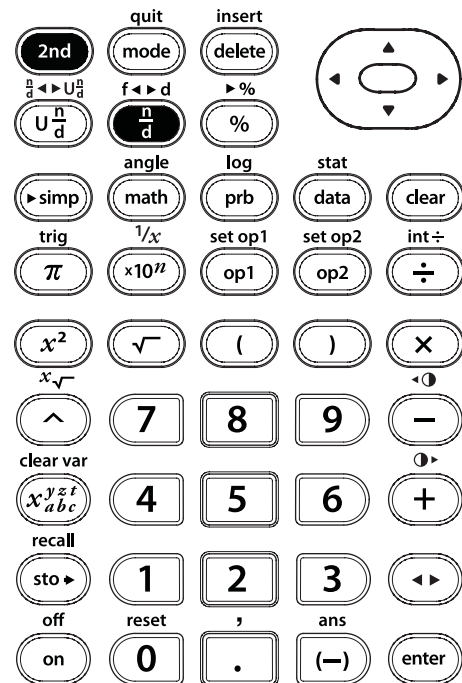
Press	Display
5 $\boxed{\text{U}\frac{n}{d}}$ 3 \downarrow 4 \rightarrow $\boxed{\text{enter}}$	
$\boxed{2\text{nd}}$ $\boxed{[f \leftrightarrow d]}$ $\boxed{\text{enter}}$	

Mode setting n/d:

Press	Display
5 $\boxed{\text{U}\frac{n}{d}}$ 3 \downarrow 4 \rightarrow $\boxed{\text{enter}}$	
$\boxed{2\text{nd}}$ $\boxed{[f \leftrightarrow d]}$ $\boxed{\text{enter}}$	

Juan swims faster than Mary since he swims 20 laps in 5.72 minutes.

$\boxed{2\text{nd}}$ $\boxed{[f \leftrightarrow d]}$



Converting fractions and decimals

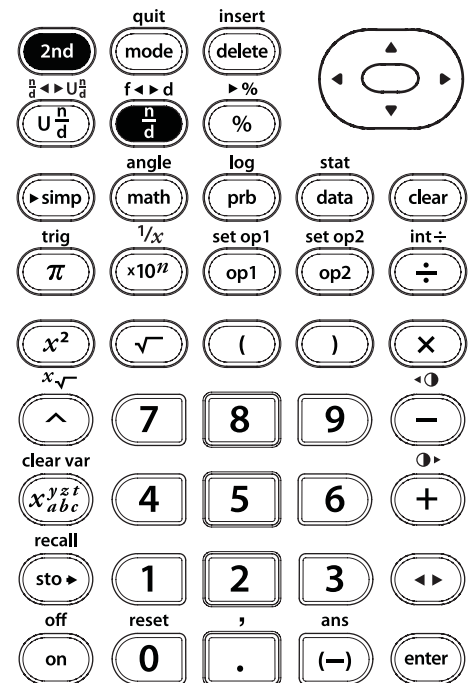
Change 2.25 to its fractional equivalent. You may have to simplify more than once to simplify the fraction to its lowest terms.

2nd **[f ◀ ▶ d]**

Mode setting Un/d:

Press	Display
2 [.] 25 2nd [f ◀ ▶ d] enter	2.25 f◀▶d ↓ 2 $\frac{25}{100}$
▶simp enter	2 $\frac{25}{100}$ ▶simp ↓ 2 $\frac{5}{20}$ Frac=5
▶simp enter	Frac=5 $\frac{5}{20}$ ▶simp 2 $\frac{1}{4}$ Frac=5

(Continued)

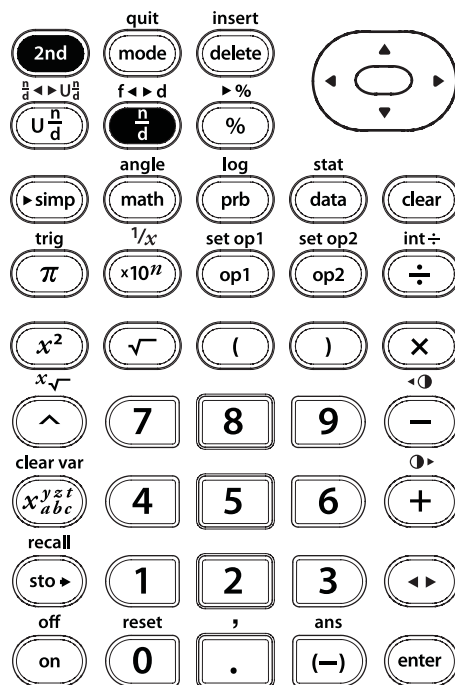


Converting fractions and decimals (Continued)

Mode setting n/d:

2nd [**f◀▶d**]

Press	Display
2 . 25 2nd [f◀▶d] enter	2.25▶f◀▶d \downarrow $\frac{225}{100}$
▶simp enter	$\frac{225}{100}$ ▶simp \downarrow $\frac{45}{20}$ Fac=5
▶simp enter	$\frac{45}{20}$ ▶simp \downarrow $\frac{9}{4}$ Fac=5



Keys

1. **[math]** displays two submenus, **MATH** and **NUM**, with various math functions. Some functions require you to enter two values, real numbers, or expressions that equal a real number.

MATH menu:

lcm(n1, n2) Returns the least common multiple (lcm) of two values, n1 and n2.

gcd(n1, n2) Returns the greatest common divisor (gcd) of two values, n1 and n2.

x^3 Calculates the cube of x.

$\sqrt[3]{x}$ Calculates the cube root of x.

NUM menu:

abs(x) Displays absolute value of x.

round(x, digits) Rounds x to specified number of digits.

ipart(x) Returns only the integer of x.

fpart(x) Returns only the fractional part of x.

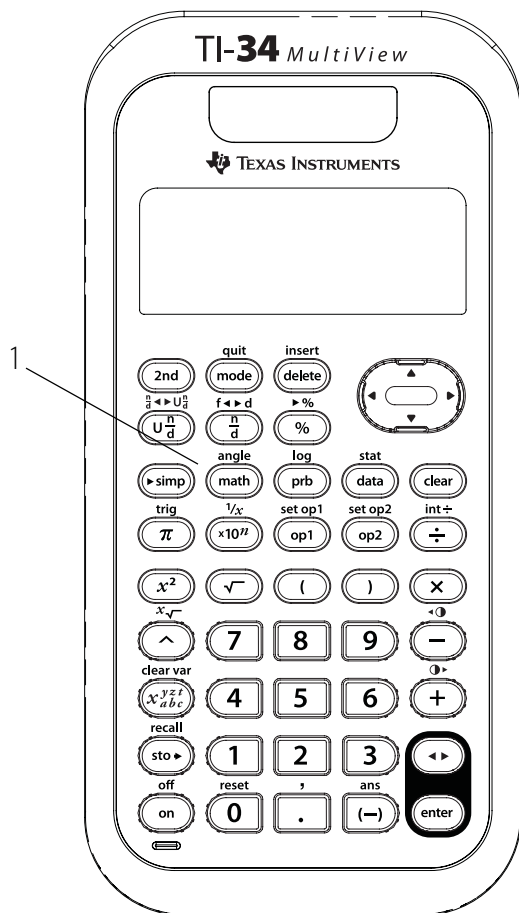
min(x1, x2) Returns the minimum of two values, x1 and x2.

max(x1, x2) Returns the maximum of two values, x1 and x2.

remainder(n1, n2): Returns the remainder resulting from the division of two values, a whole number (n1) divided by a positive whole number (n2).

Notes

- The example on the transparency master assumes all default settings.
- To use the functions, select the math function from the menu, and then enter the value.
- **[2nd][,]** must separate two values.
- Use **[)]** to close all functions.



Absolute value

Find the absolute value of -35 and then validate the answer using the calculator.

$$|-35| =$$

Press

Display

math

1 **(-)** 35

enter

Evaluate the expression

$6 + |4 - 9| \times 3$ and then validate the answer using the calculator.

Press

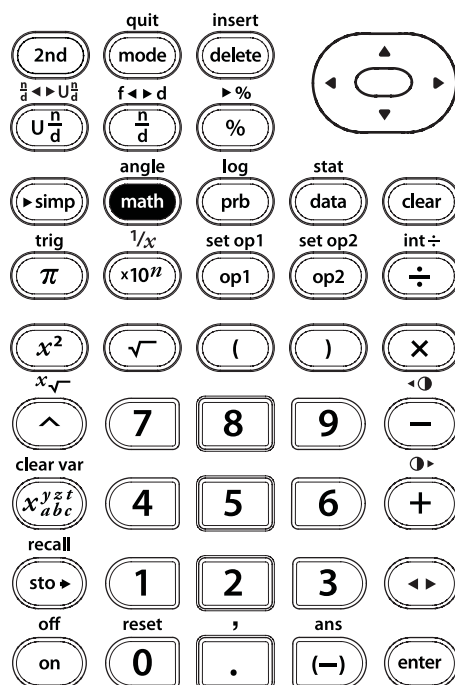
Display

6 **+** **math** 1

4 **-** 9 **×** 3

enter

math



Rounding a number

Round π to the nearest thousandths place.

math

Press

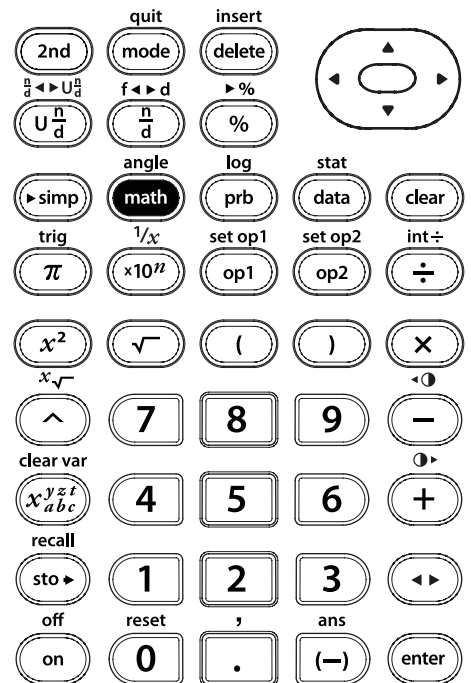
Display

math 

```
MATH [MATH]
1:abs(
2:round(
3:iPart(
```

2 **π** **2nd** [,] 3
) **enter**

```
round( $\pi$ , 3)
3.142
```



Minimum and maximum

Using **max**, put the following list of numbers in ascending order:

$$\frac{14}{17}, \frac{7}{9}, \frac{3}{5}$$

Press

Display

math \blacktriangleright 6
 7 $\frac{n}{d}$ 9 \blacktriangleright **2nd**
 [,] 14 $\frac{n}{d}$ 17 \blacktriangleright
) **enter**

$$\max\left(\frac{7}{9}, \frac{14}{17}\right) \quad \frac{14}{17}$$

math \blacktriangleright 6
 7 $\frac{n}{d}$ 9 \blacktriangleright **2nd**
 [,] 3 $\frac{n}{d}$ 5 \blacktriangleright
) **enter**

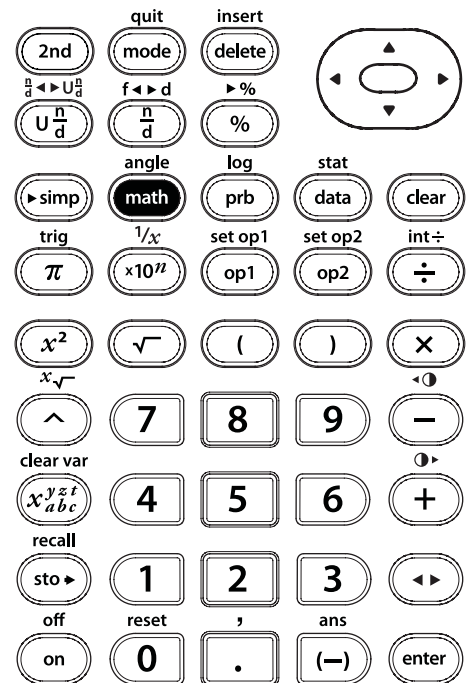
$$\max\left(\frac{7}{9}, \frac{14}{17}\right) \quad \frac{14}{17}$$

$$\max\left(\frac{7}{9}, \frac{3}{5}\right) \quad \frac{3}{5}$$

The list in ascending order: $\left\{\frac{3}{5}, \frac{7}{9}, \frac{14}{17}\right\}$.

Continued

math



Minimum and maximum (Continued)

Using **min**, check if this statement is true or false:

$$5.75 < 5\frac{7}{8}$$

Press

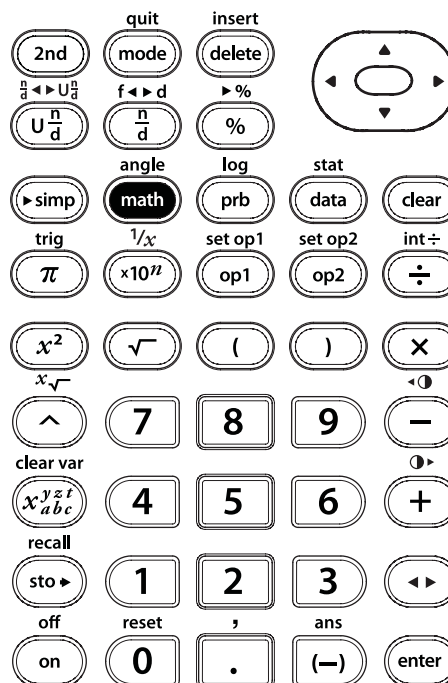
Display

math \blacktriangleright 5
 5 \square \cdot 75 **2nd** [,]
 5 \square $\frac{n}{d}$ 7 \blacktriangledown 5
 \blacktriangleright \square \square **enter**

min(5.75, 5 $\frac{7}{8}$)
 5.75

$5.75 < 5\frac{7}{8}$ is true.

math



Least common multiple

Add $\frac{1}{4} + \frac{5}{6}$ using **lcm** to find the least common denominator. Verify your answer.

math

Press	Display
math 1 4 2nd [,] 6) enter	lcm(4,6) DEG \leftrightarrow 12

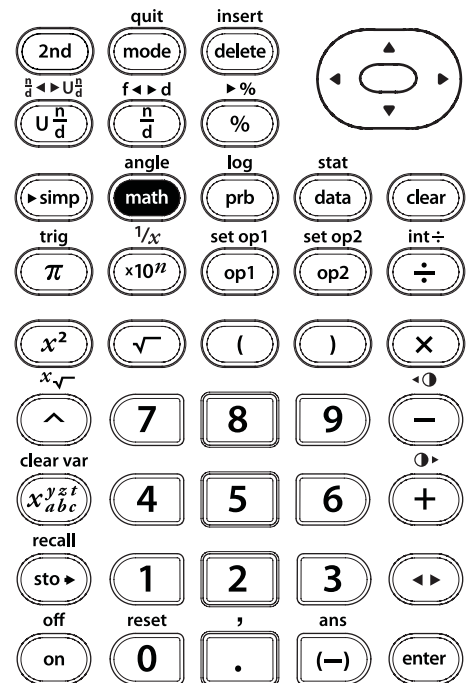
$$\frac{1}{4} = \frac{3}{12} \qquad \frac{5}{6} = \frac{10}{12}$$

$$\frac{3}{12} + \frac{10}{12} = \frac{13}{12}$$

Verify:

1 $\frac{n}{d}$ 4 \rightarrow + 5 $\frac{n}{d}$ 6 enter	lcm(4,6) DEG \leftrightarrow $\frac{1}{4} + \frac{5}{6}$ 1 $\frac{1}{12}$
--	--

2nd $\frac{n}{d} \leftrightarrow U \frac{n}{d}$ enter	lcm(4,6) DEG \leftrightarrow $\frac{1}{4} + \frac{5}{6}$ 1 $\frac{1}{12}$ 1 $\frac{1}{12}$ \rightarrow % \leftrightarrow U % $\frac{13}{12}$
--	--



Greatest common divisor

Find the greatest common divisor (gcd) for the numbers 27 and 36.

Then use gcd to simplify $\frac{27}{36}$ to its

lowest terms.

Press

Display

mode \downarrow \downarrow \downarrow
 \downarrow \downarrow \rightarrow **enter**

DEG
 U~~1728~~ n/d
 RANS IMP ~~611085114~~ †

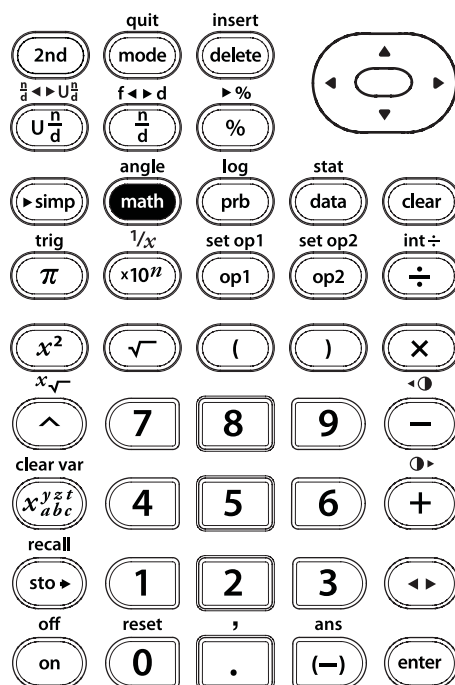
clear **math** 2
 27 **2nd** [,] 36
) **enter**

DEG $\uparrow\downarrow$
 gcd(27,36) 9

$\frac{n}{d}$ 27 \div 9 \downarrow
 36 \div 9 \rightarrow
enter

DEG $\uparrow\downarrow$
 gcd(27,36) 9
 $\frac{27 \div 9}{36 \div 9}$ $\frac{3}{4}$

math



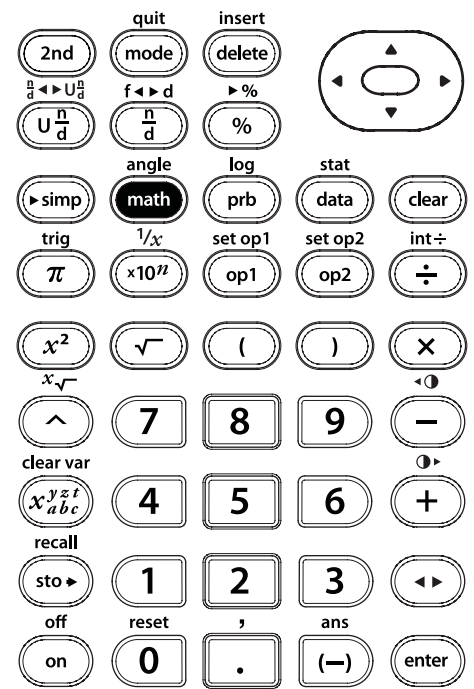
Cube and cube root

Calculate 34^3 and $\sqrt[3]{39304}$.

math

Press	Display
34 math 3 enter	34^3 39304
math 4 \uparrow enter \rightarrow enter	34^3 39304 $\sqrt[3]{39304}$ 34

Notice that $\sqrt[3]{34^3}$ is 34.



Keys

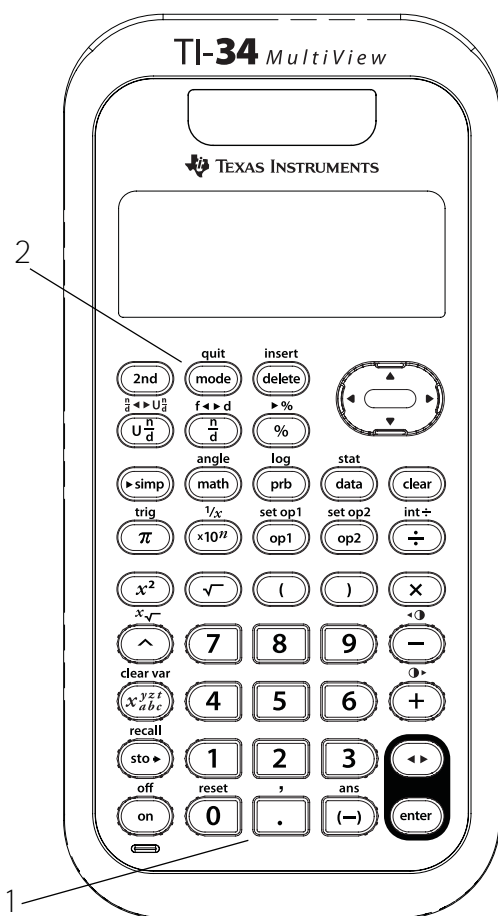
1. \cdot enters a decimal point.
2. **mode** lets you set the number of decimal places. Press \leftarrow \leftarrow and then \rightarrow to the choice of decimal desired. Press **enter** to select it.

FLOAT Sets floating decimal (standard) notation.

0-9 Sets the number of decimal places displayed. **FIX** displays when a decimal mode is set from 0-9.

Notes

- The examples on the transparency masters assume all default settings.
- Press **mode** \leftarrow \leftarrow **enter** to return to standard notation (floating decimal).
- The TI-34 MultiView™ calculator automatically rounds the result to the number of decimal places selected. For example, when the decimal is set to 2 places, 0.147 becomes 0.15 when you press **enter**. The TI-34 MultiView calculator also rounds or pads resulting values with trailing zeros to fit the selected setting. For example, when the decimal is set to 5 places, 0.147 becomes 0.14700 when you press **enter**.
- Resetting the calculator clears the decimal setting and resets to the default, **FLOAT**.
- The decimal setting does not affect the internal precision of results. It affects only the way results are displayed.

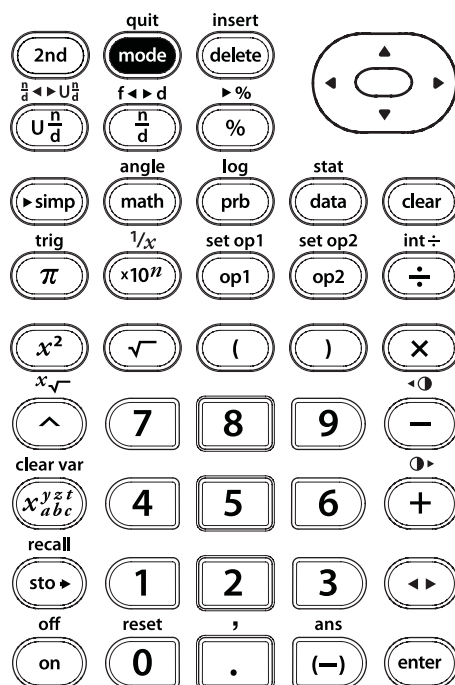


Decimal

Round 12.345 to the hundredths place, to the tenths place, and then to floating notation.

Press	Display
12 \square 345 enter	
mode \downarrow \downarrow \rightarrow \rightarrow \rightarrow enter	
clear enter	
mode \downarrow \downarrow \rightarrow \rightarrow enter	
clear enter	
mode \downarrow \downarrow enter	
clear enter	

mode

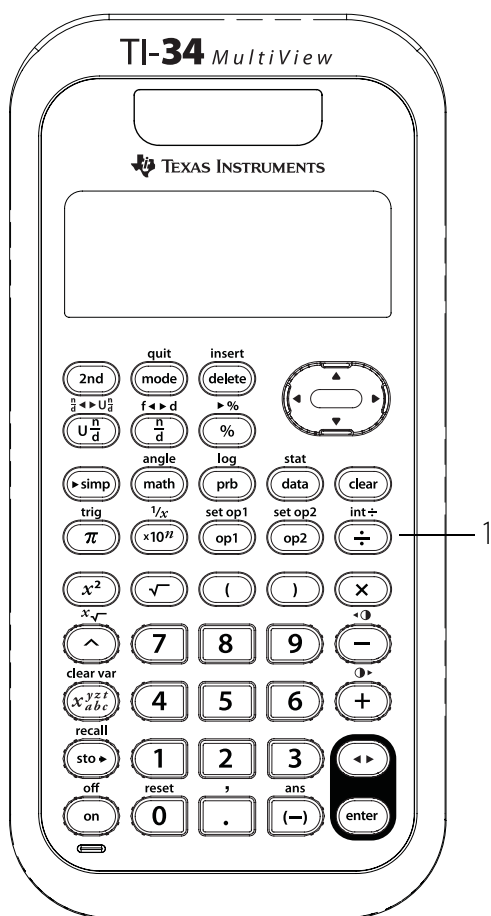


Keys

1. **2nd****[int÷]** divides two positive integers and displays the quotient and the remainder, r.

Notes

- The examples on the transparency masters assume all default settings.
- You can include integer division in an expression, but the remainder may not be displayed as part of the final answer.
- After a calculation with **2nd****[int÷]** is completed, only the quotient from the result is stored in **ans** (last answer). Therefore, if you use the result in another calculation, the remainder is ignored.



Integer divide

You have 123 music CDs. You divide them equally to store on 13 small shelves in your room. How many CDs will be on each shelf? How many will be left over?

2nd [int÷]

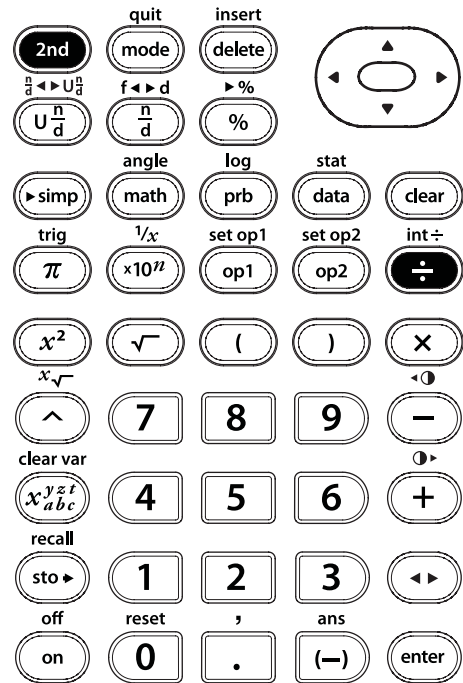
Press

Display

123 **2nd** [int÷]
13

123 int÷ 13 ^{DEG} 9r6

Each shelf will contain 9 CDs, with 6 CDs left over.

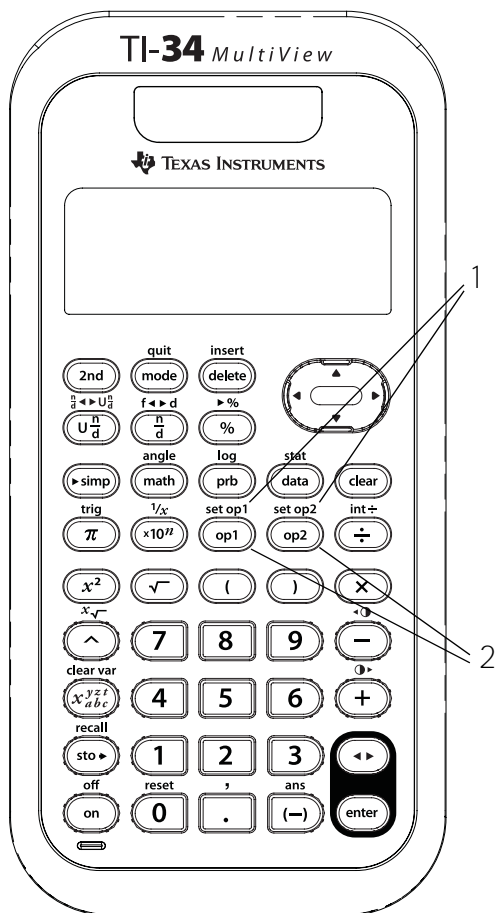


Keys

1. **2nd**[set op1] or **2nd**[set op2] lets you store an operation.
2. **op1** or **op2** recalls and displays the stored operation.

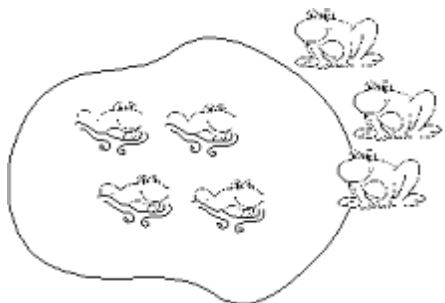
Notes

- The examples on the transparency masters assume all default settings.
- The TI-34 MultiView™ calculator stores two operations, **op1** and **op2**. To store an operation to **op1** or **op2** and recall it:
 1. Press **2nd**[set op1] or **2nd**[set op2].
 2. Enter the operation (any combination of numbers, operators, or menu items and their arguments).
 3. Press **enter** to save the operation to memory.
 4. **op1** or **op2** recalls and displays the operation. The TI-34 MultiView calculator automatically calculates the result and displays the counter and the result. (You do not have to press **enter**.)



Addition as "counting on"

There are 4 frogs in a pond. If 3 more frogs jump into the pond 1 at a time, how many frogs will be in the pond?



2nd [set op1]

op1

Press

Display

Store the operation:

2nd [set op1] **+**

1 **enter**

OP1=+1

Initialize using 4:

4

4

Add 1 one at a time:

op1

4+1

n=1 5

op1

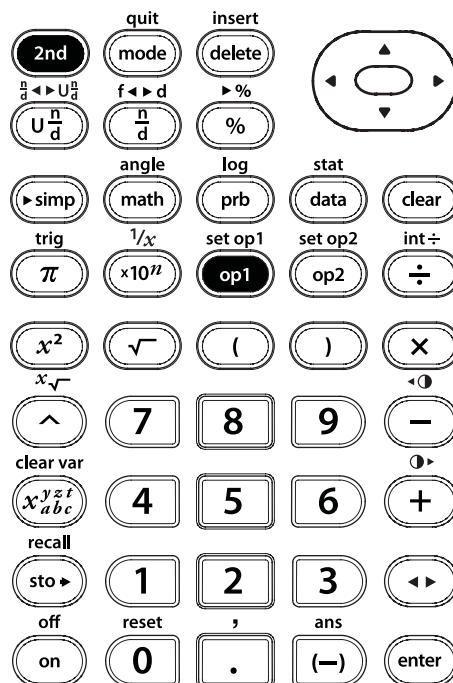
4+1
5+1

n=1 5
n=2 6

op1

4+1
5+1
6+1

n=1 5
n=2 6
n=3 7



Multiplication as "repeated addition" (Continued)

op1

	DEG	↑↓
0+5	n=1	5
5+5	n=2	10
10+5	n=3	15

op1

	DEG	↑↓
0+5	n=1	5
5+5	n=2	10
10+5	n=3	15
15+5	n=4	20

2nd [set op1]

op1

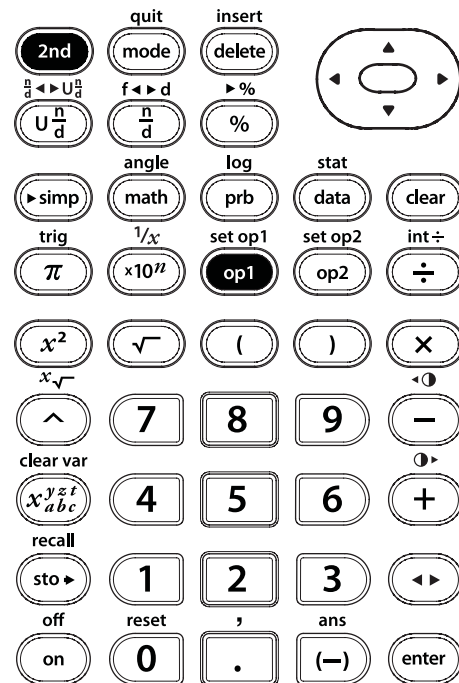
Maria used 20 tiles.

See that 4 groups of 5 is 20.

Multiplication is a shortcut to the repeated addition, $4 \times 5 = 20$. Check this on the calculator.

4 **×** 5 **enter**

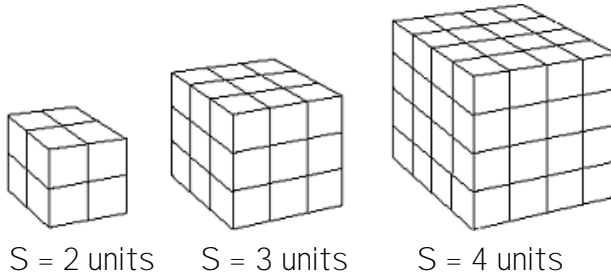
	DEG	↑↓
5+5	n=2	10
10+5	n=3	15
15+5	n=4	20
4×5		20



Using a power as a constant

Use this formula to find the volume of each cube.

$$v = \text{length of side}^3 = S^3 \text{ cubic units}$$



2nd **[set op2]**
op2

Press

Display

2nd **[set op2]**

Press **clear** if necessary to clear a previous operation.

OP2=■ DEG

math 3 **enter**

OP2=3³ DEG

2 **op2**

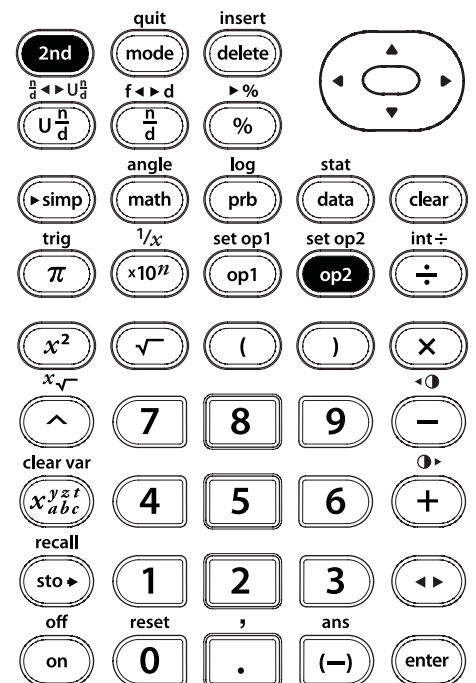
2³ DEG n=1 8

3 **op2**

2³ DEG n=1 8
3³ n=1 27

4 **op2**

2³ DEG n=1 8
3³ n=1 27
4³ n=1 64



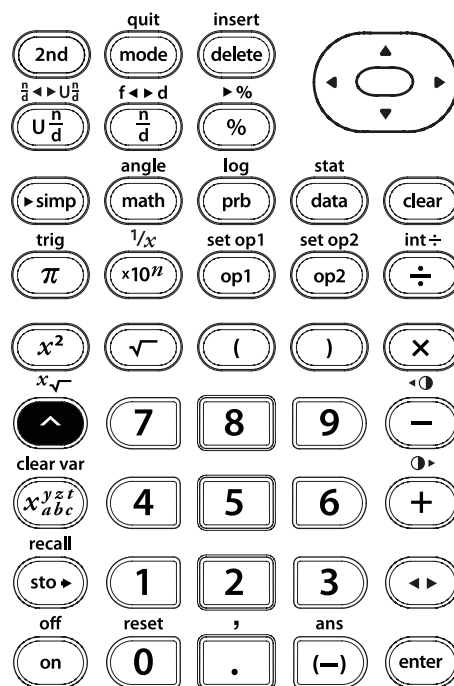
Using a power as a constant (Continued)

The volumes are 8, 27, and 64 cubic units.

Another notation used on a calculator to raise a number to a power is \wedge .

Enter 4 \wedge 3. Notice the different notations:

$$4^3 = 4^{\wedge}3 = 4 \times 4 \times 4 = 64.$$

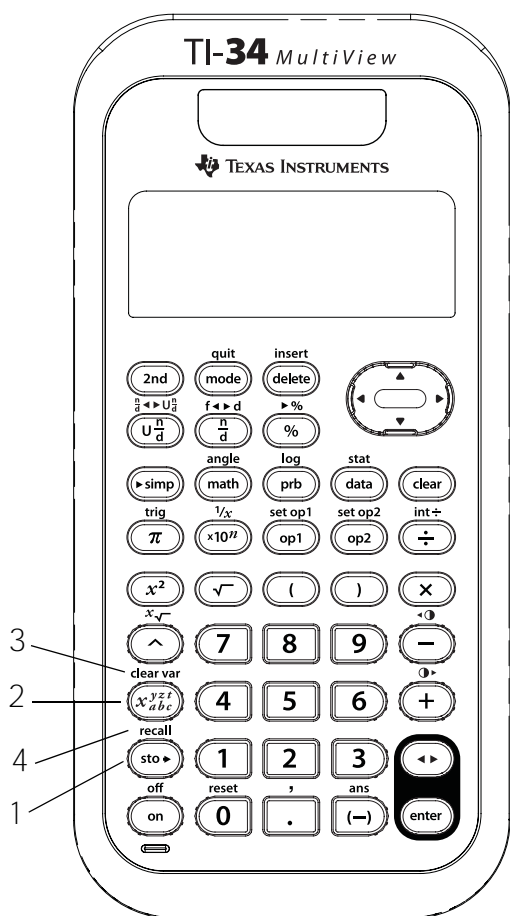


Keys

1. **[sto]** lets you store values to variables. Press **[sto]** to store a variable, and press **x^{yzt}** to select the variable to store. Press **[enter]** to store the value in the selected variable. If this variable already has a value, that value is replaced by the new one.
2. **x^{yzt}** accesses variables. Press this key multiple times to choose **x**, **y**, **z**, **t**, **a**, **b**, or **c**. You can also use **x^{yzt}** to recall the stored values for these variables.
3. **[2nd][clear var]** clears all variables.
4. **[2nd][recall]** displays a menu of the variables **x**, **y**, **z**, **t**, **a**, **b**, and **c**, and lets you view their stored values before pasting to the display.

Notes

- The examples on the transparency masters assume all default settings.
- You can store a number or an expression that results in a number to a memory variable.
- When you select a variable using **x^{yzt}** , the variable name (**x**, **y**, **z**, **t**, **a**, **b**, or **c**) is displayed. The variable name is inserted into the current entry, but the value assigned to the variable is used to evaluate the expression.
- When you select a variable using **[2nd][recall]**, a menu is displayed showing the value of the stored variables. Select the variable by pressing the corresponding menu number. The value assigned to the variable is inserted into the current entry and used to evaluate the expression.
- Resetting the calculator (**[2nd][reset]**) clears all memory variables.



Store, variables

Following are your scores for tests and homework in your math class.

Test scores: 96, 76, 85.

Homework scores: 92, 83, 97, 86.

1. Find your test grade as the average of your test scores.
2. Find your homework grade as the average of your homework scores.
3. Your teacher will compute your final grade as the average of your test grade and your homework grade. What is your final grade? Your teacher will round to the nearest whole number if needed.

Press

$\frac{n}{d}$ 96 + 76
 + 85 \downarrow 3 \rightarrow
sto x^{yzt}
enter

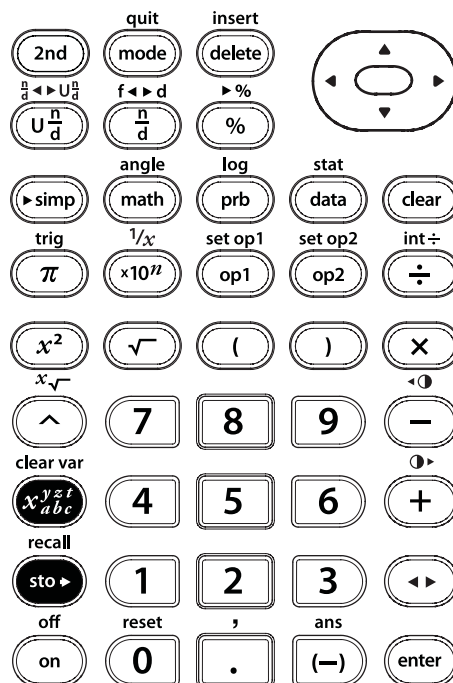
Display

$$\frac{96 + 76 + 85}{3} \rightarrow x$$

$$85 \frac{2}{3}$$

sto \rightarrow

x^{yzt}
 abc



Store, variables (Continued)

Press

Display

$\frac{n}{d}$ 92 + 83
 + 97 + 86
 ▾ 4 ▸ **sto ▶**
 x^{yzt} x^{yzt} **enter**

DEG $\frac{92+83+97+86}{4} \rightarrow y$
 $\downarrow 89 \frac{2}{4}$

$\frac{n}{d}$ x^{yzt} +
 x^{yzt} x^{yzt} ▾ 2
 ▸ **enter**

DEG $\frac{x+y}{2}$
 $\downarrow 87 \frac{14}{24}$

math ▸ 2 ▾
enter **2nd** [,] 0
) **enter**

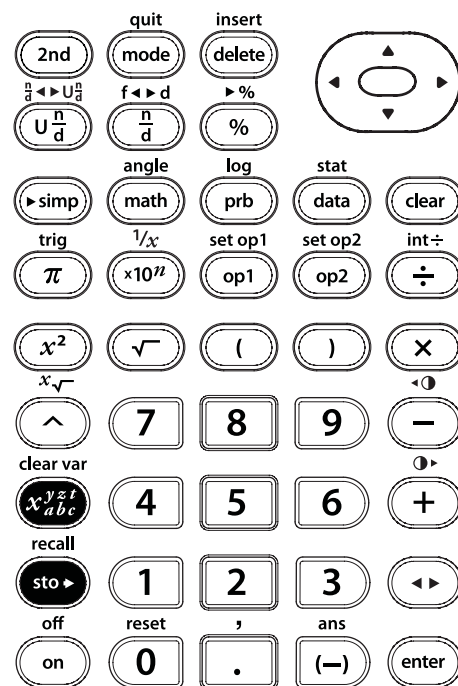
DEG $\frac{\cdot}{2}$ $\downarrow 87 \frac{14}{24}$
 round(87 $\frac{14}{24}$, 0)
 88

Your final grade is 88 rounded to the nearest whole number.

Note: \downarrow next to the resulting fraction indicates the fraction can be simplified using **▶simp**. This was not necessary for the solution to this problem.

sto ▶

x^{yzt}
 abc



Store, recall

You are going to ship a gift to each of two friends. You see the gifts at two web sites for the same price. The shipping charges are different at each site. The packages weigh 4.5 pounds and 3.2 pounds. Store A will ship a package for \$2 plus \$1.40 per pound. Store B will ship the package for \$3 plus \$1.10 per pound. Which store will charge the least for shipping each gift?

Press

Display

4 \cdot 5 **sto**
 x^{yzt} **enter**

4.5 \rightarrow x 4.5

2 $+$ x^{yzt} (1
 \cdot 40) **enter**

4.5 \rightarrow x 4.5
 2+x(1.40) 8.3

3 $+$ x^{yzt} (1
 \cdot 10) **enter**

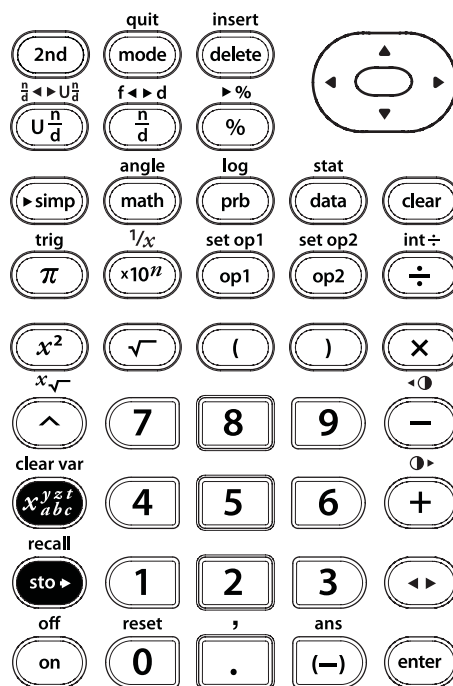
4.5 \rightarrow x 4.5
 2+x(1.40) 8.3
 3+x(1.10) 7.95

Store A charges \$8.30 and store B charges \$7.95. Store B charges less to ship the gift that weighs 4.5 pounds.

sto \rightarrow

x^{yzt}
 abc

2nd [recall]



Store, recall (Continued)

3 \square 2 **sto**
 x^{yzt} **enter**

4.5+x	DEG	+	4.5
2+x(1.40)			8.3
3+x(1.10)			7.95
3.2+x			3.2

\uparrow \uparrow \uparrow \uparrow
 \uparrow \uparrow **enter**

2+x(1.40)	DEG	↕	8.3
3+x(1.10)			7.95
3.2+x			3.2
2+x(1.40)			

enter

2+x(1.40)	DEG	↕	8.3
3+x(1.10)			7.95
3.2+x			3.2
2+x(1.40)			6.48

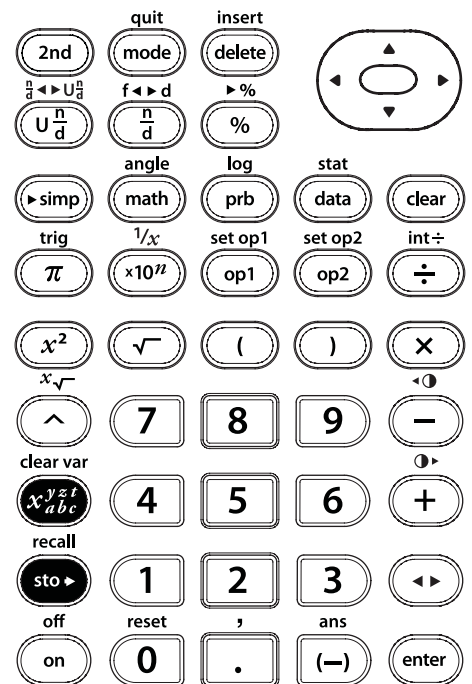
\uparrow \uparrow \uparrow \uparrow
 \uparrow \uparrow **enter**

3+x(1.10)	DEG	↕	7.95
3.2+x			3.2
2+x(1.40)			6.48
3+x(1.10)			6.52

enter

Store A charges \$6.48 and store B charges \$6.52. Store A charges less to ship the gift that weighs 3.2 pounds.

sto
 x^{yzt}
2nd **[recall]**



Store, recall (Continued)

Press

Display

2nd **[recall]**
enter **+**
2nd **[recall]** **▼**
enter **+**
2nd **[recall]** **▼**
▼ **enter** **enter**

```

DEG  ←→
6.98+9.98+z      16.96
27.96+23.94+16.▶ 68.86
    
```

sto ▶
2nd **[recall]**

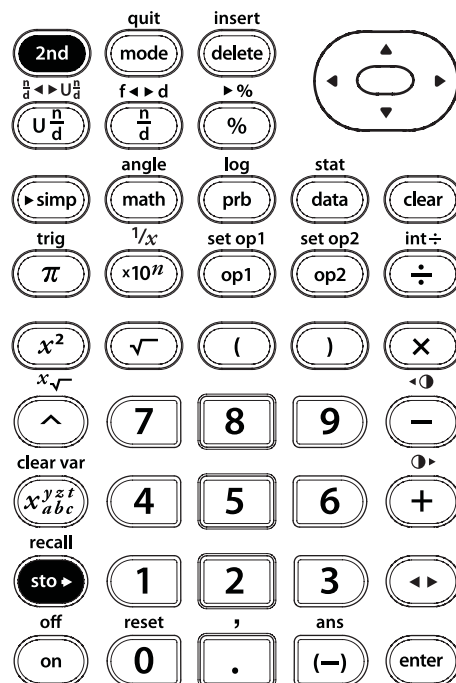
You spent:

\$27.96 at shop A,

\$23.94 at shop B,

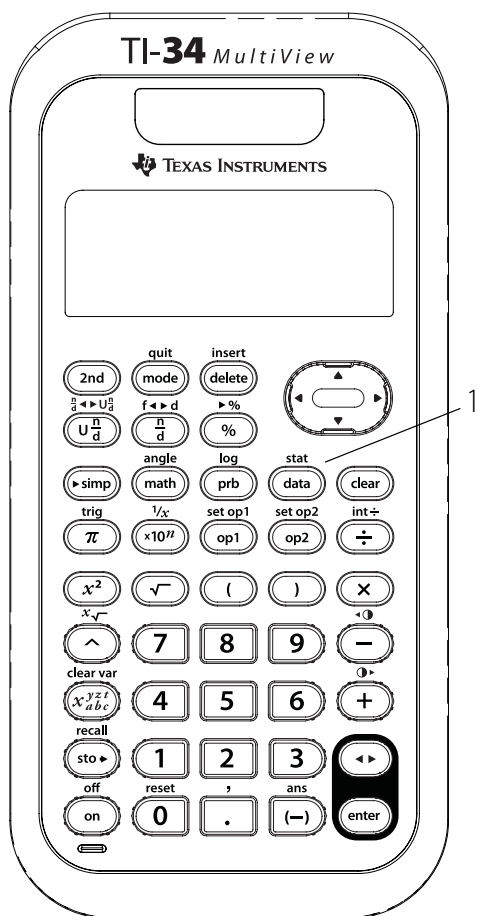
\$16.96 at shop C.

You spent \$68.86 at all three outlet shops.



Keys

1. **[data]** displays a Data editor with three lists. Each list can contain up to 42 items. To enter data, navigate to a list and enter a number. Press the arrow keys to navigate list elements.



Notes

- The examples on the transparency masters assume all default settings.
- The “Converting fractions to decimals” transparency supports the activity: “Next stop — fraction terminal.”
- List conversions accept $f \leftrightarrow d$, $\% \rightarrow$ Simp, and $n/d \leftrightarrow Un/d$.
- If a conversion is entered to a list, the conversion list automatically updates if a referenced list element is updated.
- When a conversion is deleted, the data remains for use. The data is no longer updated.
- Pressing **[data]** from the Data editor screen opens menus with options to clear lists or to enter and manage conversions.
- Pressing **[sto <->]** from a list in the Data editor is a shortcut that takes you straight to the author line to enter or edit a conversion.
- Pressing **[data]** while entering or editing a conversion opens a menu containing list names you can use in the conversions.
- To edit a conversion, press **[sto <->]** or **[data]** \downarrow 1 from anywhere in the list that contains the conversion. Edit the conversion and press **[enter]** to accept the changes. Press **[clear]** to delete the conversion.
- Pressing **[clear]** backs up screens within the data editor.
- Pressing **[2nd][quit]** exits the Data editor and returns you to the Home screen.
- In the Data editor, scientific notation displays as E to conserve space but still show the magnitude of a number.
Example: 2×10^3 appears as 2E3.

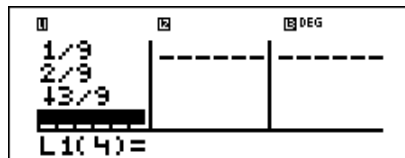
Converting fractions to decimals

Find the decimal representation of $\frac{1}{9}$, $\frac{2}{9}$, and $\frac{3}{9}$. From this pattern, can you predict the decimal representation for $\frac{7}{9}$? Check your answer using the lists on the calculator.

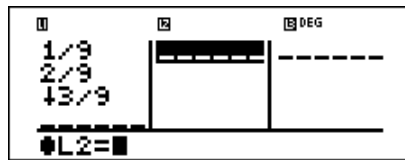
Press

Display

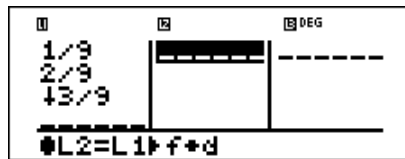
data 1 $\frac{n}{d}$ 9 \downarrow
 2 $\frac{n}{d}$ 9 \downarrow 3 $\frac{n}{d}$
 9 \downarrow



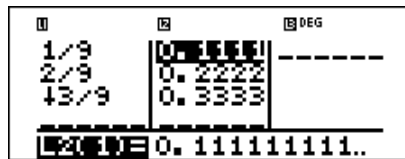
\rightarrow **data** \rightarrow 1



data 1 **2nd**
[f < > d]



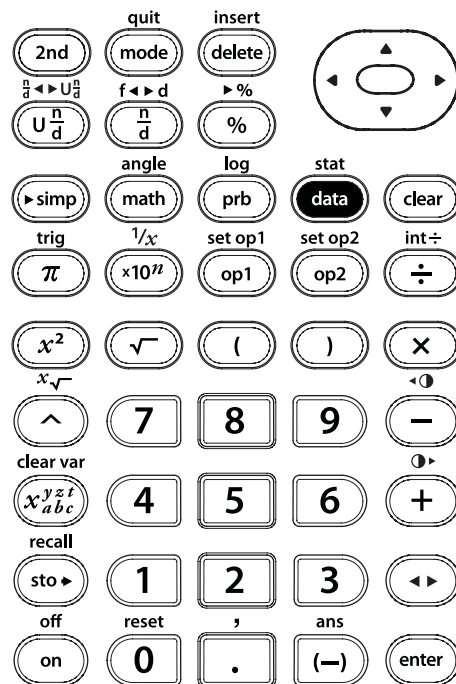
enter



Input the rest of the fractions in L1 to test the pattern. Notice L2 updates as you enter in L1. The pattern shows

data

2nd **[f < > d]**



Converting fractions to decimals (Continued)

that the decimal representation is a repetition of the number in the

numerator for ninths. Entering $\frac{4}{9}$, $\frac{5}{9}$,

$\frac{6}{9}$, and finally $\frac{7}{9}$ validates the

statement. Notice the last digit in the list is rounded, so $0.777777777\dots$ is shown rounded to 0.7778 .

Remember that $0.777777777\dots$ is written as $0.\overline{7}$.

Converting fractions to decimals to percents

The same quantity can have different number representations.

Sam and his friends ate some cake at his birthday party.

Sam ate $\frac{1}{4}$ of the cake.

Maria ate $\frac{2}{8}$ of the cake.

Leila ate $\frac{1}{2}$ of the cake.

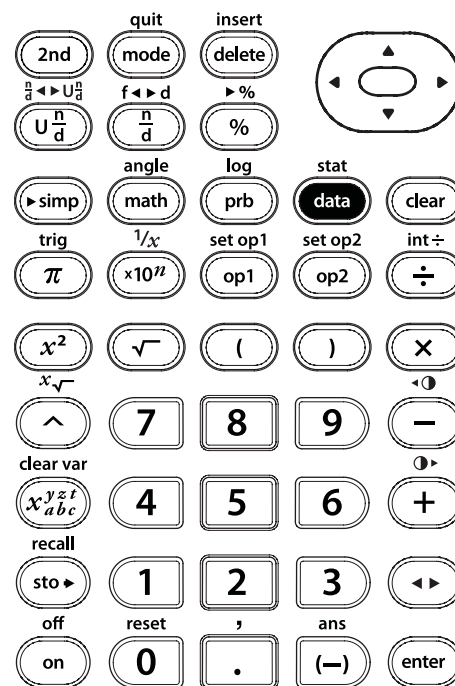


Find the amount of cake each person ate in the form of a decimal and a percent. Was there any cake left at Sam's birthday party?

data

2nd [f ◀ ▶ d]

2nd [▶ %]



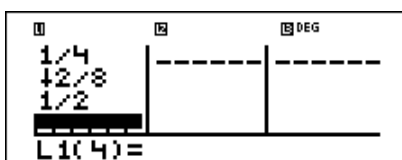
Converting fractions to decimals to percents

Use the percent form of the amount of cake eaten to justify your answer.

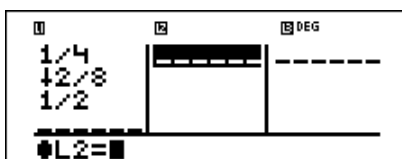
Press

Display

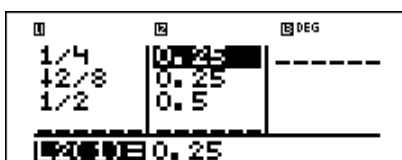
data 1 $\frac{n}{d}$ 4 \downarrow
 2 $\frac{n}{d}$ 8 \downarrow 1 $\frac{n}{d}$
 2 \downarrow



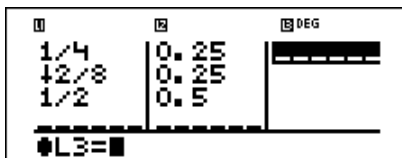
\rightarrow **data** \rightarrow 1



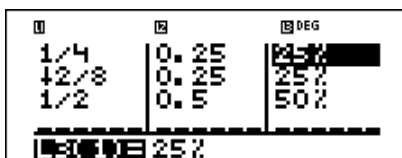
data 1
2nd [f◀▶d]
enter



\rightarrow **data** \rightarrow 1

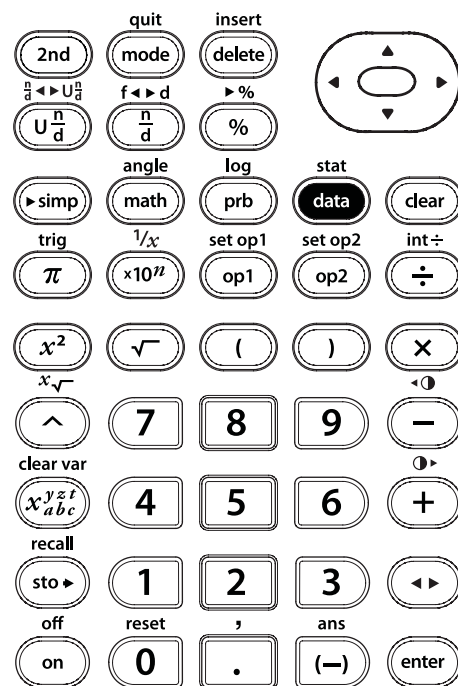


data 1 **2nd** [▶%]
enter



Since $25\% + 25\% + 50\% = 100\%$,
 Sam and his friends ate the entire
 cake!

data
2nd [f◀▶d]
2nd [▶%]



Keys

1. **[data]** lets you enter data points (x for **1-Var** stats; x and y for **2-Var** stats). (See Chapter 12, Data editor and list conversions, for more details on **[data]**.)

2. **[2nd][stat]** displays a menu from which you can select **1-Var**, **2-Var** or **StatVars**.

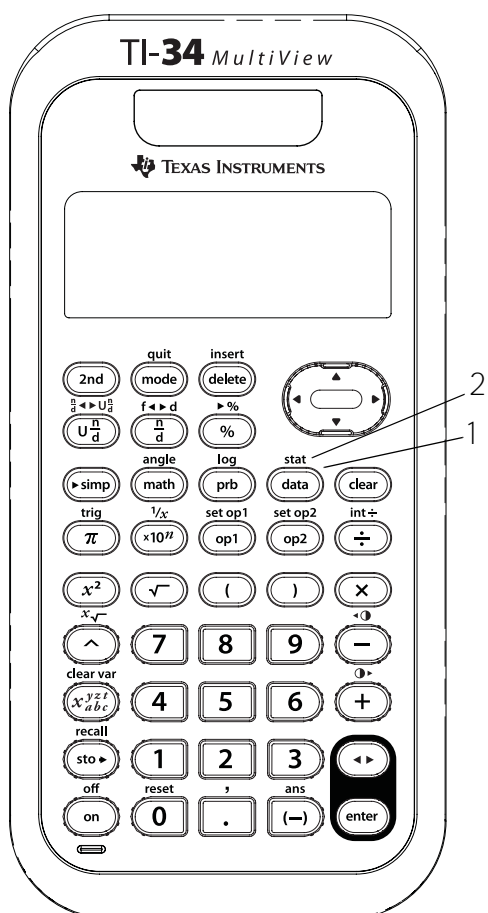
1-Var Analyzes data from 1 set of data with 1 measured variable—x.

2-Var Analyzes paired data from 2 sets of data with 2 measured variables—x, the independent variable, and y, the dependent variable.

StatVars This option appears only after you have calculated 1-var or 2-var stats. Displays the menu of variables with their current values.

StatVars menu:

n	Number of x (or x,y) data points.
\bar{x} or \bar{y}	Mean of all x or y values.
Sx or Sy	Sample standard deviation of x or y.
σ_x or σ_y	Population standard deviation of x or y.
Σx or Σy	Sum of all x values or y values.
Σx^2 or Σy^2	Sum of all x^2 values or y^2 values.
Σxy	Sum of the product of x and y for all x-y pairs in the 2 lists.
a	Linear regression slope.
b	Linear regression y-intercept.
r	Correlation coefficient.
x' (2-var)	Uses a and b to calculate predicted x value when you input a y value.
y' (2-var)	Uses a and b to calculate predicted y value when you input an x value.



Notes

- The examples on the transparency masters assume all default settings.
- You can change data points by going to the Data editor, navigating to the data element, and changing the value entered.
Note: You must then recalculate 1-Var or 2-Var stats to display the StatVars option.
- Non-integer frequency elements are valid. This is useful when entering frequencies expressed as percentages or parts that add up to 1. However, the sample standard deviation, Sx, is undefined for non-integer frequencies, and Sx = Error is displayed for that value. All other statistics are displayed.

Entering 1-var stat data

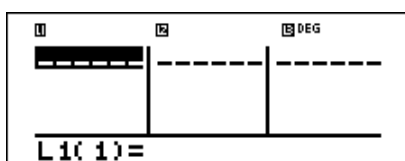
Five students took a math test.
Using their scores, enter the data
points: 85, 85, 97, 53, 77.

Use L1 for the scores and L2 for the
frequency of the scores.

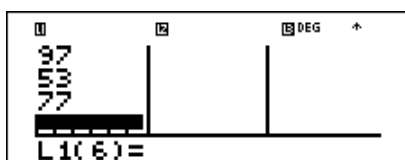
Press

Display

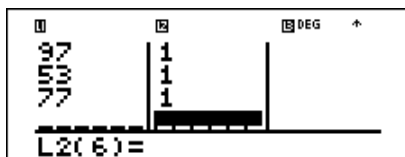
data



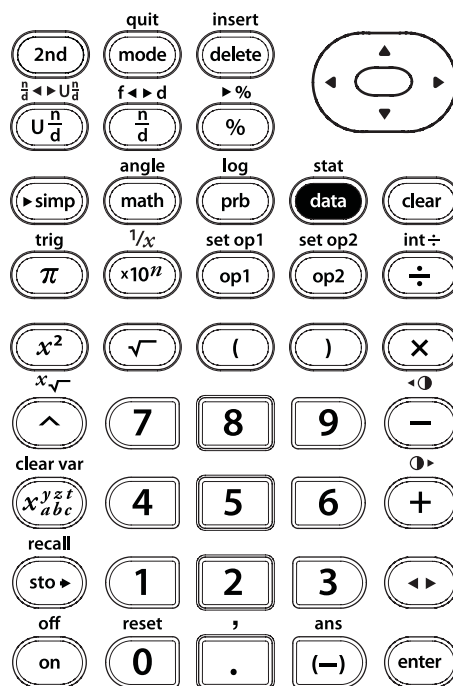
85 \blacktriangledown 97 \blacktriangledown 53
 \blacktriangledown 77 \blacktriangledown



\blacktriangleright 2 \blacktriangledown 1 \blacktriangledown 1
 \blacktriangledown 1 \blacktriangledown



data



Viewing the statistics

Find the number of data points (n), the mean (\bar{x}), the sample standard deviation (Sx), the population standard deviation (σx), the sum of the scores (Σx), and the sum of the squares (Σx^2).

2nd **[stat]**
[data]

Press

Display

2nd **[stat]**

```

DEG
STATS
1:1-Var Stats
2:2-Var Stats
    
```

1 **[down]** **[right]** **[right]** **[enter]**

```

DEG
1-VAR STATS
DATA: [L1] L2 L3
FRQ: ONE L1 [L2] L3
CALC
    
```

[enter]

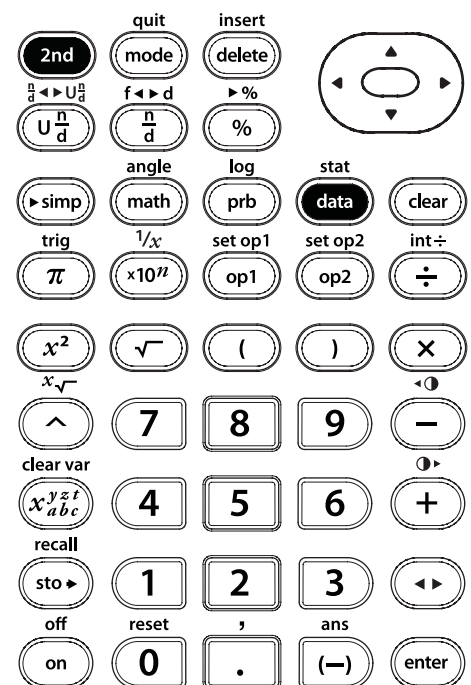
```

DEG
1-Var: L1, L2
1:n=5
2:x=79.4
3:Sx=16.39512123
    
```

[down] **[down]** **[down]** **[down]** **[down]**

```

DEG
1-Var: L1, L2
4:σx=14.66424222
5:Σx=397
6:Σx²=32597
    
```



Removing data points

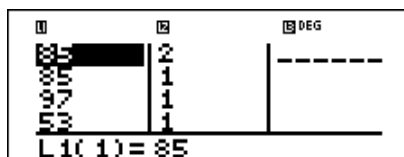
Drop the lowest test score by editing the data in L1 in the data editor.

Make sure you update the frequency list, L2, if needed. Find the new mean (\bar{x}). Finally, clear the data from all of the lists.

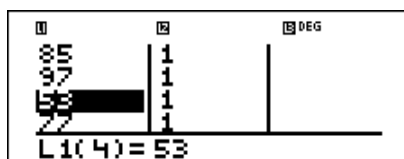
Press

Display

data



⏴ ⏴

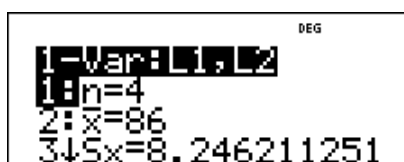


delete ⏴ **delete**

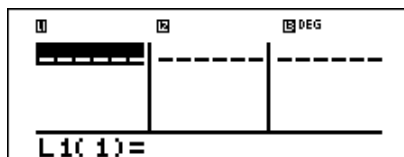
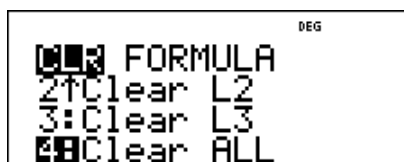


2nd **[stat]** 1

⏴ ⏴ **enter**

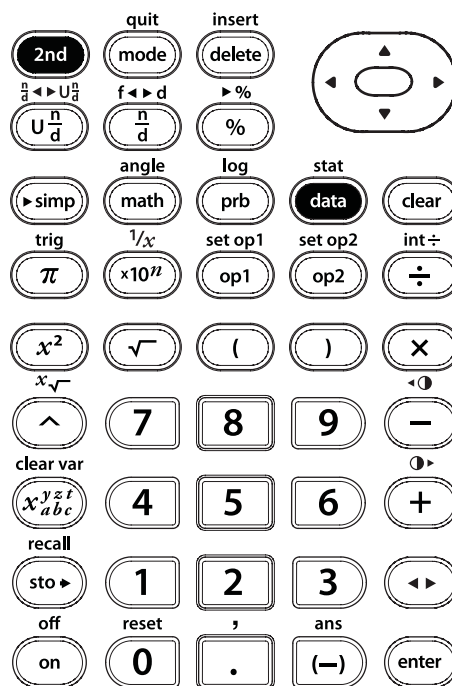


data **data** 4



2nd **[stat]**

data



Entering 2-var stat data

The table below shows the number of pairs of athletic shoes sold by a small shoe store. The table shows the total number of pairs of shoes sold for two months and the total number of pairs of Brand A shoes sold during the same months. Enter this data in the data editor.

Month	Total No.(x)	Brand A (y)
April	58	35
May	47	28

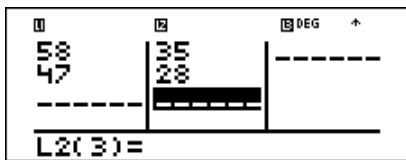
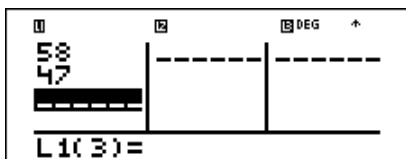
Press

Display

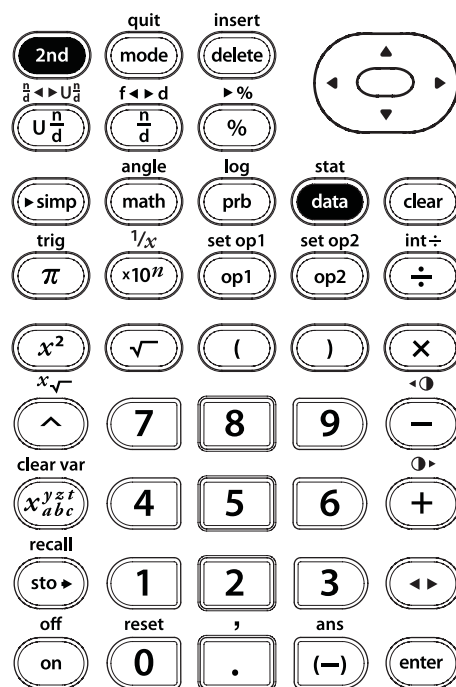
data 58 \blacktriangledown

47 \blacktriangledown

\blacktriangleright 35 \blacktriangledown 28 \blacktriangledown



2nd **[stat]**
data



Viewing the statistics

Assuming that the rate of shoe sales is a constant, you can use two data points to predict the June sales of Brand A if you know the total June sales. Use a line of best fit to find the June sales of Brand A if the store sells a total of 32 pairs in June. Hint: Find $y'(32)$.

2nd **[stat]**

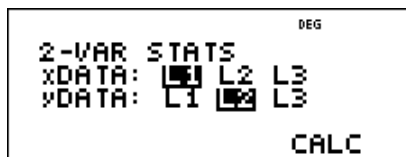
Press

Display

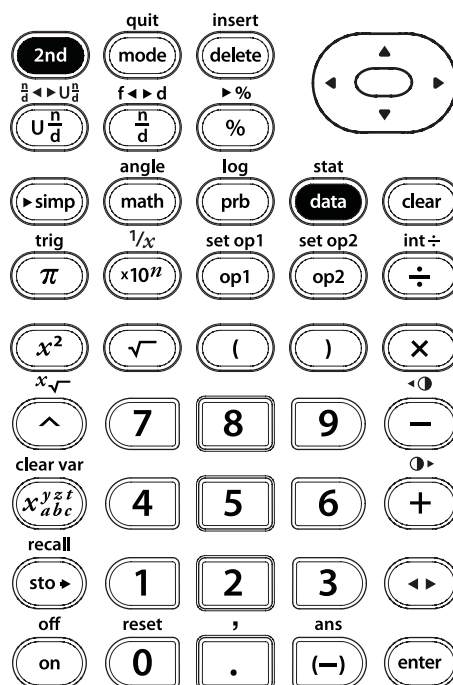
2nd **[stat]**



2 \downarrow \downarrow **enter**



(Continued)



Keys

1. **prb** displays two submenus, **PRB** and **RAND**.

PRB menu:

nPr Calculates the number of possible permutations of n items taken r at a time.

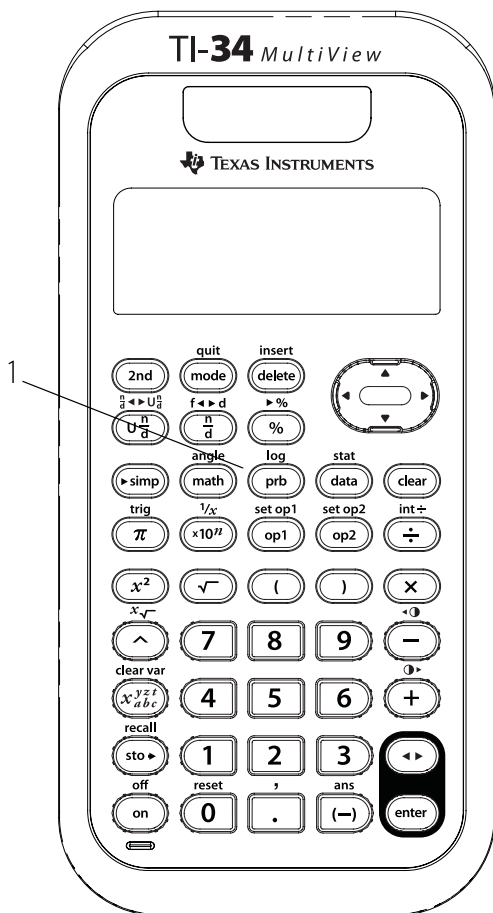
nCr Calculates the number of possible combinations of n items taken r at a time.

! Calculates the factorial of a number.

RAND menu:

rand Generates a random number between 0 and 1.

randint(Generates a random integer between 2 integers, A and B, where $A \leq \text{Randint} \leq B$.



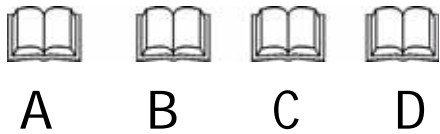
Notes

- The examples on the transparency masters assume all default settings.
- A permutation is an arrangement of objects in which the order is important, as in a race.
- A combination is an arrangement of objects in which the order is not important, as in a hand of cards.
- A factorial is the product of all the positive integers from 1 to n , where n is a positive whole number ≤ 69 .
- You can store (**sto**) an integer to **rand** just as you would store values to memory variables. If you wish to control the random numbers generated by all calculators in your class, have all students store the same number to **rand**; the sequence of random numbers is then the same on all of the calculators, if desired.
- For **randint**, use a comma to separate the 2 numbers that you specify.

Combination (nCr)

You have space for 2 books on your bookshelf. You have 4 books to put on the shelf. Use this formula to find how many ways you could place the 4 books in the 2 spaces.

$$4 C 2$$



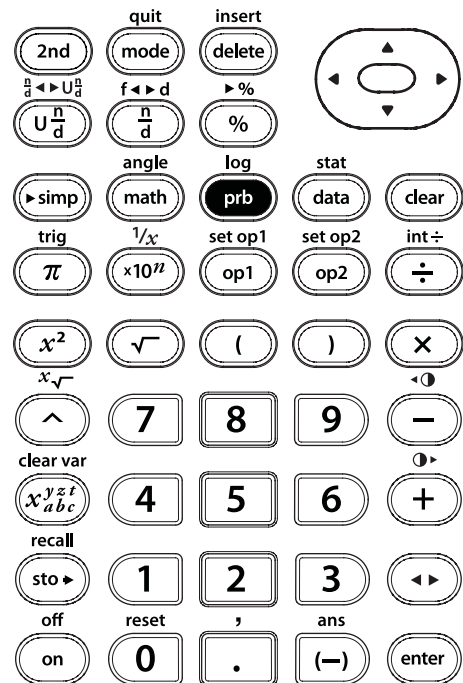
AB and BA
count as only 1
combination

AB	AC	AD
BA	BC	BD
CA	CB	CD
DA	DB	DC

Press	Display
4 prb	RAND DEG 1:nPr 2:nCr 3:1
enter 2 enter	4 nCr 2 DEG \uparrow 6

There are 6 unique combinations of 2 books chosen from 4 different books.

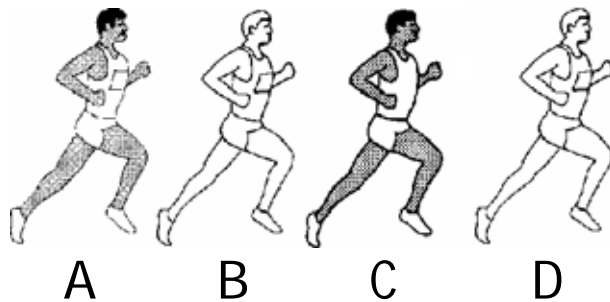
prb



Permutation (nPr)

Four different people are running in a race. Use this formula to find how many different 1st place and 2nd place outcomes can occur.

$$4 P 2$$



AB and BA
count as 2
permutations

AB	AC	AD
BA	BC	BD
CA	CB	CD
DA	DB	DC

Press

4 **prb**

Display

```

DEG
PRB RAND
1:nPr
2:nCr
3:!
    
```

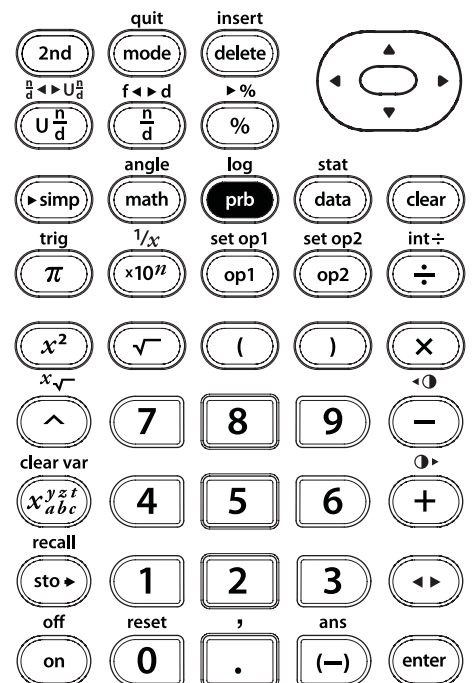
enter 2 **enter**

```

DEG
4 nPr 2 12
    
```

There are 12 different permutations for the 1st and 2nd place results of the race.

prb



Factorial (!)

State license plates contain different numbers and letters to create a unique identification number for each car. Make your own license plates each containing a 4-digit number. Using the digits 1, 3, 7, and 9 without repetition, how many 4-digit numbers can you form?

You can use a tree diagram to create the following list of license plates. Are you sure you found them all?

Hint: Find 4!


1379	1397	1739	1793	1937	1973
3179	3197	3719	3791	3917	3971
7139	7193	7319	7391	7913	7931
9137	9173	9317	9371	9713	9731

Press

4 **prb**  

enter **enter**

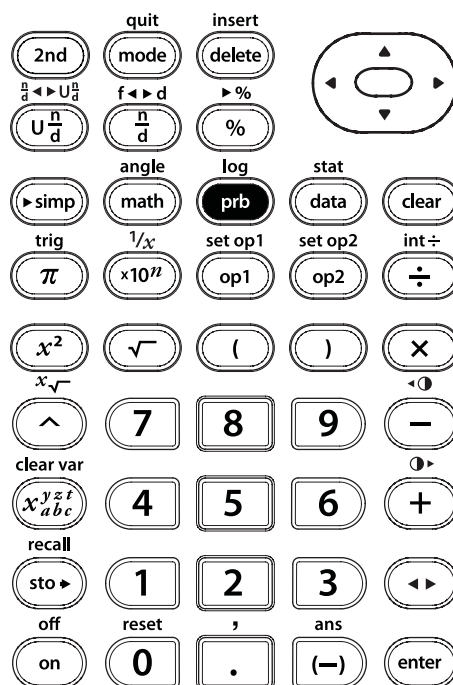
Display

 RAND
1:nPr
2:nCr
3:!

4! 24

You can make 24 unique license plates using 1, 3, 7 and 9 without repetition.

prb



Random (rand)

Generate a sequence of random numbers.

prb

Press

Display

prb 

DEG
PRB  
1:rand
2:randint(
)

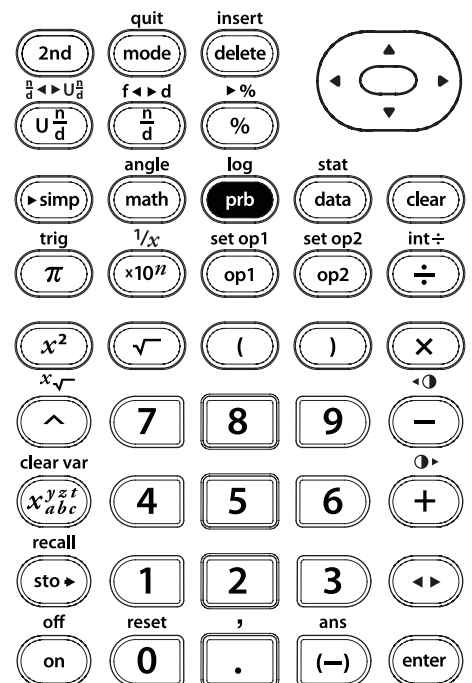
enter **enter**

DEG ↑
rand
0.390926039

enter

DEG ↑
rand 0.390926039
rand 0.514541293

Results will vary.



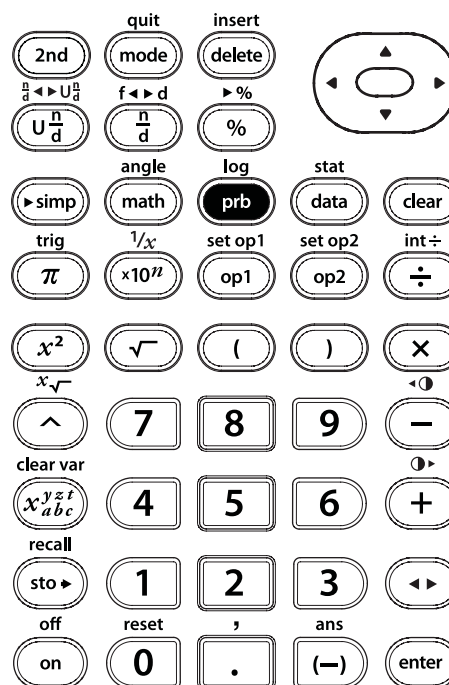
Random (rand)

Set 1 as the current seed and generate a sequence of random numbers.

prb

Press	Display
1 sto ▶ prb ▶ enter	1→rand DEG ↑
enter	1→rand DEG ↑ 1
prb ▶ enter	1→rand DEG ↑ 1 rand■
enter	1→rand DEG ↑ 1 rand 0.000018633
enter	rand DEG ↑ 0.000018633 rand 0.745579721

Note: Your results will be the same as this example if you use the same number to store to random seed.



Keys

1. **[2nd][log]** displays the choice of two submenus, LOG and LN.

The LOG menu has the following two choices:

log(calculates the common logarithm (base 10).

10[^] calculates 10 raised to the power of the value entered as the exponent (common antilogarithm).

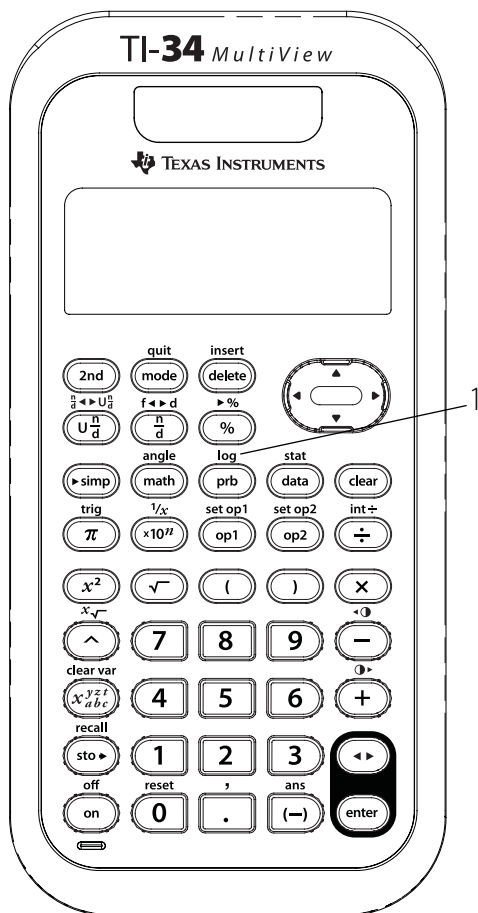
The LN menu has the following two choices:

ln calculates the natural logarithm (base e, where $e \approx 2.718281828459$).

e[^] calculates e raised to the power of the value entered as the exponent (natural antilogarithm).

Notes

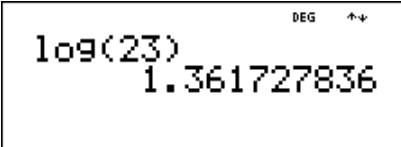
- The examples on the transparency masters assume all default settings.
- **[]** ends a logarithmic function.
- In MathPrint™ mode, press **[]** to exit the exponent function.

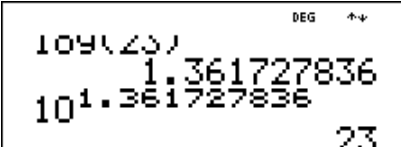


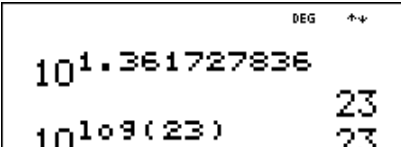
Common logarithm and antilogarithm

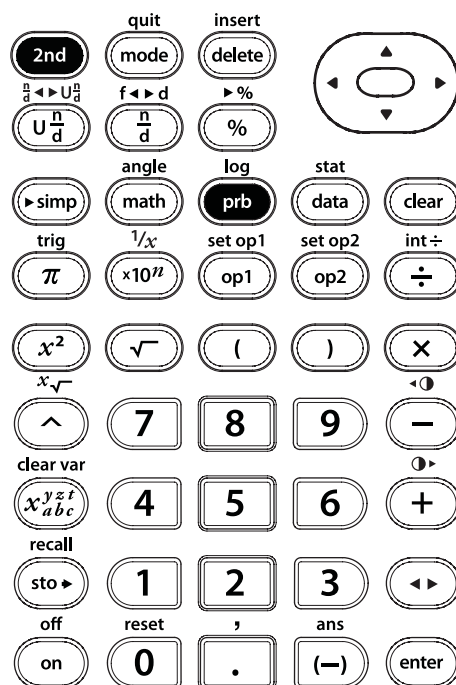
Illustrate the inverse relationship of log and 10^{\wedge} by finding $\log(23)$ and then raise 10 to the result. Notice that 23 returns as the answer.

2nd **[log]**

Press	Display
2nd [log] 1	
23) enter	

2nd [log] 2	
▲ enter ▶	
enter	

2nd [log] 2	
2nd [log] 1	
▲ enter) ▶	
enter	



Natural logarithm and antilogarithm

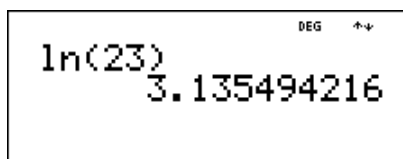
Illustrate the inverse relationship of \ln and $e^{}$ (antiln or exp) by finding $\ln(23)$ and then raise e to the result. Notice that 23 returns as the answer.

2nd **[log]**

Press

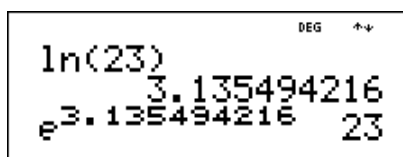
2nd **[log]** \blacktriangleright 1
23 **)** **enter**

Display



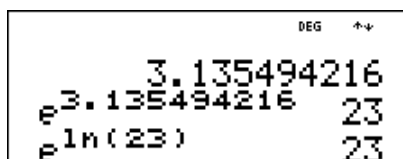
ln(23)
3.135494216

2nd **[log]** \blacktriangleright 2
 \blacktriangleleft **enter** \blacktriangleright
enter

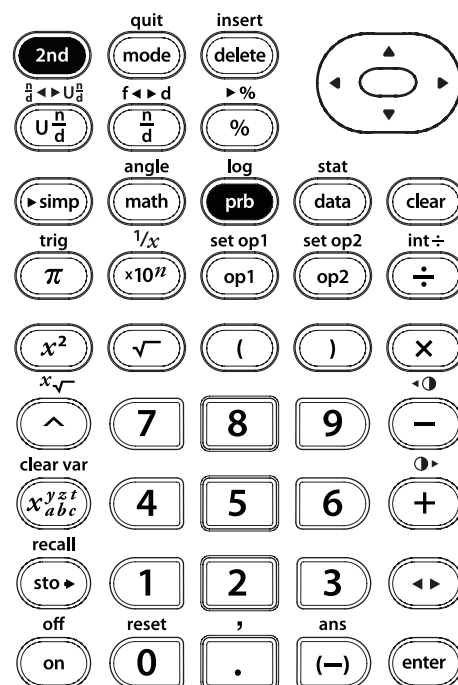


ln(23)
3.135494216
 $e^{3.135494216}$ 23

2nd **[log]** \blacktriangleright 2
2nd **[log]** \blacktriangleright 1
 \blacktriangleleft **enter** **)** \blacktriangleright
enter

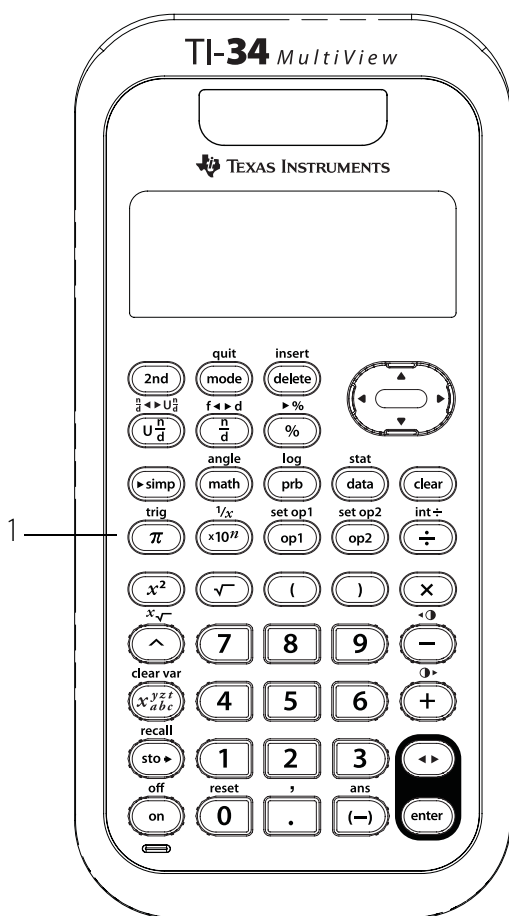


3.135494216
 $e^{3.135494216}$ 23
 $e^{\ln(23)}$ 23



Keys

1. π displays the value of pi rounded to 10 digits (3.141592654).



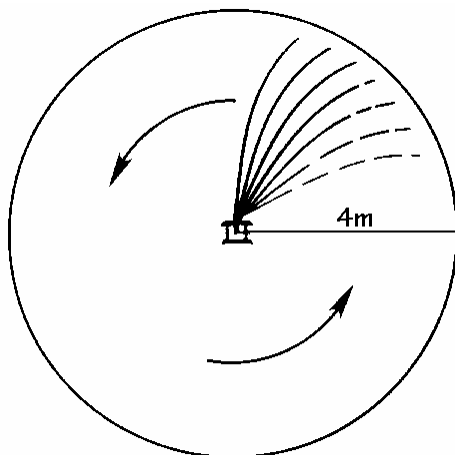
Notes

- The examples on the transparency masters assume all default settings.
- In MathPrint mode™, include a decimal number inside the expression with pi to receive a decimal output. For example, if you enter 2π , the TI-34 MultiView™ calculator displays 2π . If you enter 2.0π , the calculator displays the decimal version, 6.283185307.
- In MathPrint mode, you can use $\left[\right]$ to toggle the answer between decimal and pi formats.
- In Classic and DEG mode, the TI-34 MultiView calculator displays calculations with π as a decimal approximation.
- Internally, pi is stored to 13 digits (3.141592653590).
- You can select the number of decimal places from the mode menu.

Area

Use this formula to find how much of a lawn would be covered by the sprinkler. Round your answer to the nearest whole number, and then return to floating decimal mode.

$$A = \pi r^2 = \pi \times 4^2 \text{ square meters}$$



Press

Display

π \times 4 x^2
enter

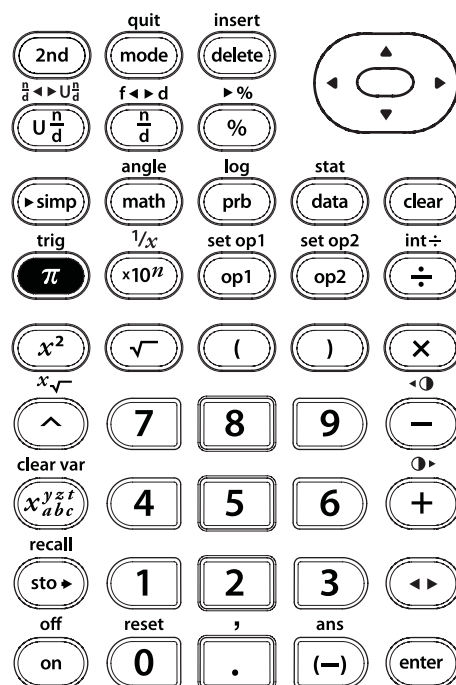
$\pi \times 4^2$ DEG $\uparrow \downarrow$
16 π

mode \downarrow \downarrow \rightarrow
enter

FIX DEG
MODE RAD
MODE SCI
FLOAT 123456789
CLASSIC ~~XXXXXXXXXX~~
↓

clear $\leftarrow \rightarrow$

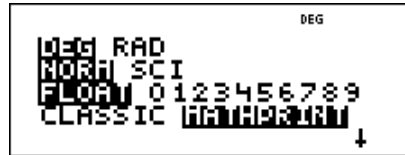
FIX DEG $\uparrow \downarrow$
 $\pi \times 4^2$ 16 π
16 π 50



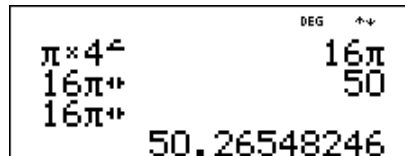
Area (continued)

mode  

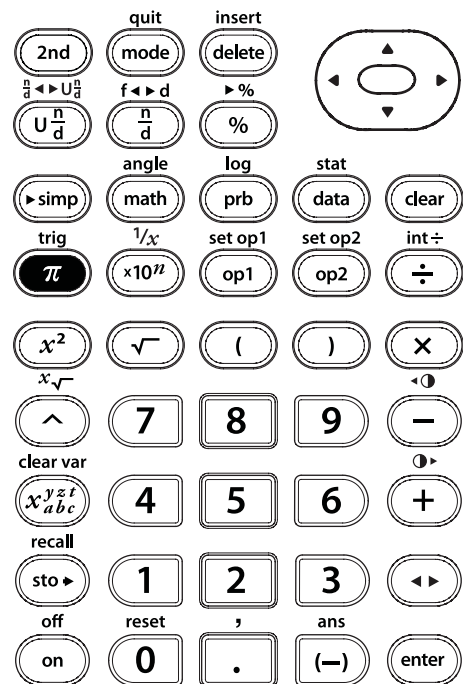
enter



clear **enter**



The area that will be covered by the sprinkler is approximately 50 square meters.

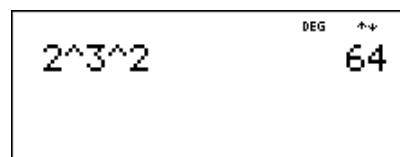


Keys

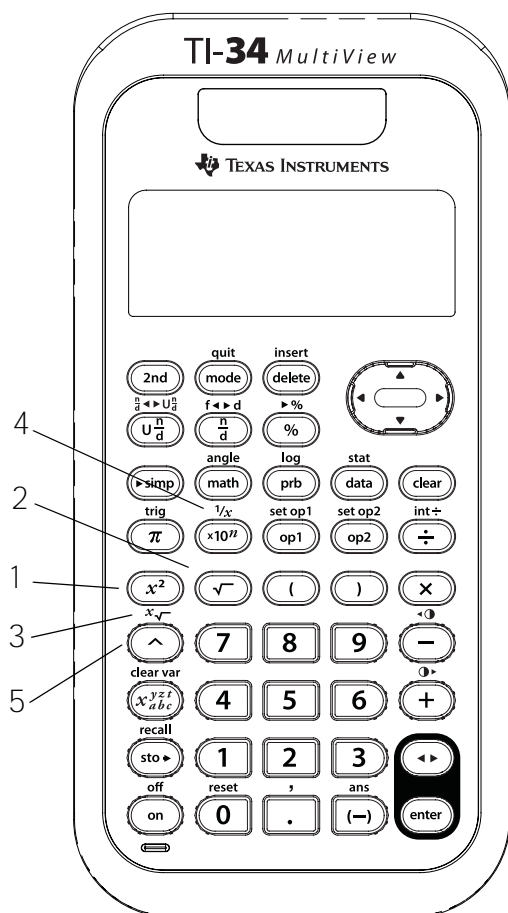
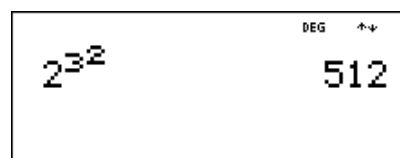
1. x^2 squares the value.
2. $\sqrt{}$ calculates the square root.
3. $2^{nd}[x\sqrt{}]$ calculates the specified root (x) of the value.
4. $2^{nd}[1/x]$ calculates the reciprocal.
5. \wedge raises a value to a specified power.

Notes

- The examples on the transparency masters assume all default settings.
- To use \wedge , enter the base, press \wedge , and then enter the exponent.
- In Classic mode, exponentiation using \wedge is evaluated from left to right. The expression 2^3^2 is evaluated as $(2^3)^2$, with a result of 64.



- In MathPrint™ mode, exponentiation using \wedge is evaluated from right to left. The expression 2^3^2 is evaluated as $2^{(3^2)}$, with the result of 512.



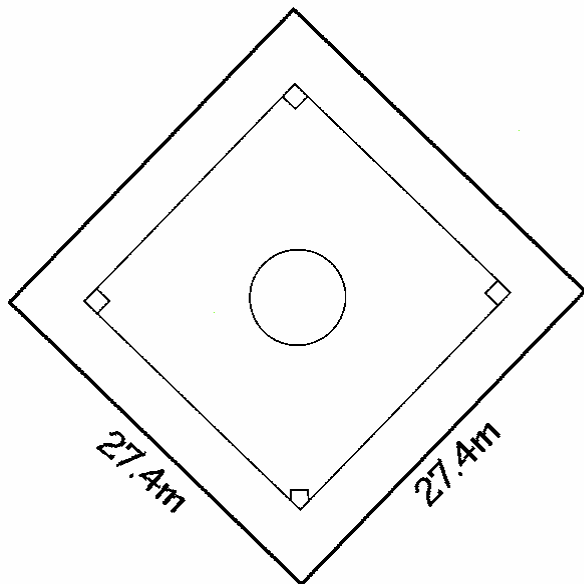
- The result of calculations with \wedge must be within the range of the TI-34 MultiView™ calculator.
- The TI-34 MultiView calculator evaluates expressions entered with x^2 from left to right in both Classic and MathPrint modes. Pressing $3 [x^2] [x^2]$ calculates as $(3^2)^2 = 81$.
- The base and the exponent may be either positive or negative. Refer to Domain under Error Messages in Appendix C for restrictions.
- Use parentheses where needed to obtain the desired results.

Example: $-5^2 = -25$
 $(-5)^2 = 25$

Squares

Use this formula to find the size of the tarpaulin needed to cover the entire baseball infield.

$$A = x^2 = 27.4^2 \text{ square meters}$$



Press

27 \cdot 4
 x^2 **enter**

or

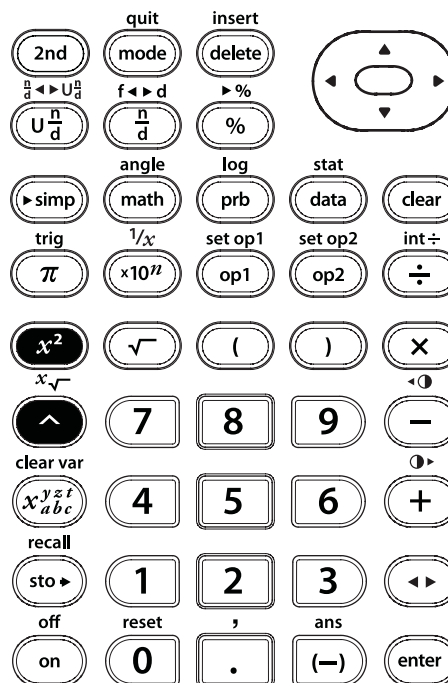
27 \cdot 4 \wedge
 2 **enter**

Display

27.4² 750.76 DEG \leftrightarrow

27.4² 750.76 DEG \leftrightarrow

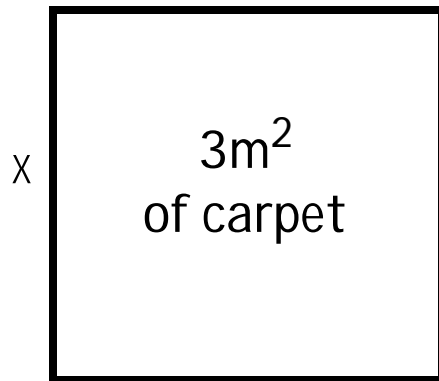
The area of the tarpaulin is 750.76 square meters.



Square roots

Use this formula to find the length of the side of a square clubhouse if 3m^2 of carpet would cover the floor. Round your answer to 0 decimal places.

$$L = \sqrt{x} = \sqrt{3} \text{ meters}$$



Press

Display

$\sqrt{}$ 3 **enter**

$\sqrt{3}$ 1.732050808

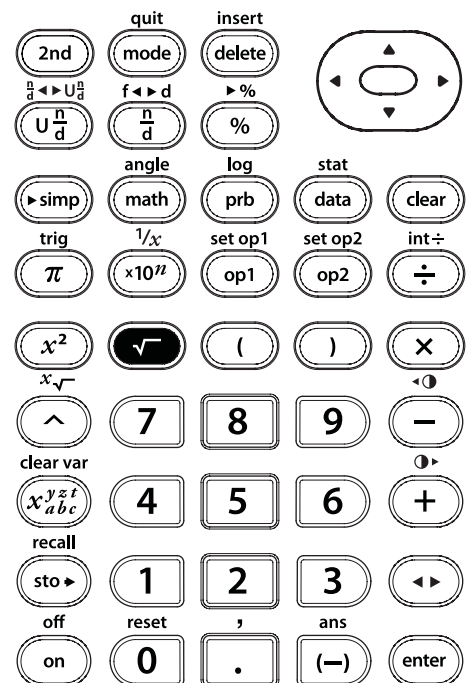
mode \downarrow \downarrow

\rightarrow **enter**

clear **enter**

$\sqrt{3}$ 1.732050808
 $\sqrt{3}$ 2

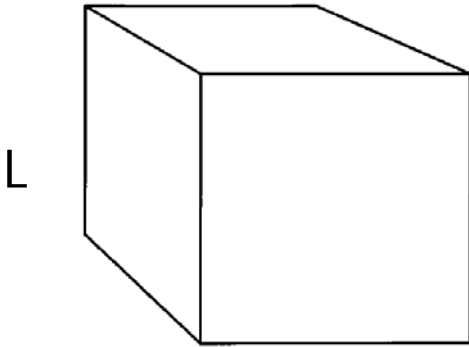
The length of a side of the square clubhouse is 2 meters rounded to 0 decimal places.



Cubes

Use this formula to find the volume of a cube with sides 2.3 meters long. Change your answer to a fraction.

$$V = L^3 = 2.3^3 \text{ cubic meters}$$



Press

Display

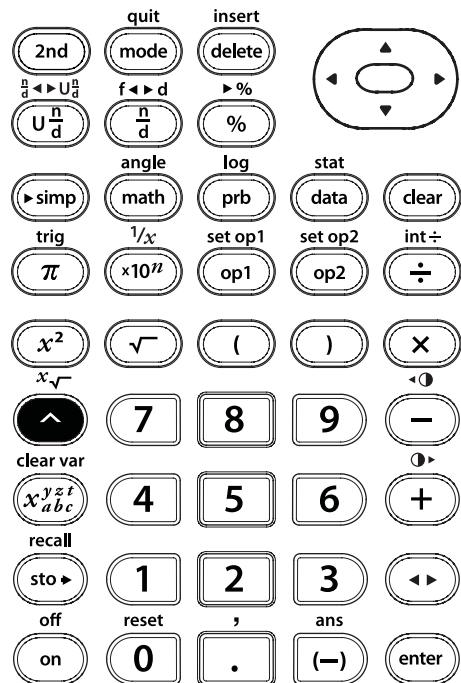
2 \cdot 3 \wedge
3 **enter**

2.3³ 12.167

$\leftarrow \rightarrow$


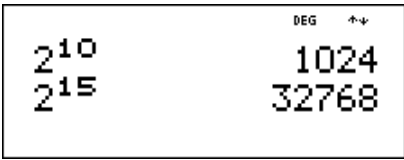
2.3³ 12.167
12.167⁺ $12 \frac{167}{1000}$

The volume of the cube is 12.167 cubic meters.

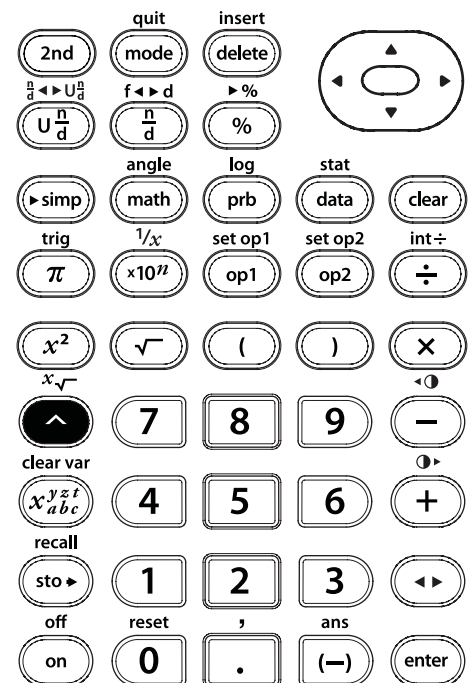


Powers

Fold a piece of paper in half, in half again, and so on until you cannot physically fold it in half again. How many sections would there be after 10 folds? After 15 folds?

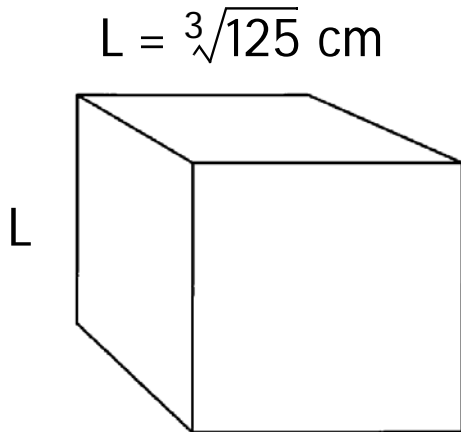
Press	Display
2 \wedge 10 enter	
2 \wedge 15 enter	

Fold the paper in half once and you will see two sections. Fold the paper in half again and you will see four sections. Folding again yields 8 sections, and so on. After 10 folds there will be 1,024 sections. After 15 folds, there will be 32,768 sections!



Roots

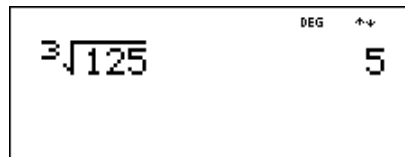
If the volume of a cube is 125 cm^3 ,
what is the length of each side?



Press

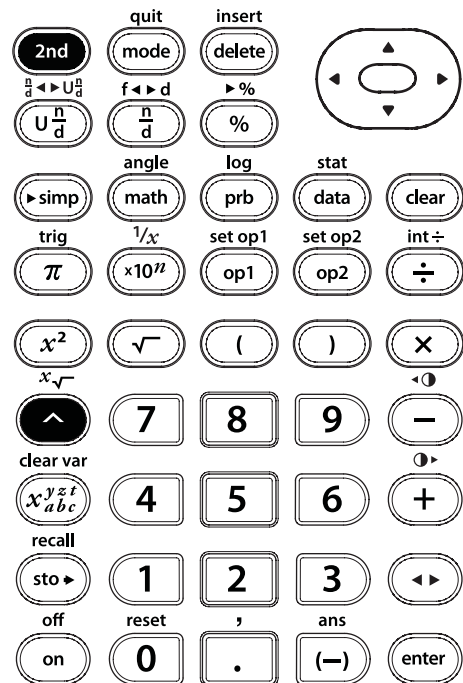
3 **2nd** [$x\sqrt{}$]
125 **enter**

Display



The length of each side is 5 cm.

2nd [$x\sqrt{}$]



Reciprocals (Continued)

Steam ship:

5 $\left[\frac{n}{d} \right]$ 3 $\left[\downarrow \right]$ 4
 $\left[\rightarrow \right]$ $\left[2^{nd} \right]$ $\left[\frac{n}{d} \leftarrow \rightarrow \frac{n}{d} \right]$
 $\left[\text{enter} \right]$

$$\frac{5 \frac{3}{4} \times \% \div U\%}{1} \quad \text{DEG} \quad \begin{array}{r} 23 \\ 4 \\ 4 \\ \hline 23 \end{array}$$

$\left[2^{nd} \right]$ $\left[1/x \right]$ $\left[\text{enter} \right]$

Luxury liner:

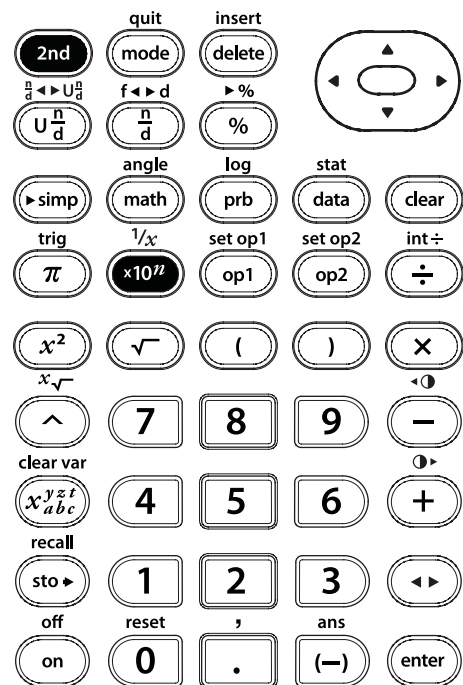
5 $\left[\frac{n}{d} \right]$ 1 $\left[\downarrow \right]$ 3 $\left[\rightarrow \right]$
 $\left[2^{nd} \right]$ $\left[\frac{n}{d} \leftarrow \rightarrow \frac{n}{d} \right]$
 $\left[\text{enter} \right]$

$$\frac{5 \frac{1}{3} \times \% \div U\%}{1} \quad \text{DEG} \quad \begin{array}{r} 16 \\ 3 \\ 3 \\ \hline 16 \end{array}$$

$\left[2^{nd} \right]$ $\left[1/x \right]$ $\left[\text{enter} \right]$

<u>Ships</u>	<u>Time Spent Building</u>	<u>Portion Completed Per Hour</u>
Sailing	$10 \frac{1}{2}$ hrs.	$\frac{2}{21}$
Steam	$5 \frac{3}{4}$ hrs.	$\frac{4}{23}$
Luxury	$5 \frac{1}{3}$ hrs.	$\frac{3}{16}$

$\left[2^{nd} \right]$ $\left[1/x \right]$



Keys

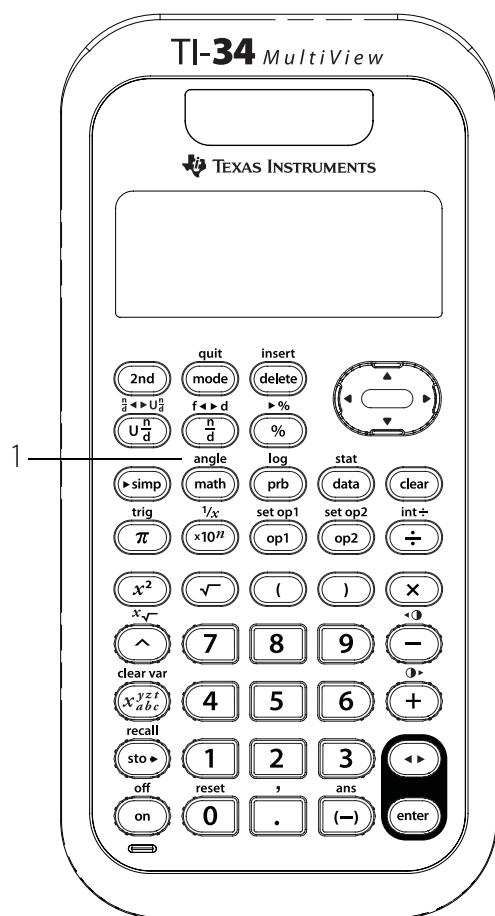
1. **2nd**[angle] displays the choice of two submenus that enable you to specify the angle unit modifier as degrees ($^{\circ}$), minutes ($'$), seconds ($''$), or radians (r); or convert units using **DMS**. You can also convert between rectangular coordinate form (R) and polar coordinate form (P). (See Chapter 19, Polar and rectangular conversions, for more information.)

Choose an angle mode from the mode screen. You can choose from DEG (default), or RAD. Entries are interpreted and results displayed according to the angle mode setting without needing to enter an angle unit modifier.

If you specify an angle unit modifier from the Angle menu, the calculation is performed in that angle type, but the result will be given in the angle mode setting.

Notes

- The examples on the transparency masters assume all default settings.
- **DMS** angles are entered as $^{\circ}$ (degrees), $'$ (minutes), and $''$ (seconds).



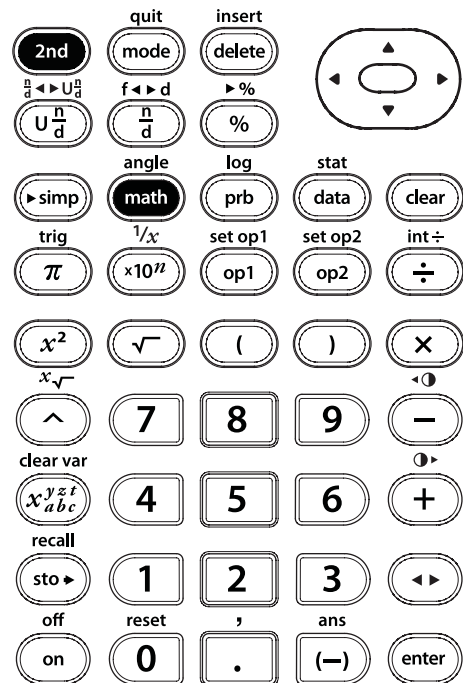
Degrees, minutes, and seconds to decimal

Find the measure of the third angle of a triangle if one angle measures $45^\circ 30'$ and the other angle measures $36^\circ 15''$. Express the angle measure in degrees, minutes, and seconds?

2nd **[angle]**

Press	Display
45 2nd [angle] 1	
30 2nd [angle] 2 + 36 2nd [angle] 1 15 2nd [angle] 2 enter	

Continued



Degrees, minutes, and seconds to decimal (Continued)

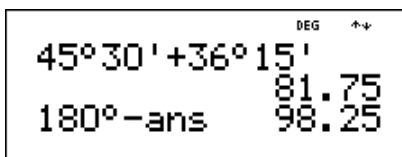
180 **2nd** [angle]

1 **-** **2nd** [ans]

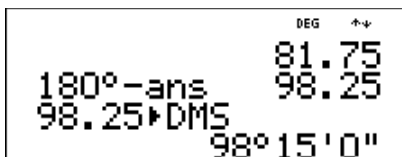
enter

2nd [angle]

5 **enter**



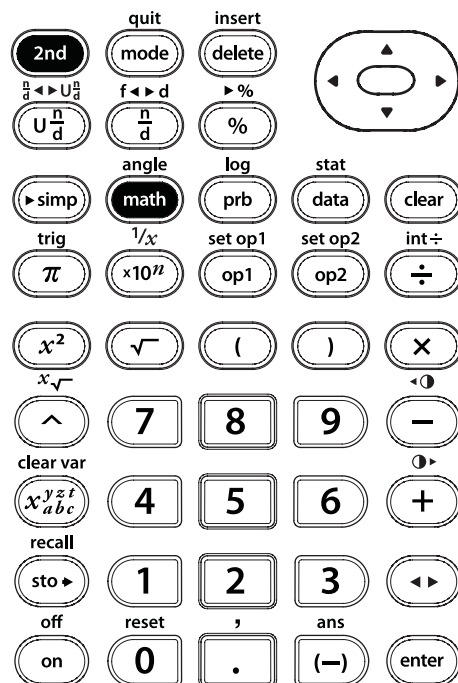
DEG +↔
45°30' + 36°15' = 81.75
180° - ans = 98.25



DEG +↔
180° - ans = 81.75
98.25 DMS = 98°15'0"

2nd [angle]

The measure of the third angle is
98° 15'.



Degrees and radians

Calculate the following:

$\cos(180 \text{ degrees})$

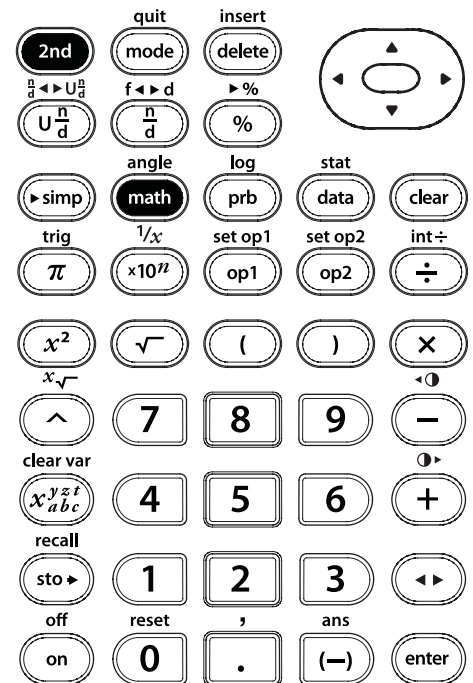
$\cos(\pi \text{ radians})$

Remember:

180 degrees = π radians.

Press	Display
2nd [trig] 2 180 2nd [angle] 1) enter	
2nd [trig] 2 π 2nd [angle] 4) enter	

2nd [angle]



Keys

1. **2nd**[angle] displays a choice of two submenus that lets you convert rectangular coordinates (x,y) to polar coordinates (r, θ) or vice versa. You can also specify the angle unit modifier. (See Chapter 18, Angle settings and conversions, for more information.)

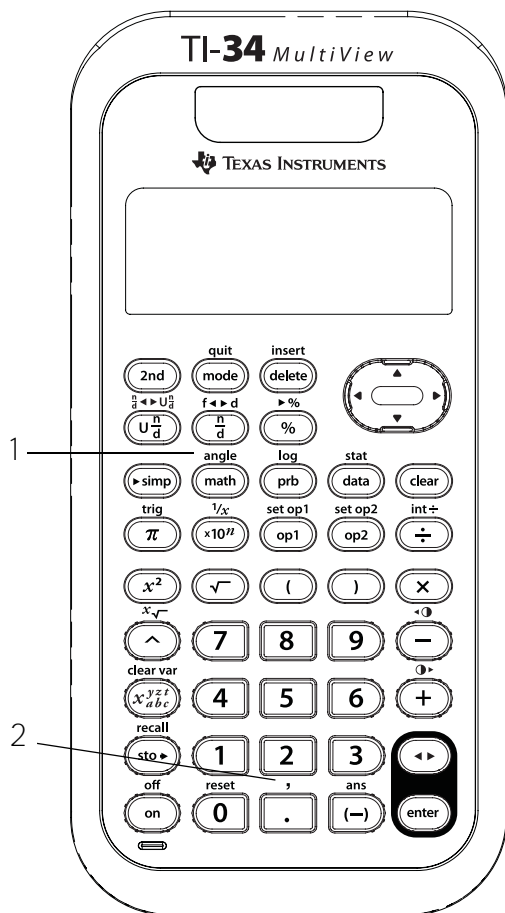
R \leftrightarrow P Menu

- R \rightarrow Pr(Converts rectangular coordinate to polar coordinate r .
- R \rightarrow P θ (Converts rectangular coordinate to polar coordinate θ .
- P \rightarrow Rx(Converts polar coordinate to rectangular coordinate x .
- P \rightarrow Ry(Converts polar coordinate to rectangular coordinate y .

2. **2nd**[,] enters a comma.

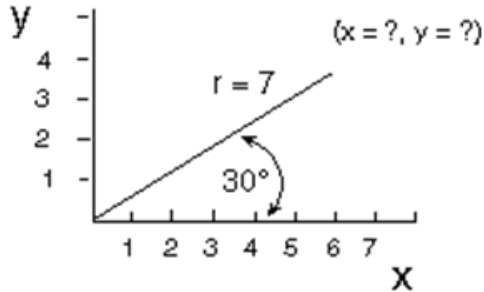
Notes

- The example on the transparency master assumes all default settings.
- Before starting calculations, set the angle mode as necessary.



Polar to rectangular

Convert the polar ordered pair $(7, 30^\circ)$ to rectangular coordinates.



2nd **[angle]**

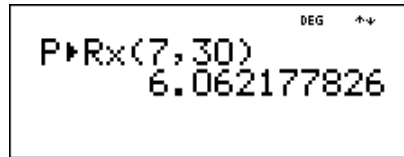
Press

Display

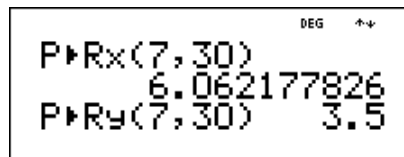
2nd **[angle]** **[▶]**



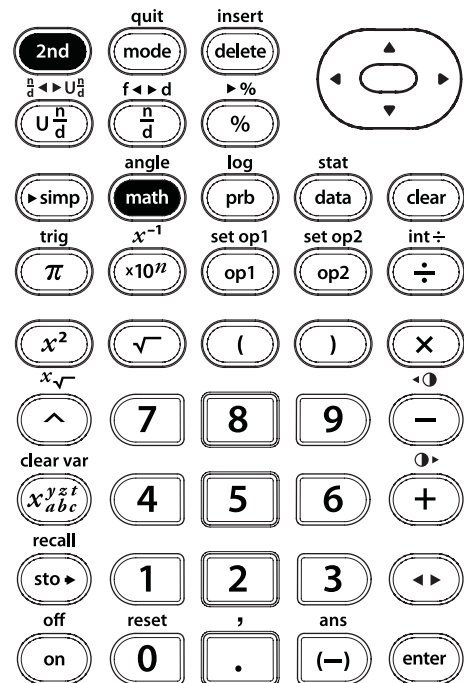
3
7 **2nd** **[,]** 30
) **enter**



2nd **[angle]** **[▶]** 4
7 **2nd** **[,]** 30
) **enter**



The rectangular ordered pair is $(x, y) = (6.062177826, 3.5)$.



Keys

1. **2nd**[trig] displays a menu of all trigonometric functions (sin, cos, tan, \sin^{-1} , \cos^{-1} , \tan^{-1}).

sin calculates the sine.

cos calculates the cosine.

tan calculates the tangent.

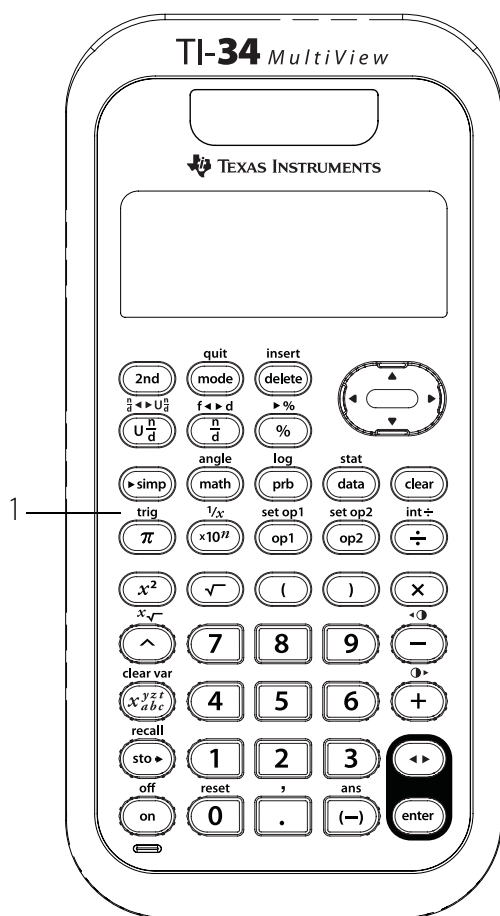
\sin^{-1} calculates the inverse sine.

\cos^{-1} calculates the inverse cosine.

\tan^{-1} calculates the inverse tangent.

Notes

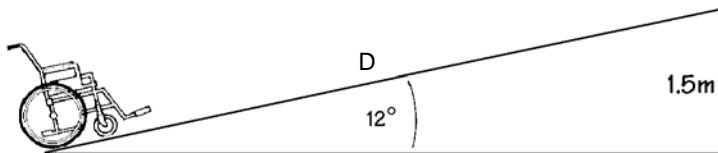
- The examples on the transparency masters assume all default settings.
- Before starting a trigonometric calculation, be sure to select the appropriate angle mode setting (**degree** or **radian**—See Chapter 18, Angle settings and conversions). The calculator interprets values according to the current angle-unit mode setting.
- **□** ends a trig function.



Sine

Use this formula to find the length of the ramp, D. Round your answer to the nearest whole number, and then return to floating decimal mode.

$$D = \frac{1.5}{\sin(12^\circ)} \text{ meters}$$



Press

Display

1 \square 5 $\frac{n}{d}$
2nd **[trig]** 1
 12 \square **enter**
mode \downarrow \downarrow \rightarrow
enter

```

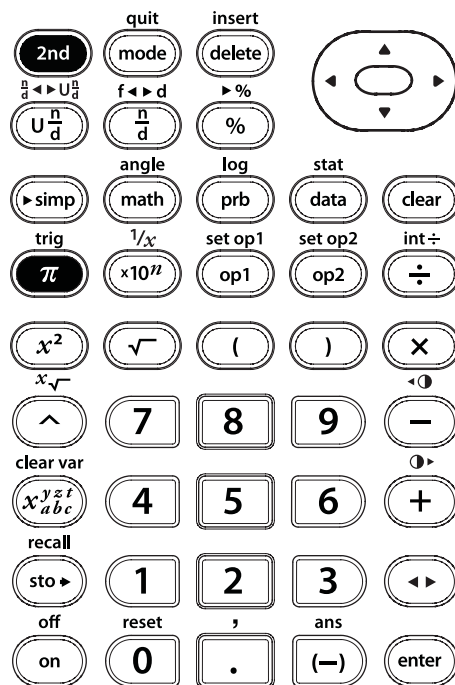
          1.5
        -----
      sin(12)
        7.214601517
  
```

```

      FIX          DEG
MODE RAD
MODE SCI
FLOAT 0 123456789
CLASSIC 123456789
  
```

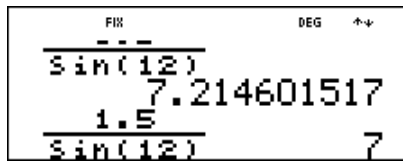
Continued

2nd **[trig]**



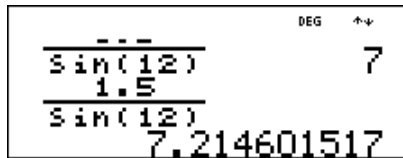
Sine (Continued)

clear **enter**



mode  

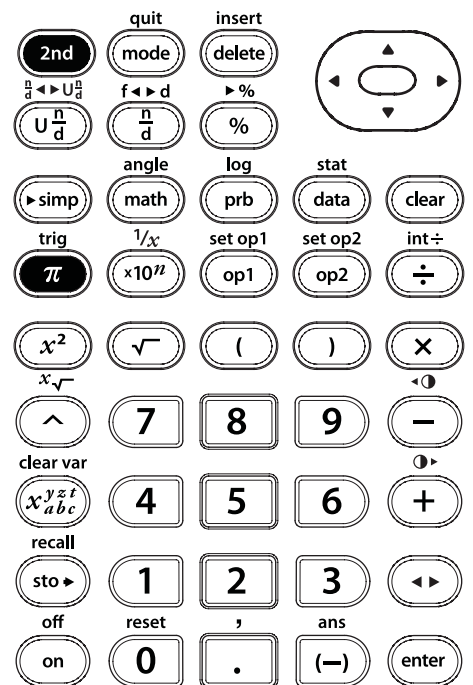
enter **clear**



enter

The length of the ramp is $D = 7$ m rounded to the nearest whole number.

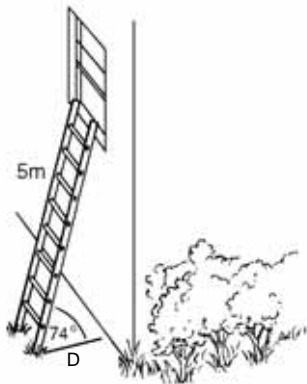
2nd **[trig]**



Cosine

Use this formula to find the distance, D, from the base of the ladder to the house. Round your answer to the nearest whole number, and then return to floating decimal mode.

$$D = 5 \times \text{COS}(74^\circ) \text{ meters}$$



2nd **[trig]**

Press

Display

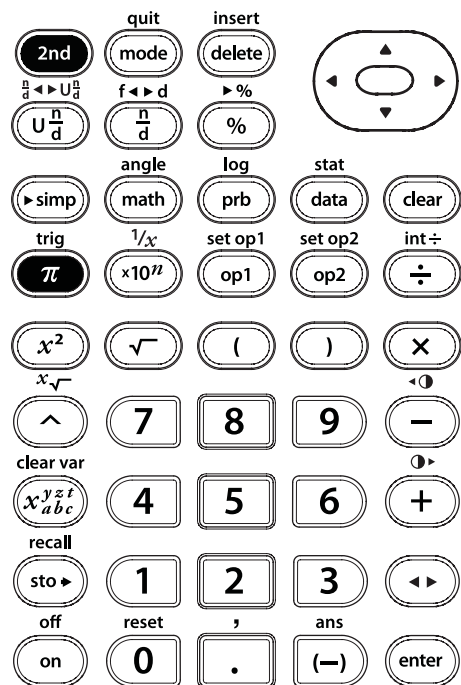
5 **[x]** **2nd** **[trig]** 2
74 **)** **enter**

5xcos(74) DEG ↕
1.378186779

mode ⏴ ⏵ ⏴
enter

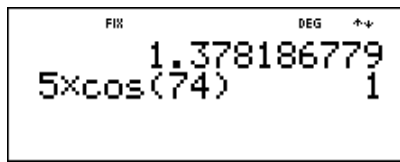
FIX DEG
MODE RAD
NORMAL SCI
FLOAT 0 123456789
CLASSIC [HARD] [RUN] ↓

Continued



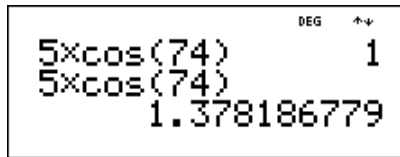
Cosine (Continued)

clear **enter**



mode \downarrow \downarrow

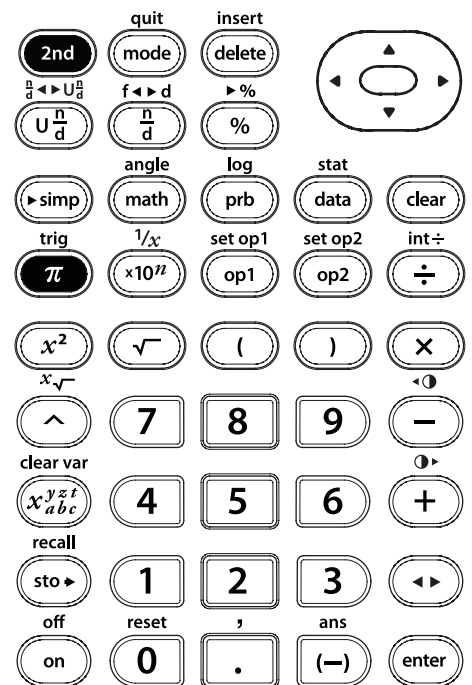
enter **clear**



enter

The distance is approximately 1 meter.

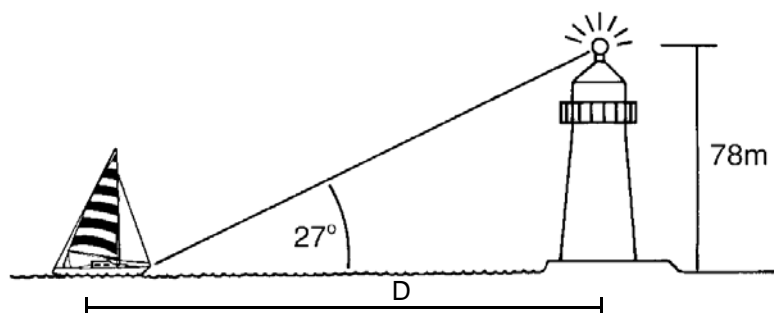
2nd **[trig]**



Tangent

Use this formula to find the distance, D , from the lighthouse to the boat. Round your answer to the nearest whole number, and then return to floating decimal mode.

$$D = \frac{78}{\tan 27^\circ}$$



Press

Display

78 $\frac{n}{d}$ **2nd** **[trig]**

3

27 **)** **enter**

```

DEG  ↑↓
  78
tan(27)
153.0836194
    
```

mode \downarrow \downarrow \rightarrow

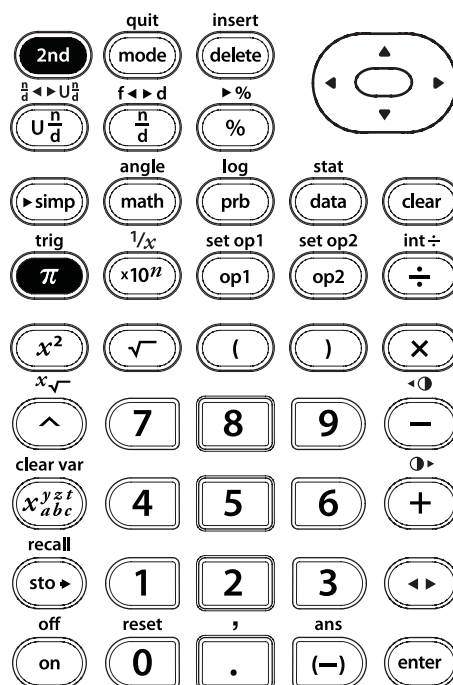
enter

```

FIX  DEG
MODE RAD
MODE SCI
FLOAT 123456789
CLASSIC
    
```

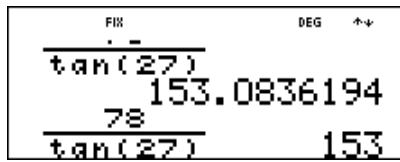
Continued

2nd **[trig]**



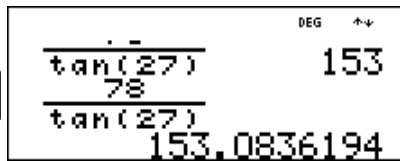
Tangent (Continued)

clear **enter**



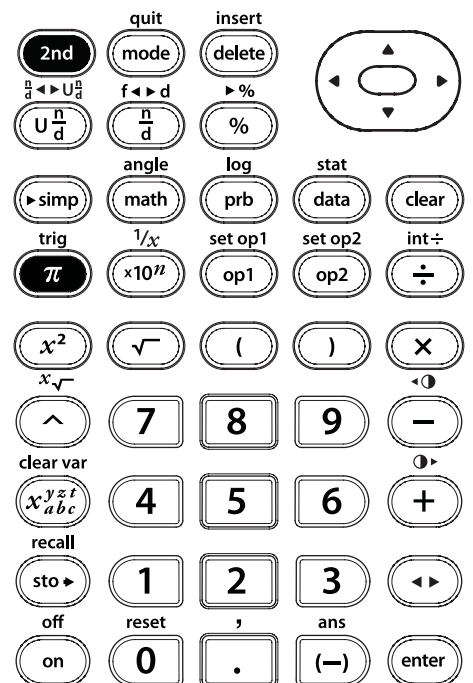
mode  

enter **clear** **enter**



The distance from the lighthouse to the boat is approximately 153 m.

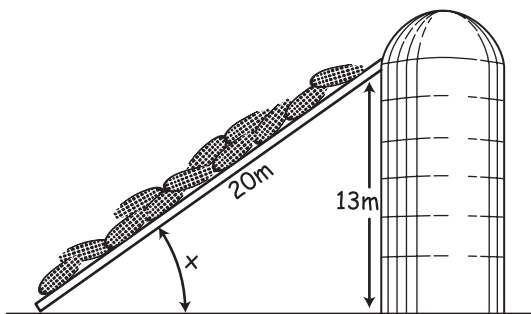
2nd **[trig]**



Inverse sine

Use this formula to find the angle of the conveyor belt, x . Round your answer to the nearest tenth, and then return to floating decimal mode.

$$x = \text{SIN}^{-1} \frac{13}{20}$$



Press

Display

2nd **[trig]** 4
 13 $\frac{n}{d}$ 20 \blacktriangleright **)**
enter
mode \blacktriangledown \blacktriangledown \blacktriangleright
 \blacktriangleright **enter**

sin⁻¹($\frac{13}{20}$)
 40.54160187

FIX DEG
 MODE RAD
 MODE SCI
 FLOAT 0 1 2 3 4 5 6 7 8 9
 CLASSIC **123456789**

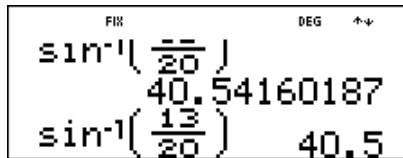
Continued

2nd **[trig]**

2nd	quit mode	insert delete		
$\frac{n}{d} \blacktriangleleft \blacktriangleright U \frac{n}{d}$	f $\blacktriangleleft \blacktriangleright$ d	\blacktriangleright %		
$\frac{n}{d}$	$\frac{n}{d}$	%		
\blacktriangleright simp	angle math	log prb		
trig π	$\frac{1}{x}$ $\times 10^{n/}$	set op1 op1	set op2 op2	int \div \div
x^2	$\sqrt{\quad}$	()	\times
$x\sqrt{\quad}$	\wedge	7	8	9
clear var	$x^y \frac{z}{abc}$	4	5	6
recall sto \blacktriangleright	1	2	3	$\blacktriangleleft \blacktriangleright$
off on	reset 0	,	ans (-)	enter

Inverse sine (Continued)

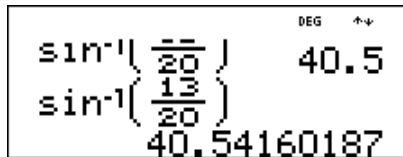
clear **enter**



mode  

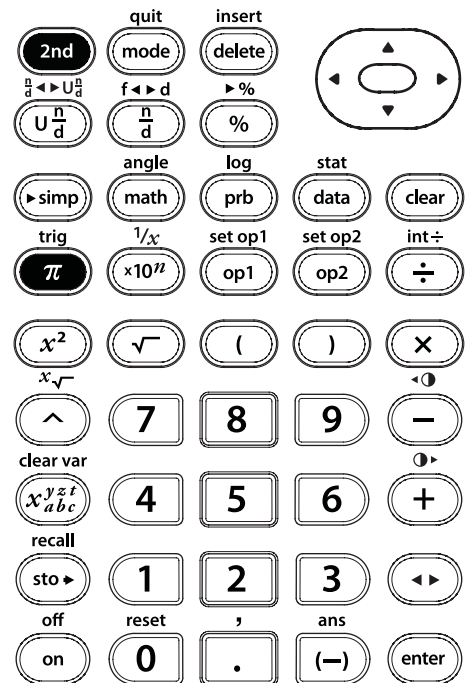
enter **clear**

enter



2nd **[trig]**

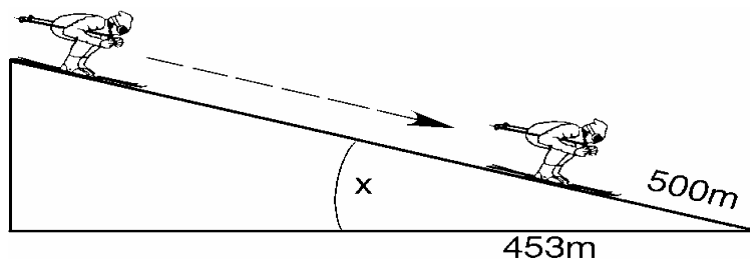
The angle of the conveyer belt is
 $x = 40.5^\circ$ rounded to the nearest tenth.



Inverse cosine

Use this formula to find the angle of the ski jump, x . Round your answer to the nearest tenth, and then return to floating decimal mode.

$$x = \cos^{-1} \frac{453}{500}$$



Press

Display

2nd **[trig]** 5
453 **[n/d]** 500

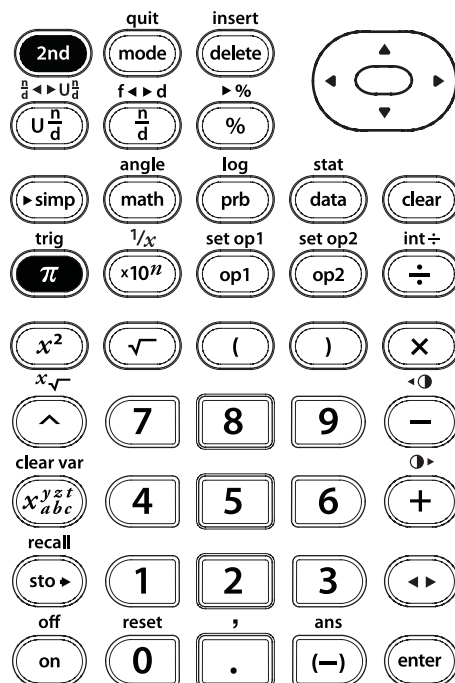
$\cos^{-1}\left(\frac{453}{500}\right)$
25.04169519

[>] **)** **enter**
mode **[v]** **[v]** **[>]**
[>] **enter**

FIX DEG
MODE RAD
MODE SCI
FLOAT 0 23456789
CLASSIC 123456789
↓

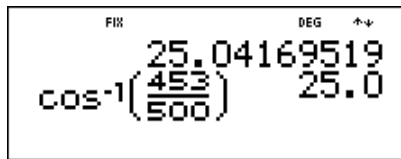
Continued

2nd **[trig]**

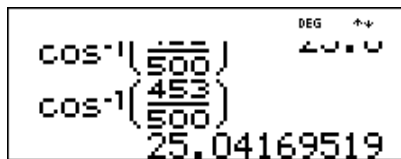


Inverse cosine (Continued)

clear **enter**

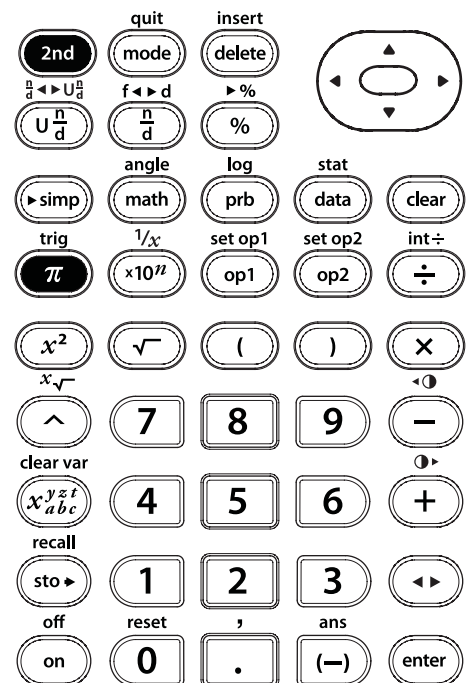


mode \downarrow \downarrow
enter **clear**
enter



The angle of the ski jump is $x = 25.0^\circ$ rounded to the nearest tenth.

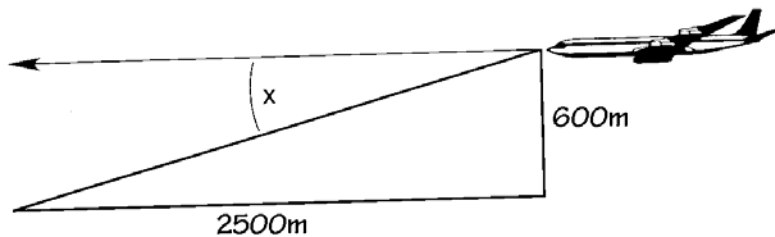
2nd **[trig]**



Inverse tangent

Use this formula to find the angle of depression, x . Round your answer to the nearest tenth, and then return to floating decimal mode.

$$x = \text{TAN}^{-1} \frac{600}{2500}$$



Press

Display

2nd **[trig]** 6
 600 **[n/d]** 2500
[▶] **)** **enter**
mode **[▼]** **[▼]** **[▶]**
[▶] **enter**

```

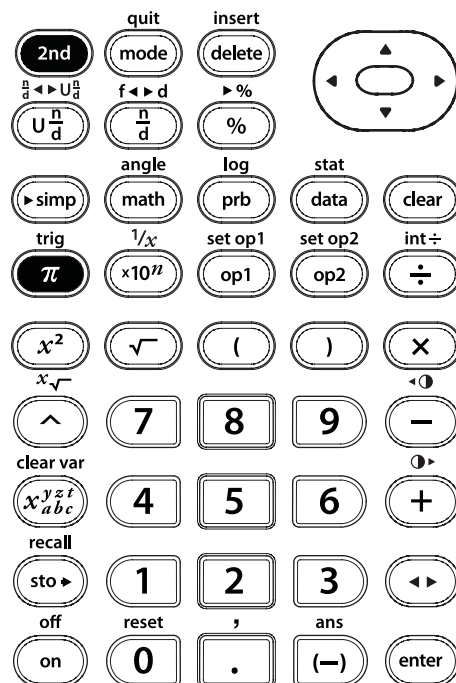
tan⁻¹( 600 / 2500 )
13.49573328
    
```

```

FIX          DEG
MODE RAD
MODE SCI
FLOAT 0 23456789
CLASSIC
    
```

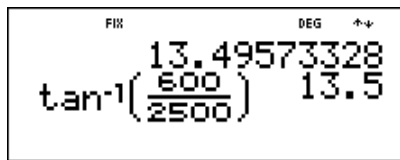
Continued

2nd **[trig]**



Inverse tangent (Continued)

clear **enter**



mode  

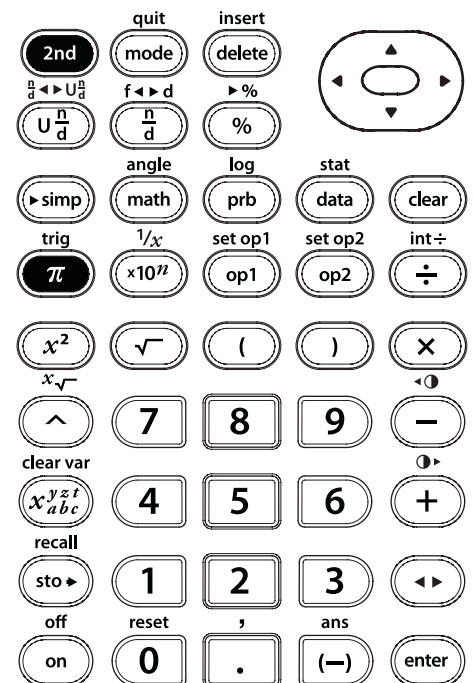
enter **clear**



enter

The angle of depression is $x = 13.5^\circ$ rounded to the nearest tenth.

2nd **[trig]**



Quick reference to keys

KEY	FUNCTION
\leftarrow \rightarrow	\leftarrow \rightarrow move the cursor left and right so you can scroll an entry on the Home screen.
\uparrow \downarrow	Press 2nd \leftarrow or 2nd \rightarrow to scroll to the beginning or end of a current entry. \uparrow \downarrow move the cursor up and down to navigate menu items, view entries in the Data editor and function table, and view previous entries on the Home screen. 2nd \uparrow moves the cursor to the oldest entry on the Home screen, and to the top entry of the active column in Data editor. 2nd \downarrow moves the cursor below the last entry on the Home screen, and to the bottom entry of the active column in Data editor.
$+$ $-$ \times \div	Adds, subtracts, multiplies, and divides.
0 - 9	Enters the digits 0 through 9.
()	Opens a parenthetical expression. Closes a parenthetical expression.
2nd $\frac{1}{x}$	Calculates the reciprocal.
x^2	Squares the value.
π	Enters the value of pi rounded to 10 digits (3.141592654).
\cdot	Enters a decimal point.
$(-)$	Indicates the value is negative.
\wedge	Raises a value to a specified power.
2nd	Turns on the 2ND indicator and accesses the function shown above the next key that you press.
$\leftarrow \rightarrow$	Toggles the answer between fraction and decimal, and exact pi and decimal.
mode	Lets you set the angle, numeric, decimal, display, and fraction modes.
2nd $\text{int} \div$	Divides two positive integers and displays the quotient and the remainder.
2nd quit	Exits applications and returns you to the Home screen.
2nd $\cdot \bullet$	Adjusts the contrast. 2nd $\cdot \bullet$ lightens the screen.
2nd $\bullet \cdot$	2nd $\bullet \cdot$ darkens the screen.

A Quick reference to keys (continued)

KEY	FUNCTION												
$\boxed{2\text{nd}}[\text{angle}]$	<p>Displays the following menus.</p> <p>DMS lets you specify the unit of an angle.</p> <p>R \blacklozenge P lets you convert rectangular coordinates to polar coordinates, or vice versa.</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 50%;"><u>DMS</u></td> <td style="text-align: center; width: 50%;"><u>R \blacklozenge P</u></td> </tr> <tr> <td>1: $^{\circ}$</td> <td>1: R \blacktriangleright Pr(</td> </tr> <tr> <td>2: ' </td> <td>2: R \blacktriangleright Pθ(</td> </tr> <tr> <td>3: " </td> <td>3: P \blacktriangleright Rx(</td> </tr> <tr> <td>4: r</td> <td>4: P \blacktriangleright Ry(</td> </tr> <tr> <td>5: \blacktriangleright DMS</td> <td></td> </tr> </table>	<u>DMS</u>	<u>R \blacklozenge P</u>	1: $^{\circ}$	1: R \blacktriangleright Pr(2: '	2: R \blacktriangleright P θ (3: "	3: P \blacktriangleright Rx(4: r	4: P \blacktriangleright Ry(5: \blacktriangleright DMS	
<u>DMS</u>	<u>R \blacklozenge P</u>												
1: $^{\circ}$	1: R \blacktriangleright Pr(
2: '	2: R \blacktriangleright P θ (
3: "	3: P \blacktriangleright Rx(
4: r	4: P \blacktriangleright Ry(
5: \blacktriangleright DMS													
$\boxed{\times 10^n}$	$\boxed{\times 10^n}$ is a shortcut key to enter a number in scientific notation format												
$\boxed{\sqrt{\quad}}$	Calculates the square root.												
$\boxed{\%}$	Appends the % sign to a number. Results display according to the decimal notation mode setting.												
$\boxed{2\text{nd}}[\blacktriangleright\%]$	Changes a number to a percentage.												
$\boxed{2\text{nd}}[,]$	Enters a comma.												
$\boxed{2\text{nd}}[x\sqrt{\quad}]$	Calculates the specified root (x) of the value.												
$\boxed{U\frac{n}{d}}$	Lets you enter mixed numbers and fractions. Press $\boxed{U\frac{n}{d}}$ between the entry of the unit, and the numerator.												
$\boxed{\frac{n}{d}}$	Lets you enter a simple fraction. In MathPrint™ mode, press \blacktriangledown between the entry of the numerator and the denominator. In Classic mode, press $\boxed{\frac{n}{d}}$ between the entry of the numerator and the denominator.												
$\boxed{2\text{nd}}[\frac{n}{d}\blacktriangleleft\blacktriangleright U\frac{n}{d}]$	Converts a simple fraction to a mixed number or a mixed number to a simple fraction.												
$\blacktriangleright\text{simp}$	Simplifies a fraction using the smallest common prime factor, or a factor you choose (a positive integer).												
$\boxed{2\text{nd}}[f\blacktriangleleft\blacktriangleright d]$	Converts a fraction to its decimal equivalent or converts a decimal to its fractional equivalent, if possible.												
$\boxed{2\text{nd}}[\text{ans}]$	Recalls the most recently calculated result, displaying it as ans .												
$\boxed{\text{clear}}$	Clears characters and error messages on the entry line.												

Quick reference to keys (continued)

KEY	FUNCTION																
2nd [clear var]	Clears all memory variables.																
data	Lets you enter the statistical data points for 1-Var stats and 2-Var stats.																
data data	Press data once to display the data editor screen. Press again to display the Clear and Conversion menus. Lets you access list names when in the Conversion menu.																
delete	Deletes the character at the cursor.																
enter	Completes the operation or executes the command.																
2nd [insert]	Lets you insert a character at the cursor.																
2nd [set op1] 2nd [set op2]	Lets you store an operation (any combination of numbers, operators, or menu items and their arguments).																
op1 op2	Recalls and displays a stored operation.																
math	Displays the following menus, with various math functions. <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left;"><u>MATH</u></th> <th style="text-align: left;"><u>NUM</u></th> </tr> </thead> <tbody> <tr> <td>1: lcm(</td> <td>1: abs(</td> </tr> <tr> <td>2: gcd(</td> <td>2: round(</td> </tr> <tr> <td>3: 3</td> <td>3: iPart(</td> </tr> <tr> <td>4: $^3\sqrt{(}$</td> <td>4: fPart(</td> </tr> <tr> <td></td> <td>5: min(</td> </tr> <tr> <td></td> <td>6: max(</td> </tr> <tr> <td></td> <td>7: remainder(</td> </tr> </tbody> </table>	<u>MATH</u>	<u>NUM</u>	1: lcm(1: abs(2: gcd(2: round(3: 3	3: iPart(4: $^3\sqrt{(}$	4: fPart(5: min(6: max(7: remainder(
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2: gcd(2: round(
3: 3	3: iPart(
4: $^3\sqrt{(}$	4: fPart(
	5: min(
	6: max(
	7: remainder(
2nd [log]	Displays the following menus. LOG calculates common logarithm (base 10) functions. LN calculates natural logarithm (base e, where $e \approx 2.718281828459$) functions. <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left;"><u>LOG</u></th> <th style="text-align: left;"><u>LN</u></th> </tr> </thead> <tbody> <tr> <td>1: log(</td> <td>1: ln(</td> </tr> <tr> <td>2: $10^{(}$</td> <td>2: $e^{(}$</td> </tr> </tbody> </table>	<u>LOG</u>	<u>LN</u>	1: log(1: ln(2: $10^{(}$	2: $e^{(}$										
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2: $10^{(}$	2: $e^{(}$																

A Quick reference to keys (continued)






KEY	FUNCTION												
x^{yzt}	<p>Accesses variables. Press this key multiple times to choose x, y, z, t, a, b, or c. You can also use x^{yzt} to recall the stored values for these variables.</p> <p>In the Data editor, x^{yzt} is a shortcut that takes you straight to the author line to enter or edit a conversion.</p>												
2nd [off]	Turns off the calculator and clears the display.												
on	Turns on the calculator.												
prb	<p>Displays the following menus.</p> <p>PRB lets you calculate permutations, combinations, or factorials.</p> <p>RAND lets you generate a random number or random integer, within parameters.</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;"><u>PRB</u></td> <td style="text-align: center;"><u>RAND</u></td> </tr> <tr> <td style="text-align: center;">1: nPr</td> <td style="text-align: center;">1: rand</td> </tr> <tr> <td style="text-align: center;">2: nCr</td> <td style="text-align: center;">2: randint(</td> </tr> <tr> <td style="text-align: center;">3: !</td> <td></td> </tr> </table>	<u>PRB</u>	<u>RAND</u>	1: nPr	1: rand	2: nCr	2: randint(3: !					
<u>PRB</u>	<u>RAND</u>												
1: nPr	1: rand												
2: nCr	2: randint(
3: !													
2nd [recall]	Recalls the stored values to the display.												
2nd [reset]	<p>Displays the Reset menu.</p> <p>Reset</p> <p>1: No</p> <p>2: Yes</p> <p>Press 1 (No) to return to the previous screen without resetting the calculator.</p> <p>Press 2 (Yes) to reset the calculator. The message MEMORY CLEARED is displayed.</p>												
2nd [trig]	<p>Displays the TRIG menu.</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">1: sin(</td> <td>Calculates the sine of an angle.</td> </tr> <tr> <td style="text-align: center;">2: cos(</td> <td>Calculates the cosine of an angle.</td> </tr> <tr> <td style="text-align: center;">3: tan(</td> <td>Calculates the tangent of an angle.</td> </tr> <tr> <td style="text-align: center;">4: sin⁻¹(</td> <td>Calculates the inverse sine.</td> </tr> <tr> <td style="text-align: center;">5: cos⁻¹(</td> <td>Calculates the inverse cosine.</td> </tr> <tr> <td style="text-align: center;">6: tan⁻¹(</td> <td>Calculates the inverse tangent.</td> </tr> </table>	1: sin(Calculates the sine of an angle.	2: cos(Calculates the cosine of an angle.	3: tan(Calculates the tangent of an angle.	4: sin ⁻¹ (Calculates the inverse sine.	5: cos ⁻¹ (Calculates the inverse cosine.	6: tan ⁻¹ (Calculates the inverse tangent.
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Quick reference to keys (continued)

KEY	FUNCTION
$\boxed{2nd}$ $\boxed{[stat]}$	<p>Displays the following menu from which you can select 1-Var, 2-Var, or StatVars.</p> <p>1-Var Stats Analyzes data from 1 set of data with 1 measured variable—x.</p> <p>2-Var Stats Analyzes paired data from 2 sets of data with 2 measured variables—x, the independent variable, and y, the dependent variable.</p> <p>StatVars After choosing 1-Var or 2-Var stats, displays data values.</p> <p>StatVars displays the following menu of stat variables with their current values.</p> <p>n Number of x (or x,y) data points.</p> <p>\bar{x} or \bar{y} Mean of all x or y values.</p> <p>Sx or Sy Sample standard deviation of x or y.</p> <p>σx or σy Population standard deviation of x or y.</p> <p>Σx or Σy Sum of all x values or y values.</p> <p>Σx^2 or Σy^2 Sum of all x^2 values or y^2 values.</p> <p>Σxy Sum of the product of x and y for all xy pairs in 2 lists.</p> <p>a Linear regression slope.</p> <p>b Linear regression y-intercept.</p> <p>r Correlation coefficient.</p> <p>x' (2-Var) Uses a and b to calculate predicted x value when you input a y value.</p> <p>y' (2-Var) Uses a and b to calculate predicted y value when you input an x value.</p>
\boxed{sto} \blacktriangleright	<p>Lets you store values to variables. Press $\boxed{sto}$$\blacktriangleright$ to store a variable, and press $\boxed{x^{yzt}}$$\boxed{abc}$ to select the variable to store.</p> <p>$\boxed{x^{yzt}}$$\boxed{abc}$ displays the following menu of variables: x y z t a b c.</p> <p>Press \boxed{enter} to store the value in the selected variable. If this variable already has a value, that value is replaced by the new one.</p>
\boxed{enter}	<p>Completes the operation or executes the command.</p>

A

Quick reference to keys (continued)

INDICATOR	MEANING
2ND	2nd function.
FIX	Fixed-decimal setting. (See the Mode section in Chapter 1, TI-34 MultiView basic operations, and Chapter 8, Decimals and decimal places.)
SCI	Scientific notation. (See the Mode section in Chapter 1, TI-34 MultiView basic operations.)
DEG, RAD	Angle mode (degrees or radians). (See the Mode section in Chapter 1, TI-34 MultiView basic operations.)
L1, L2, L3	Displays above the lists in data editor.
	The TI-34 MultiView™ calculator is performing an operation.
↑↓	An entry is stored in history before and/or after the active screen. Press  and  to scroll.
◀▶	An entry or menu displays beyond 16 digits. Press  or  to scroll.

Error messages

C

When the TI-34 MultiView™ calculator detects an error, it returns an error message with the type of error.

To correct the error, note the error type and determine the cause of the error. If you cannot recognize the error, use the following list, which describes error messages in detail.

Press **clear** to clear the error message. The previous screen is displayed with the cursor at or near the error location. Correct the expression.

MESSAGE	MEANING
ARGUMENT	A function does not have the correct number of arguments.
DIVIDE BY 0	You attempted to divide by 0.
DOMAIN	You specified an argument to a function outside the valid range. For example: For $\sqrt[x]{y}$: $x = 0$ or ($y < 0$ and x is not an odd integer). For \sqrt{x} : $x < 0$. For LOG or LN : $x \leq 0$. For TAN : $x = 90^\circ, -90^\circ, 270^\circ, -270^\circ, 450^\circ$, etc. For SIN⁻¹ or COS⁻¹ : $ x > 1$. For nCr or nPr : n or $r < 0$.
EQUATION LENGTH ERROR	An entry exceeds the digit limits (88 for entry line and 47 for statistics or stored operation entry lines); for example, combining an entry with a stored operation that exceeds the limit.
OVERFLOW	You attempted to enter, or you have calculated, a number that is beyond the range of the calculator.
STAT	Attempting to calculate 1-Var or 2-Var stats with no defined data points, or attempting to calculate 2-Var stats when the data lists are not of equal length.
FRQ DOMAIN	The FRQ value in 1-Var statistics < 0 .
CONVERSION	The conversion does not contain a list name (L1, L2, or L3), or the conversion for a list contains its own list name; for example, a conversion for L1 contains L1. You attempted to enter a function (for example, L1+3).
SYNTAX	The command contains a syntax error, or has misplaced functions, arguments, parentheses, or commas. If using $\frac{\square}{\square}$, try using $\frac{\square}{\square}$.
OP NOT DEFINED	The stored operation (op1 or op2) is not defined.

C Error messages (continued)

MESSAGE	MEANING
MEMORY LIMIT	The calculation contains too many pending operations (more than 23). If using op1 or op2, you attempted to enter more than four levels of nested functions using fractions, square roots, exponents with $^$, $x\sqrt{\quad}$, and x^2 (MathPrint™ mode only).
LOW BATTERY	Replace the battery. Note: This message displays briefly and then disappears. Pressing clear does not clear this message.

For general information

Home Page:	education.ti.com
KnowledgeBase and e-mail inquiries:	education.ti.com/support
Phone:	(800) TI-CARES / (800) 842-2737 For U.S., Canada, Mexico, Puerto Rico, and Virgin Islands only
International Information:	education.ti.com/international

For technical support

KnowledgeBase and e-mail inquiries:	education.ti.com/support
Phone (not toll-free):	(972) 917-8324

For product (hardware) service

Customers in the U.S., Canada, Mexico, Puerto Rico and Virgin Islands:	Always contact Texas Instruments Customer Support before returning a product for service.
All other customers:	Refer to the leaflet enclosed with this product (hardware) or contact your local Texas Instruments retailer/distributor.

Battery precautions

- Do not leave batteries within the reach of children.
- Do not mix new and used batteries. Do not mix brands (or types within brands) of batteries.
- Do not mix rechargeable and non-rechargeable batteries.
- Install batteries according to polarity (+ and -) diagrams.
- Do not place non-rechargeable batteries in a battery recharger.
- Properly dispose of used batteries immediately.
- Do not incinerate or dismantle batteries.
- Seek medical advice immediately if a cell or battery has been swallowed. (In the USA, contact the National Capital Poison Center at 1-800-222-1222.)

Battery disposal

Do not mutilate, puncture, or dispose of batteries in fire. The batteries can burst or explode, releasing hazardous chemicals. Discard used batteries according to local regulations.

Per CA Regulation 22 CCR 67384.4, the following applies to the button cell battery in this unit:

Perchlorate Material - Special handling may apply.

See www.dtsc.ca.gov/hazardouswaste/perchlorate

Remove or replace the battery

Remove the protective cover and turn the TI-34 MultiView™ face downwards.

- With a small screwdriver, remove the screws from the back of the case.
- From the bottom, carefully separate the front from the back. **BE CAREFUL** not to damage any of the internal parts.
- With a small screwdriver (if required), remove the battery.
- To replace the battery, check the polarity (+ and -) and slide in a new battery. Press firmly to snap the new battery into place.
Important: When replacing the battery, avoid any contact with the other components of the TI-34 MultiView.
- Dispose of the dead batteries immediately and in accordance with local regulations.

Type of battery The TI-34 MultiView uses one 3 volt CR2032 lithium battery.

