TI-34 II Explorer Plus™

A Guide for Teachers

Developed by
Texas Instruments Incorporated

Activities developed by
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About the Authors

Gary Hanson and Aletha Paskett are math teachers in the Jordan Independent School District in Sandy, Utah. They developed the *Activities* section and assisted in evaluating the appropriateness of the examples in the *How to Use the TI-34 II* section of this guide.

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Table of Contents

About the Teacher Guide

How the Teacher Guide is Organized

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

Activities

The activities are designed to be teacher-directed. They are intended to help develop mathematical concepts while incorporating the TI-34 II as a teaching tool. 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 II key presses.
- A student activity sheet.

How to Use the TI-34 II

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 II, 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 II keyboard.

Things to Keep in Mind

- While many of the examples on the transparency masters may be used to develop mathematical concepts, they were not designed specifically for that purpose.
- For maximum flexibility, each example and activity is independent of the others. Select the transparency master appropriate for the key you are teaching, or select the activity appropriate for the mathematical concept you are teaching.
- If an example does not seem appropriate for your curriculum or grade level, use it to teach the function of a key (or keys), and then provide examples of your own.
- To ensure that everyone starts at the same point, have students reset the calculator by pressing [ON] and [CLEAR] simultaneously or by pressing [2nd] [RESET], selecting **Y** (yes), and then pressing [ENTER].

Conventions Used in this Guide

- In the text, brackets [ ] around a key's symbol indicate that the key is a second, or alternate, function.

  For example: [√‾]

- On the transparency masters, second functions are shown as they appear on the TI-34 II keyboard.

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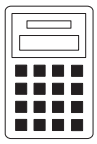
About the TI-34 II



Two-Line Display

The first line (entry line) displays an entry of up to 88 digits (47 digits for stat or stored operations entry line). Entries begin on the left; those with more than 11 digits scroll to the right. Press ◀ and ▶ to scroll the entry line. Press 2nd ◀ or 2nd ▶ to move the cursor immediately to the beginning or end of the entry.

The second line (result line) displays a result of up to 10 digits, plus a decimal point, a negative sign, a "**x10**" indicator, and a two-digit positive or negative exponent. Results that exceed the digit limit are displayed in scientific notation.

Display Indicators

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

Order of Operations

The TI-34 II 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 (or) to change the order of operations and, therefore, change the result.

2nd Functions

Pressing 2nd displays the **2nd** indicator, and then accesses the function printed above the next key pressed. For example, 2nd [√‾] **25**) ENTER calculates the square root of 25 and returns the result, **5**.

Menus

Certain TI-34 II keys display menus: MEMVAR, 2nd [RCL], STO▶, 2nd [STAT], STATVAR, 2nd [EXIT STAT], PRB, [DR], 2nd [R↔P], [°′″], 2nd [FIX] and 2nd [RESET].

Press ◀ or ▶ to move the cursor and underline a menu item. To return to the previous screen without selecting the item, press CLEAR. To select a menu item:

- Press ENTER while the item is underlined, or
- For menu items followed by an argument value (for example, **nPr**), enter the value while the item is underlined. The item and the argument value are displayed on the previous screen.

Previous Entries ▲ ▼

After an expression is evaluated, use ▲ and ▼ to scroll through previous entries, which are stored in the TI-34 II history. You cannot retrieve previous entries while in STAT mode.

Error Messages

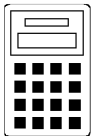
Refer to Appendix C for a listing of the error messages.

Last Answer (Ans)

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

- Press 2nd [ANS] (**Ans** displays on the screen), or
- Press any operation key (+, −, x^2, and so on) as the first part of an entry. **Ans** and the operator are both displayed.

About the TI-34 II (Continued)



Resetting the TI-34 II

Pressing [ON] and [CLEAR] simultaneously or pressing [2nd] [RESET] , selecting **Y** (yes), and then pressing [ENTER] resets the calculator.

Resetting the calculator:

- Returns settings to their defaults: Standard notation (floating decimal) and degree mode.
- Clears memory variables, pending operations, entries in history, statistical data, constants (stored operations), and **Ans** (Last Answer).

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

Automatic Power Down™ (APD™)

If the TI-34 II remains inactive for about 5 minutes, Automatic Power Down (APD) turns it off automatically. Press [ON] after APD. The display, pending operations, settings, and memory are retained.

Activities

The Better Batter—The Fix Key

Overview

Students use 2nd [FIX] on the TI-34 II to change numbers to different place values. Students calculate batting averages using the TI-34 II and then round their answers to 3 decimal places.

Math Concepts

- rounding
- place value
- division
- comparing and ordering decimals

Materials

- TI-34 II
- pencil
- student activity (page 4)

Introduction

1. Have students practice rounding the following numbers to 3 decimal places using pencil and paper.

   a. 2.35647 *2.356*
   b. 15.3633 *15.363*
   c. 0.02698 *0.027*

2. Have students round the following numbers to 4 decimal places using the TI-34 II.

   a. 4.39865 *4.3987*
   b. 72.965912 *72.9659*
   c. 0.29516 *0.2952*
   d. 0.00395 *0.0040*

Activity

Present the following problem to students:

You are going to play Virtual Baseball. You need to select 9 players from the list to be on your team. Choose the players with the best batting averages. Find the batting averages (number of hits/ number of times at bat) rounded to 3 decimal places for each player. Make a list of your players in order, from highest to lowest.

See the table on the next page for solutions.

1. Enter the first number and press ENTER.

   4.39865

2. Press 2nd [FIX] to display the menu that lets you set the number of decimal places.

   F0123456789

3. Press **4** to select 4 decimal places.

   4.39865
   4.3987

The Better Batter—The Fix Key (Continued)

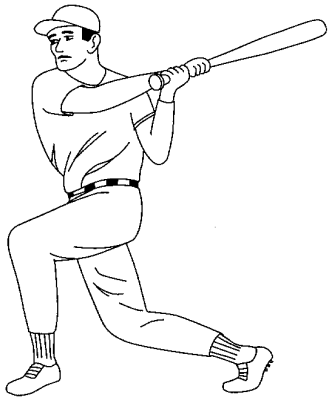
Player	Number of Hits	Number of Times at Bat	Batting Average
C. Ripken	122	368	0.332
Puckett	119	363	0.328
Molitor	119	364	0.327
Greenwell	104	334	0.311
Tartabull	103	311	0.331
Palmeiro	120	366	0.328
Franco	109	344	0.317
Joyner	105	338	0.311
Boggs	106	329	0.322
Baines	91	290	0.314
Sax	113	388	0.291
Williams	20	74	0.270
Sheridan	15	63	0.238
Barfield	64	284	0.225
Mattingly	109	367	0.297
Hall	87	280	0.311

The Better Batter—
The Fix Key

Name _____

Date _____

1. Round the following numbers to 3 decimal places.
   a. 2.35647 _____
   b. 15.3633 _____
   c. 0.02698 _____
2. Using the TI-34 II, round the following numbers to 4 decimal places.
   a. 4.39865 _____
   b. 72.965912 _____
   c. 0.29516 _____
   d. 0.00395 _____



The Better Batter—
The Fix Key

Name _____

Date _____

Problem

You are going to play Virtual Baseball. You need to select 9 players from the list to be on your team. Choose the players with the best batting averages.

Procedure

1. Find the batting averages (number of hits ÷ number of times at bat) rounded to 3 decimal places for each player.

Player	Number of Hits	Number of Times at Bat	Batting Average (rounded to 3 decimal places)
C. Ripken	122	368	
Puckett	119	363	
Molitor	119	364	
Greenwell	104	334	
Tartabull	103	311	
Palmeiro	120	366	
Franco	109	344	
Joyner	105	338	
Boggs	106	329	
Baines	91	290	
Sax	113	388	
Williams	20	74	
Sheridan	15	63	
Barfield	64	284	
Mattingly	109	367	
Hall	87	280	

2. Make a list of your players in order, from highest to lowest.

Player 1 _____ Player 6 _____

Player 2 _____ Player 7 _____

Player 3 _____ Player 8 _____

Player 4 _____ Player 9 _____

Player 5 _____

Star Voyage—Scientific Notation

Overview

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

Math Concepts

- scientific notation
- addition
- division

Materials

- TI-34 II
- pencil
- student activity (page 8)

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 using the TI-34 II.

   a. 12 000 000 000 000 — 1.2×10^{13}
   b. 974 000 000 000 — 9.74×10^{11}
   c. 0.0000000000034 — 3.4×10^{-12}
   d. 0.00000000004 — 4×10^{-11}

3. Have students change the following numbers into floating decimal (standard 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*

1. Enter the first number.
   ←0000000000
2. Press [ENTER] to display the number in scientific notation.
   1. 2x10 13

1. Enter **5.8** and press [EE].
   5.8E
2. Enter **7** and press [ENTER].
   5.8E7
   58000000.

Note: To enter a negative number, press [(−)] and then enter the number.

Star Voyage—Scientific Notation (Continued)

Activity

Present the following problem to students:

You are a captain of a starship. You have been assigned to go to Alpha Centauri and you have 5 years to get there. The distance from the sun to Alpha Centauri is 2.5 x 10^{13} miles. The distance from the earth to the sun is approximately 9.3 x 10^{7} miles. Your ship can travel at the speed of light. You know that light can travel a distance of 6 x 10^{12} miles in 1 light year. Will you be able to get to Alpha Centauri on time?

Procedure

1. Using the TI-34 II, find the total distance you need to travel.

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

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

   $2.5000093 \times 10^{13} \div 6 \times 10^{12} = 4.166682167$ *years*

3. Can you make the trip in the given time?

   Yes

1. Press **2.5** [EE] **13** [+] **9.3** [EE] **7** [ENTER].

   2.5E13 + 9.3E→
   2.5000093×10^13

2. Press [÷] **6** [EE] **12** [ENTER].

   Ans÷6E12
   4.166682167

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 x 10^{13} miles. How long will it take you to get there from Earth?

≈15 years

Hint: The Earth is approximately 9.3 x 10^{7} miles from the Sun.

Star Voyage—Scientific Notation

Name _____

Date _____

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 II, change the following numbers into scientific notation.

Standard Notation	Scientific Notation
a. 12 000 000 000 000	_____
b. 974 000 000 000	_____
c. 0.0000000000034	_____
d. 0.0000000004	_____

3. Using the TI-34 II, change the following numbers into floating decimal notation (Standard).

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. You have been assigned to go to Alpha Centauri and you have 5 years to get there. The distance from the Sun to Alpha Centauri is 2.5×10^{13} miles. The distance from the Earth to the Sun is approximately 9.3×10^{7} miles. Your ship can travel at the speed of light. You know that light can travel a distance of 6×10^{12} miles in 1 light year. Will you be able to get to Alpha Centauri on time?

Procedure

1. Using the TI-34 II, find the total distance that you need to travel.

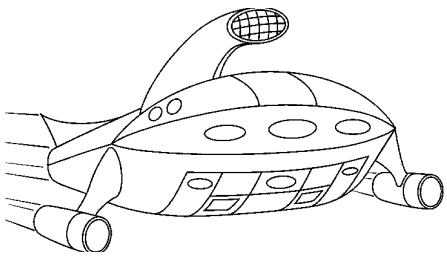
2. Next, find out how long it will take you to travel the distance. (Distance traveled ÷ 1 light year)

3. Can you make the trip in the given time?

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.



Trig Functions

Overview

Students practice solving sine, cosine, and tangent ratios, and solve problems involving trigonometric ratios.

Math Concepts

- multiplication
- division
- trigonometric ratios

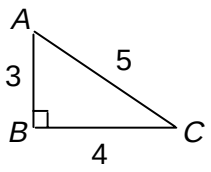
Materials

- TI-34 II
- pencil
- student activity (page 12)

Introduction

Introduce the trigonometric ratios to students.

sin = opposite leg ÷ hypotenuse
cos = adjacent leg ÷ hypotenuse
tan = opposite leg ÷ adjacent leg



1. Have students find the trigonometric ratios for the triangle using the above definitions. Round to the nearest hundredth if necessary. (Use 2nd [FIX] for rounding.)

   a. sin C — *3 ÷ 5 = 0.6*
   b. cos *C* — *4 ÷ 5 = 0.8*
   c. tan *C* — *3 ÷ 4 = 0.75*
   d. sin *A* — *4 ÷ 5 = 0.8*
   e. cos *A* — *3 ÷ 5 = 0.6*
   f. tan *A* — *4 ÷ 3 = 1.33*

2. Have students find the value of each ratio using the TI-34 II. Round to the nearest 10 thousandth.

   a. sin 71° — *0.9455*
   b. tan 31° — *0.6009*
   c. cos 25° — *0.9063*

3. Have students find the measure of each angle using the TI-34 II. Round to the nearest degree.

   a. sin *B* = 0.4567 — *27 degrees*
   b. cos *A* = 0.6758 — *47 degrees*
   c. tan *C* = 5.83 — *80 degrees*

To set 2 decimal places:

1. Press 2nd [FIX].
   F0123456789
2. Press **2** to select 2 decimal places and press ENTER.

To find sin 65°,

1. Press 2nd [FIX] **4**.
2. Press 2nd [TRIG] ENTER.
   sin(
3. Enter **65**, and press) ENTER.
   sin(65)
   0.9063

To find *A* when sin *A*= 0.2756:

1. Press 2nd [FIX] **0**.
2. Press 2nd [TRIG] ▶ ENTER.
   sin⁻¹(
3. Enter **0.2756**, and press) ENTER.
   sin⁻¹(0.2756
   16

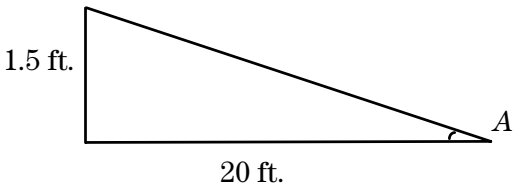
Activity

Present the following problem to students:

You need to build a ramp to your front door. The distance from the ground to the bottom of the door is 1.5 feet. You don't want the angle of incline to be more than 6 degrees. The distance from the street to the door is 20 feet. Is there enough room to build the ramp?

Procedure

1. Make a drawing of the problem.



2. Use the trigonometric ratio tan = opposite leg ÷ adjacent leg to find angle *A*.

   Angle A is 4.3 degrees (rounded to the nearest tenth). Yes, there is enough room to build the ramp.

Extension

Present the following problem to students:

You want to start the ramp 15 feet away from the door. Can you do that and still have the angle of incline be less than 6 degrees?

Yes, angle A is 5.7°.

1. Press 2nd [FIX] **1**.
2. Press 2nd [TRIG] ▶ ▶ ▶ ▶ ▶ ENTER.

   $\tan^{-1}$(
3. Enter **1.5** ÷ **20** and press) ENTER.

   $\tan^{-1}$(1.5÷20)
   4.3

1. Enter **1.5 ÷ 15** and press ENTER.

   0.1
2. Press 2nd [TRIG] ◀ ENTER 2nd [ANS]) ENTER.

   $\tan^{-1}$(Ans)
   5.7

Trig Functions

Name _____

Date _____

1. Find the trigonometric ratios for the triangle. Round to the nearest hundredth. (Use 2nd [FIX] for rounding.)

   a. sin C _____

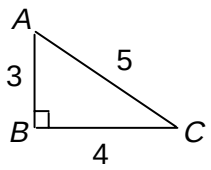
   b. cos C _____

   c. tan C _____

   d. sin A _____

   e. cos A _____

   f. tan A _____



2. Using the TI-34 II, find the value of each ratio. Round to the nearest ten thousandth.

   a. sin 71° _____

   b. tan 31° _____

   c. cos 25° _____

3. Using the TI-34 II, find the measure of each angle. Round to the nearest degree.

   a. sin B = 0.4567 _____

   b. cos A =0.6758 _____

   c. tan C = 5.83 _____

Trig Functions

Name _____

Date _____

Problem

You need to build a ramp to your front door. The distance from the ground to the bottom of the door is 1.5 feet. You don't want the angle of incline to be more than 6 degrees. The distance from the street to the door is 20 feet. Is there enough room to build the ramp?

Procedure

1. Make a drawing of the problem.

2. Use the trig ratio *tan* = *opposite leg* ÷ *adjacent leg* to find angle *A*. (Round your answer to the nearest tenth.)

3. Is there room to build the ramp?

Extension

You want to start the ramp 15 feet away from the door. Can you do that and still have the angle of incline be less than 6 degrees?

What's My Score?—1-Variable Statistics

Overview

Students use the given test scores to find averages.

Math Concepts

- averages

Materials

- TI-34 II
- pencil
- student activity (page 16)

Introduction

Discuss finding averages with your students.

Activity

Present the following problem to students:

You and your friend are having a contest. Whoever gets the highest average on their math tests for one quarter wins. Your scores are 98, 89, 78, 98, and 100. Your friend's scores are 89, 89, 97, 90, and 100. Who is the winner?

Procedure

1. Have students find the average of their scores using the TI-34 II. Remember to enter 2 as the frequency for 98 and 1 for all others.

Be sure that the TI-34 II is set to floating decimal before you begin this activity. Press 2nd [FIX] ⊡.

1. Press 2nd [STAT] ENTER to select **1-VAR** mode.
2. Press DATA and enter your first score.

   X1 = 98
3. Press ⊙ and enter **2** as the frequency for 98.

   FRQ = 2
4. Press ⊙. Continue entering your scores and frequencies, pressing ⊙ after each score and frequency.
5. When finished, press STATVAR ⊙ to select $\bar{x}$, the average. Write it down.

   n $\bar{x}$ Sx σx →
   92.6

What's My Score?—1-Variable Statistics

(Continued)

2. Now find the average of your friend's scores. Remember to put 2 as the frequency for 89 and 1 for all others.

3. Who won?

   Your friend: 93 (You had 92.6.)

Extension

Present the following problem to students:

Your friend took a test on the day you were absent and scored 95. What score do you need to get so that you are the winner?

Your score: 98

Note: Make sure you exit the **STAT** mode before going on to another problem.

1. Press 2nd [STAT] ▶ ▶ to select **CLRDATA**. Press ENTER.
2. Press DATA and enter the friend's first score.

   X1 = 89
3. Continue entering the friend's scores and frequencies, following steps 3 and 4 on the previous page.
4. When finished, press STATVAR ▶ to select $\bar{x}$, the average. Write it down.

   n $\bar{x}$ Sx σx →
   93

1. Press 2nd [STAT] and ▶ ▶ to **CLRDATA**. Press ENTER.
2. Recalculate your friend's average, making sure to include the new score.
3. Use guess and check to figure out what score you need to get.
4. To exit **STAT** mode, press 2nd [EXIT STAT] ENTER.

What's My Score?— 1-Variable Statistics

Name _____

Date _____

1. You and your friend are having a contest. Whoever gets the highest average on their math tests for one quarter wins. Your scores are 98, 89, 78, 98, and 100. Your friend's scores are 89, 89, 97, 90, and 100. Who is the winner?

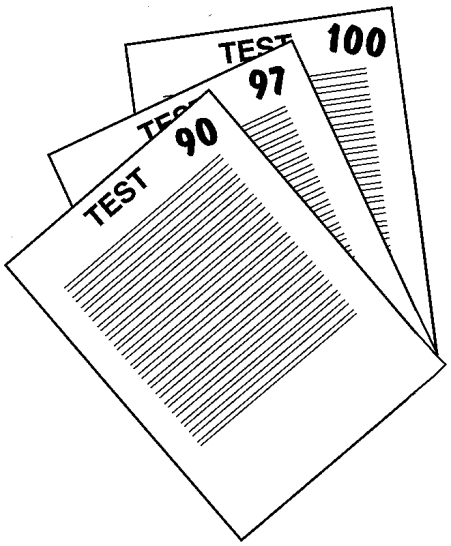
   Your average _____

   Your friend's average _____

2. Your friend took a test on the day you were absent and scored 95. What score do you need to get so that you are the winner?

   Your friend's new average _____

   Your new score _____



Heart Rates—1-Variable Statistics

Overview

Students use the statistics functions of the TI-34 II calculator to investigate the effect of exercise on heart rate.

Math Concepts

- mean, minimum, maximum, and range

Materials

- TI-34 II
- stopwatch or a watch with a second hand
- student activity (page 19)

Introduction

Students may be placed in smaller groups for this activity to minimize the amount of data to be entered. Ask the 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 the students check their resting heart rate by timing their pulse for 1 minute. (You could time them for 10 seconds and have them multiply by 6, but this could be the most quiet minute of your day!)

2. Collect data on the chart. Enter each student's heart rate and enter 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 II.

   a. Enter the first heart rate on the chart as the first **X** value, and the number of tallies for that heart rate as the frequency.

   b. You must press ⊙ between entries. For example, enter the first heart rate, and then press ⊙. Enter the first frequency, and then press ⊙.

1. Press [2nd] [STAT] [ENTER].
2. Press [DATA] to enter the heart rates and frequencies.

   X1=

3. Enter first heart rate and press ⊙.

   FRQ=

4. Enter frequency and press ⊙.

   X2=

For an example, we assume a class of 22 students, three having a heart rate of 60, five with a rate of 61, six with 62, three with 63, one with 64, and four with 65.

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

   How many heartbeats were there in one minute? Is the average heart rate higher or lower than you expected?

   The numbers show the results of the example described above. The results your students obtain will vary depending on the size of the class or group, and the heart rate readings.

5. Now we will see the effect of some exercise on heart rate. Tell the 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:

   a. *Time your pulse for 1 minute.*
   b. *Record your heart rate as before.*
   c. *Enter the data into the calculator.*
   d. *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 two averages.

8 How fit is the class? If the class (or individual) heart rate after jumping jacks is less than 90, then you are in great shape. If it is higher than 125, then you are in poor shape.

9. Instruct students to make a histogram of the 3 sets of data they collected. Ask students:

   How are the histograms the same? How are they different? Is the data grouped the same or is it more spread out in one graph compared to another?

5. Repeat steps 3 and 4.

1 Press [STAT VAR]. **n** should equal the total number of students sampled.

n x̄ Sx σx →
22

2. Press ▶ to **x̄** to see the average heart rate.

n x̄ Sx σx →
62.27272727

3. Press ▶ ▶ ▶ to **Σx**.

Σx Σx² →
1370

Heart Rates—
1-Variable Statistics

Name _____

Date _____

Problem

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

Procedure

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

Heartbeats per minute (resting)	Frequency

2. What is the class (group) average?

3. What is the total number of heartbeats for the minute?

Heart Rates—
1-Variable Statistics

Name _____

Date _____

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

Heartbeats per minute (running)	Frequency

5. What is the class (group) average?

6. What is the total number of heartbeats for the minute?

Heart Rates—
1-Variable Statistics

Name _____

Date _____

7. Use the following 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. How fit is the class?

Note:If the class (or individual) heart rate after jumping jacks is less than 90, then you are in great shape. If it is higher than 125, then you are in poor shape.

Name _____

Date _____

11. Now make a histogram for each of the 3 sets of data you collected.

Resting **Running** **Jumping**

How are the histograms the same? How are they different?

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

WNBA Stats—2-Variable Statistics

Overview

Students use WNBA Statistics to explore the relationship between 2 variables. They use the TI-34 II to compute the regression equation and evaluate some values.

Math Concepts

- 2-variable statistics

Materials

- TI-34 II
- pencil
- student activity (page 26)

Activity

Present the following problem to students:

Do you think WNBA (Women's National Basketball Association) playing time (in minutes per game) is related to how many points a player scores? Do you think it is related to how many rebounds they get? Or is it related to their field-goal percentage?

Procedure

1. Put the calculator in STAT mode.

   1. Press [2nd] [STAT] and press ▶ to select **2 -VAR**.

      1-VAR 2-VAR

   2. Press [ENTER].

2. Enter the data for points per game and playing time in minutes. Enter the points as the **X**-variable and playing time as the **Y**-variable.

   1. Press [DATA].

      X1=

   2. Enter **10.1** (Rhonda Mapp's points).

      X1=10.1

   3. Press ▼.

      Y1=1

   4. Enter **21.7** (Rhonda Mapp's playing time).

      Y1=21.7

   5. Press ▼ to enter the data for the second player.

   6. Continue to enter data for each player in the chart. Press ▼ after entering each number.

3. Calculate the statistical data. You may want to fix the decimal to 2 places before doing the statistical calculations.

Ask students:

- *What is the average points scored for the players shown?*
- *What is the average playing time?*
- *What is the total number of points scored per game for all the given players?*

You may want to discuss the other statistical variables and what they mean.

4. The form of the equation is ***y = ax + b***. Write the equation for the line of best fit (round to the nearest hundredth).

   *1.56*x + *7.02*

5. The closer the correlation coefficient value is to 1 (or –1), the better the correlation between the two variables. Write the correlation coefficient.

   r = *.91*

6. Now calculate how many minutes you would expect a player to play if she averages 15 points per game.

1. Press [2nd] [FIX].
   F0123456789
2. Press ▶ to **2**.
   F012<u>3</u>456789
3. Press [ENTER].

1. Press [STAT VAR].
   n x̄ Sx σx ȳ →
2. Press ▶ to **x̄**.
   n x̄ Sx σx ȳ
   9.33
3. Press ▶ ▶ ▶ to **ȳ**.
   n x̄ Sx σx ȳ
   21.59
4. Press ▶ ▶ ▶ to **Σ*x***.
   Sy σy Σx →
   112.00
5. Press ▶ until you get to **a**. This is the slope of the line of best fit.
   Σxy a b r
   1.56
6. Press ▶ to **b**. This is the y-intercept of the line.
   ΣXY a b r
   7.02
7. Press ▶ to **r**. This is the correlation coefficient.
   ΣXY a b r →
   0.91

1. Press ▶▶ to **y′**.
2. Press [ENTER].
3. Type **15** [)] and press [ENTER].
   y′(15)
   30.44

7. Now calculate how many points you would expect a player to score if she plays 35 minutes a game.

8. Discuss the correlation as a class. Ask students:
   - *Are there other factors affecting the players' minutes per game besides points scored?*
   - *What about defense, rebounding, etc.?*

Extension

Now have students use the calculator to investigate the correlation of the other data in the chart such as the relation of field-goal percentage to minutes per game, or rebounds per game to minutes per game. (Remember, since you have already entered the minutes in **Y**, you only need to enter the new data in **X**.)

Ask students:

Which two variables have the closest correlations? (That is, which have the correlation coefficient closest to 1 or –1?)

1. Press [STATVAR].
   n x̄ Sx σx ȳ
   12.00
2. Press ◀ ◀ to **x′**.
   x′ y′
3. Press [ENTER].
4. Type **35** [)] and press [ENTER].
   x′(35)
   17.92

WNBA Stats—
2-Variable Statistics

Name _____

Date _____

Problem

Do you think WNBA playing time (in minutes per game) is related to how many points a player scores? Do you think it is related to how many rebounds they get? Or is it related to their field goal percentage?

Procedure

Use the following table of data to explore the relationships of different pairs of data. Begin by entering the points per game as the **X** variable and the minutes per game as the **Y** variable.

Player	Field-Goal Percentage	Points per Game	Rebounds per Game	Minutes per Game
Rhonda Mapp	.506	10.1	4.3	21.7
Vicky Bullet	.441	13.3	6.5	31.6
Janeth Arcain	.426	6.8	3.6	21.9
Cynthia Cooper	.446	22.7	3.7	35
Elena Baranova	.420	12.9	9.3	33.6
Malgozata Dydek	.482	12.9	7.6	28
Heidi Burge	.509	6.7	3.3	16.7
Keri Chaconas	.297	4.8	.8	13.2
Rebecca Lobo	.484	11.7	6.9	29.2
Coquese Washington	.294	1.9	.9	8.1
Toni Foster	.467	4.9	1.9	13.6
Maria Stepanova	.426	3.3	1.9	6.5

WNBA Stats—
2-Variable Statistics

Name _____

Date _____

Extension

Use the calculator to investigate the correlation of the other data in the chart such as the relation of field-goal percentage to minutes per game, or rebounds per game to minutes per game. (Remember, since you have already entered the minutes in **Y**, you only need to enter the new data in **X**.)

1. What is the average field-goal percentage?

2. Write the equation for the line of best fit.

3. Write the correlation coefficient.

4. What is the average number of rebounds per game?

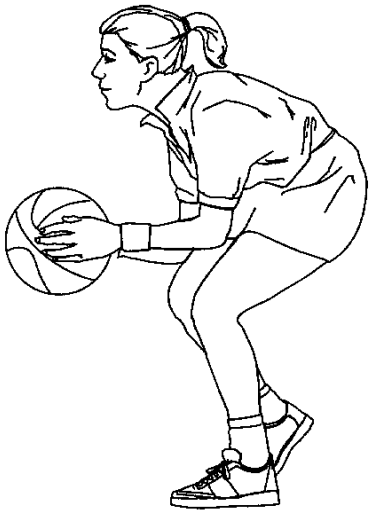
5. Write the equation for the line of best fit.

6. What is the total number of rebounds per game for all the given players?

7. Write the equation for the line of best fit.

8. Write the correlation coefficient.

9. Which 2 variables have the closest correlation? (That is, which have the correlation coefficient closest to 1 or -1?)



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 II
- pencil
- student activity (page 30)

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. $4\ 5/8 + 3\ 4/5$ — *$8\ 17/40$*
   b. $9\ 7/8 + 6\ 4/5$ — *$16\ 27/40$*
   c. $5\ 5/6 + 3\ 1/9$ — *$8\ 17/18$*
   d. $8\ 1/3 + 7\ 4/7$ — *$15\ 19/21$*

2. Have students practice simplifying fractions and mixed numbers.

   a. $9/12$ — *$3/4$*
   b. $9\ 6/8$ — *$9\ 3/4$*
   c. $4/6$ — *$2/3$*
   d. $8\ 4/24$ — *$8\ 1/6$*

1. Before you begin, be sure that the calculator is in mixed-number mode. Press [2nd] [FracMode] and press ▶ or ◀ to select the mixed number mode.

   A␣b/c d/e

2. Press [ENTER].

To simplify a fraction or a mixed number, enter the number and press [▸Simp] [ENTER]. For the first simplification problem at the left, enter **9** [/] **12** and press [▸Simp] [ENTER].

9/12▸Simp
3/4

If the result of a calculation is already displayed as a fraction that needs to be simplified, press [▸Simp] [ENTER], and the simplified form will be displayed.

You may need to press [▸Simp] [ENTER] more than once to get the fraction to its lowest terms.

Ans→Simp
18␣1/12

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 1/4 cups brown sugar
2 1/2 cups white sugar
1 1/2 cups butter
3/4 cups shortening
5 eggs
1 teaspoon salt
2 teaspoons baking powder
2 teaspoons baking soda
1 teaspoon vanilla
4 1/3 cups flour
5 3/8 cups oatmeal

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.

   Teaspoon measures: total = 6 tsp. = 2 T. = 1/8 C.
   5 eggs = 1 ¼ C.

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

   18 1/12 cups

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

   4 25/48

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.

My Favorite Recipe–Adding Fractions

Name _____

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:

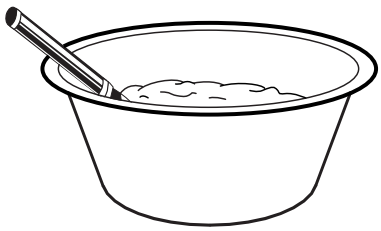
2 1/4 cups brown sugar
2 1/2 cups white sugar
1 1/2 cups butter
3/4 cups shortening
5 eggs
1 teaspoon salt
2 teaspoons baking powder
2 teaspoons baking soda
1 teaspoon vanilla
4 1/3 cups flour
5 3/8 cups oatmeal

Procedure

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

Ingredient	Cup Measurement	
a. 5 eggs	_____	cups
b. Other ingredients	_____	cups

(Salt, baking powder, baking soda, vanilla)



My Favorite Recipe–Adding Fractions

Name _____

Date _____

2. Using the TI-34 II, add all the measurements in the recipe.

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

3. Using the TI-34 II, 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.

Sewing Costumes—Fractions

Overview

Students will use the fraction capability of the TI-34 II calculator to determine if enough material is available to make a given number of costumes. They will also determine how much more is needed or how much extra they have.

Math Concepts

- multiplying mixed numbers by whole numbers
- subtracting mixed numbers

Materials

- TI-34 II
- pencil
- student activity (page 34)

Introduction

Set up the activity by discussing the concepts of multiplying mixed numbers by whole numbers, and subtracting mixed numbers.

1. Have students practice multiplying mixed numbers by whole numbers (and simplifying where necessary):

   a. $3\frac{3}{5} \times 7$ — *$25\frac{1}{5}$*
   b. $9\frac{7}{8} \times 4$ — *$39\frac{1}{2}$*
   c. $4\frac{1}{7} \times 5$ — *$20\frac{5}{7}$*
   d. $7\frac{4}{5} \times 3$ — *$23\frac{2}{5}$*

2. Have students practice subtracting mixed numbers.

   a. $4\frac{5}{8} - 3\frac{4}{5}$ — *$\frac{33}{40}$*
   b. $9\frac{7}{8} - 6\frac{3}{4}$ — *$3\frac{1}{8}$*
   c. $5\frac{5}{6} - 3\frac{1}{9}$ — *$2\frac{13}{18}$*
   d. $8\frac{1}{3} - 7\frac{4}{7}$ — *$\frac{16}{21}$*

Activity

Present the following problem to students:

You are sewing costumes for a dance festival. Each costume takes $2\frac{3}{8}$ yards of material. You have 23 yards to make 14 costumes. Do you have enough?

If you do, do you have any extra? How much? Do you need more? How much?

If the material cost $3.98 per yard, how much will it cost to buy the additional material?

How many costumes could you make with the material you have?

What if each costume only required $1\frac{2}{3}$ yards? Would you have enough?

Be sure that the calculator is in mixed-number mode by pressing 2nd [FracMode] and pressing ▶ or ◀ to select the mixed number mode.

A␣b/c **d/e**

To enter the first problem, press **3** UNIT **3** / **5** × **7** ENTER.

3␣3/5×7
25␣1/5

To simplify, press ▸Simp ENTER.

Before starting the problem, set your calculator for two decimal places by pressing 2nd [FIX] **2**.

Procedure

1. Using the TI-34 II, find the total yardage needed for the 14 costumes by multiplying the amount of material needed for the costume by the number of costumes needed.

   33 2/8 yards

2. Next, simplify the result.

   The total yardage needed is 33 ¼ yards, but you only have 23 yards. You don't have enough.

3. Find out how much more you need by subtracting the yardage you have from the yardage you need.

   10 1/4 yards

4. Compute how much it will cost to buy the additional material by multiplying the additional amount by $3.98.

   $40.80

5. Find out how many costumes you could make with the material you have. After the students make the calculations, ask them what the answer means. Can they make nine or ten costumes?

   9

6. Find out if you would have enough material for all 14 costumes if each costume only required 1 2/3 yards by multiplying the two numbers.

   You still don't have enough.

Extension

Have the students determine how much material it would take to make a shirt for everyone in the class.

Be sure your calculator is in mixed number mode before you begin.

1. Press **2** UNIT **3** / **8** × **14** ENTER.

   2␣3/8×14
   33␣2/8

2. To simplify, press ▸Simp ENTER.

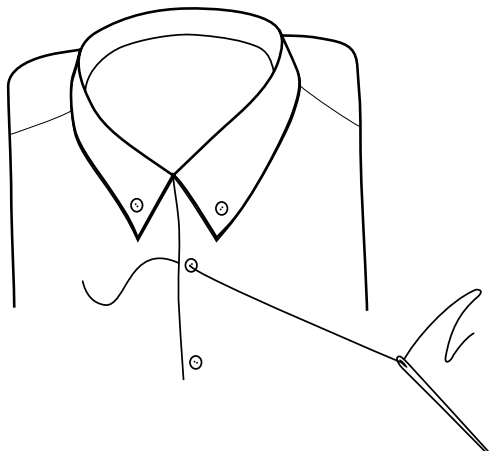
   Ans▸Simp
   33␣1/4

Sewing Costumes—Fractions

Name _____

Date _____

1. Using the TI-34 II, practice multiplying mixed numbers by whole numbers.
   a. $3\frac{3}{5} \times 7 =$ _____
   b. $9\frac{7}{8} \times 4 =$ _____
   c. $4\frac{1}{7} \times 5 =$ _____
   d. $7\frac{4}{5} \times 3 =$ _____
2. Practice subtracting mixed numbers.
   a. $4\frac{5}{8} - 3\frac{4}{5} =$ _____
   b. $9\frac{7}{8} - 6\frac{3}{4} =$ _____
   c. $5\frac{5}{6} - 3\frac{1}{9} =$ _____
   d. $8\frac{1}{3} - 7\frac{4}{7} =$ _____



Sewing Costumes—Fractions

Name _____

Date _____

Problem

You are sewing costumes for a dance festival. Each costume takes $2\frac{3}{8}$ yards of material. You have 23 yards of material to make 14 costumes. Do you have enough? If you do, do you have any extra? How much? Do you need more? How much?

Procedure

1. Using the TI-34 II, compute how many yards of material are needed for the costumes by multiplying the amount needed for each costume by the number of costumes.

   Total yardage needed for 14 costumes:

   Do you have enough?

2. Find out how much more you need by subtracting the amount of material you have from the total amount needed.

   Additional amount of material needed:

3. If the material costs $3.98 per yard, find out how much it will cost to buy the additional material. (Multiply the cost per yard by the additional yardage needed.)

   Cost to buy additional material: $

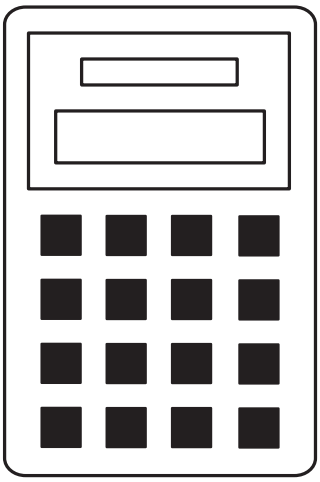
4. Determine how many costumes you could make with the material you have by dividing the yardage you have by the amount needed for each costume.

   Number of costumes with material on hand:

5. If each costume required only $1\frac{2}{3}$ yards, determine if you would have enough material to make the 14 costumes. Do you have enough?

Extension

If you wanted to make a shirt or other item, find out how much material it would take, and figure out how much material would be needed to make matching shirts for everyone in the class. How much would it cost to make shirts for the class?



How to Use the TI-34 II

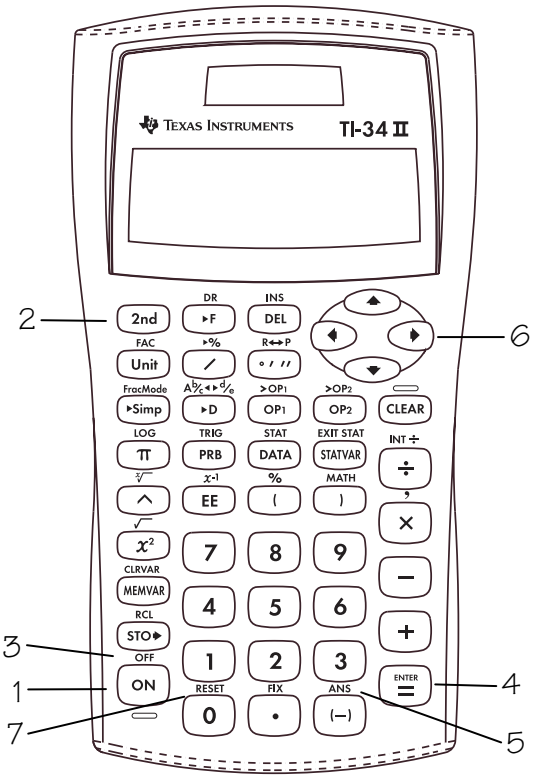
TI-34 II Basic Operations

1

Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

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. ◀ and ▶ move the cursor left and right to scroll the entry line. Press [2nd] ◀ or [2nd] ▶ to scroll to the beginning or end of the entry line.



Press ▲ and ▼ to move the cursor up and down through previous entries. Press [2nd] ▲ or [2nd] ▼ to scroll to the beginning or end of the history.

7. [2nd] [RESET] displays the **RESET** menu:

   Reset: N Y

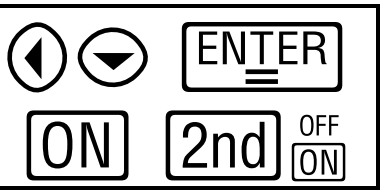
   - Press [ENTER] when **N** (no) is underlined to return to the previous screen without resetting the calculator.
   - Press [ENTER] when Y (yes) is underlined to reset the calculator. The message MEM CLEARED is displayed.

   Pressing [ON] and [CLEAR] *simultaneously* also resets the calculator immediately. No menu or message is displayed.

Notes

- The examples on the transparency masters assume all default settings.
- Resetting the calculator:
  - Returns settings to their defaults: floating decimal (standard) notation and degree mode.
  - Clears memory variables, pending operations, entries in history, statistical data, constants and (Last Answer) **Ans.**
- The entry line can contain up to 88 characters. When ← or → appear in the display, the entry line contains additional characters to the left or right. When ↑ or ↓ appear, additional characters are above and below the entry line.
- Press [ON] after Automatic Power Down™ (APD™). The display, pending operations, settings, and memory will be retained.

Arrows, Equals, On, Second, Off



Enter 46 - 23. Change 46 to 41. Change 23 to 26 and complete the operation. Enter 81 + 57 and complete the operation. Scroll to see your previous entries.

Press	Display
46 [−] 23	46-23
◀◀◀◀1 ▶▶ 6 [ENTER]	41-26 ↑ 15.
81 [+] 57 [ENTER]	81+57 ↑ 138.
[2nd] [OFF ON] [ON]	↑
▲▲▼	81+57 ↑

Reset

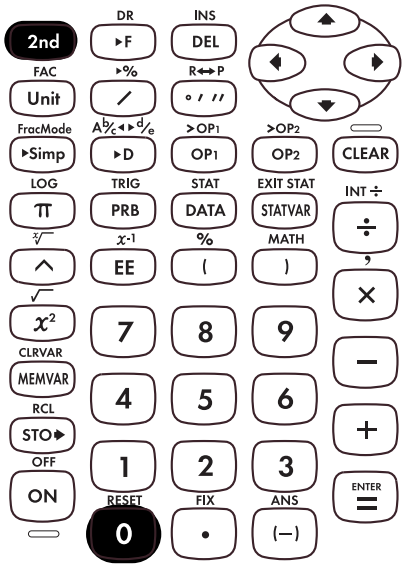
2nd RESET 0

Reset the calculator.

Press	Display
2nd RESET 0	RESET: N Y
▶	RESET: N Y
ENTER	MEM CLEARED
CLEAR	

Pressing ON and CLEAR at the same time also resets the calculator immediately. No menu or message is displayed.

Using 2nd RESET 0 or ON and CLEAR returns all settings to their defaults and clears the memory.

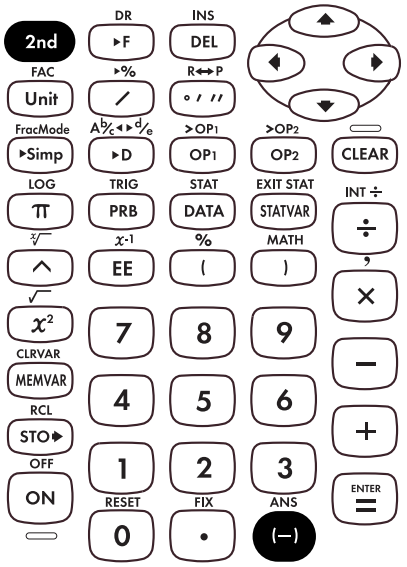


Last Answer (Ans)

2nd ANS (−)

Use Last Answer (**Ans**) to calculate $(2+2)^2$.

Press	Display
2 + 2 ENTER	2+2 4.
2nd ANS (−) x^2 ENTER	Ans² 16.



Editing the Display

2

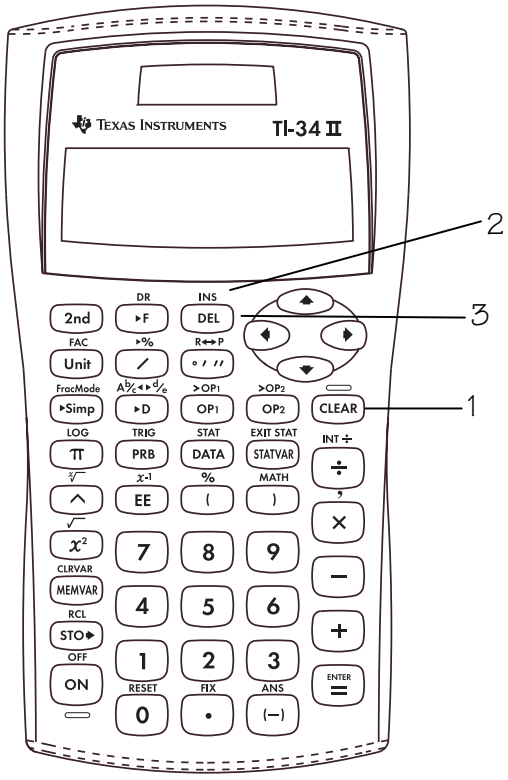
Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

1. [CLEAR] clears characters and error messages. Once the display is clear, it moves the cursor to the most recent entry.
2. [2nd] [INS] inserts a character at the cursor.
3. [DEL] deletes the character at the cursor or at the immediate left of the cursor. Hold [DEL] down to delete all characters to the right.

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, Insert

DEL 2nd INS DEL

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

Press	Display
4569 + 285	4569+285
◀ ◀ ◀ ◀ ◀ ◀ DEL	459+285
▶ ▶ ▶ ▶	459+2865
2nd INS DEL 6	
ENTER	459+2865 ↑ 3324.

Clear

CLEAR

Enter 21595.
Clear the 95.
Clear the entry.

Press	Display
21595	21595
◀◀ CLEAR (Clear to right of cursor)	215
CLEAR (Clear entry)	

Basic Math

3

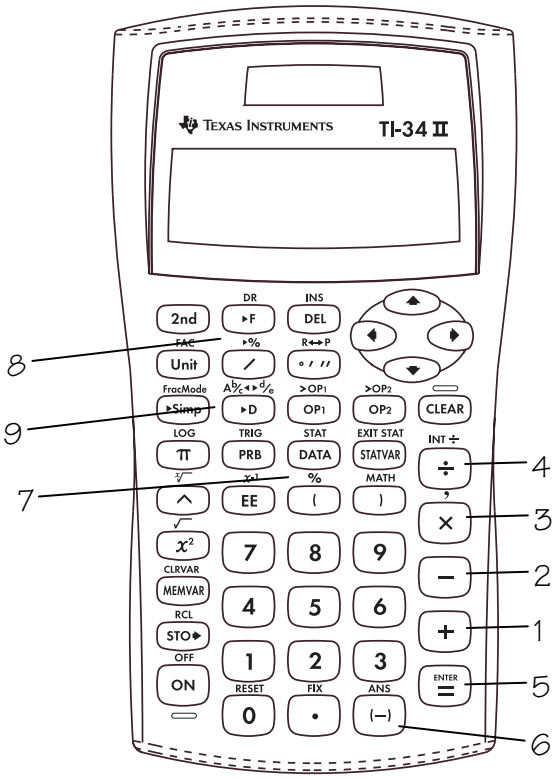
Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

1. [+] adds.
2. [−] subtracts.
3. [×] multiplies.
4. [÷] divides.
5. [ENTER] completes the operation or executes a command.
6. [(−)] lets you enter a negative number.
7. [2nd] [%] designates an entry as a percent.
8. [2nd] [▸%] converts an entry to a percent.
9. [▸D] converts an entry to a decimal.

Notes

- The examples on the transparency masters assume all default settings.
- The TI-34 II allows implied multiplication. Example: 3 (4+3) = 21
- Do not confuse [(−)] with [−]. Use [−] for subtraction.
- Results of percent calculations display according to the decimal notation mode setting.



Add, Subtract, Multiply, Divide, Equals

[+] [−] [×] [÷]
[ENTER]

Find: 2 + 54 - 6 =
16 x 21 =
78 ÷ 2 =
12 x (5 + 6) =

Press	Display
2 [+] 54 [−] 6 [ENTER]	2+54−6 ↑ 50.
16 [×] 21 [ENTER]	16×21 ↑ 336.
78 [÷] 2 [ENTER]	78÷2 ↑ 39.
12 [(] 5 [+] 6 [)] [ENTER]	12(5+6) ↑ 132.

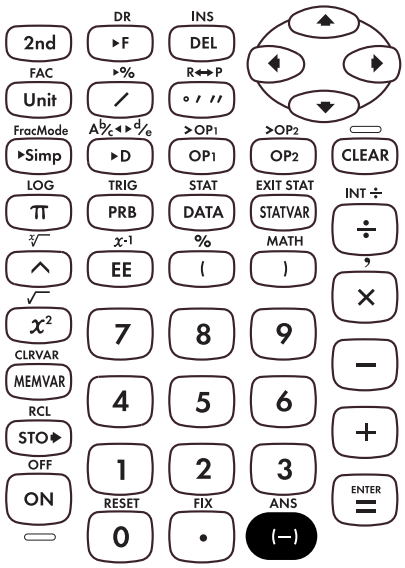
(The last example illustrates implied multiplication)

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	-3+12 ↑ 9.

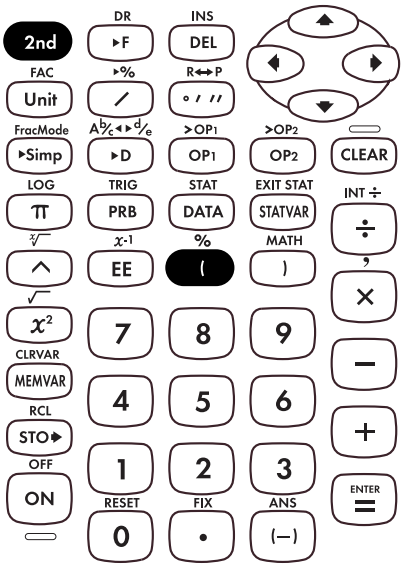


Percent

2nd %

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

Press	Display
15	15
2nd % (× 80 ENTER	15%x80 ↑ 12.



Order of Operations

4

Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

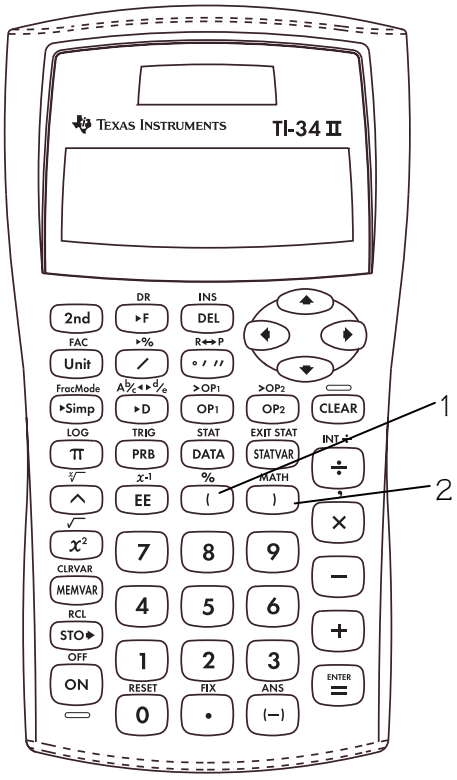
1. (opens a parenthetical expression.
2.) closes a parenthetical expression.

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 II completes calculations.
- Operations inside parentheses are performed first. Use ( ) to change the order of operations and, therefore, change the result.

  Example: 1 + 2 x 3 = 7

  (1 + 2) x 3 = 9



Equation Operating System (EOS™)

1 (first)	Expressions inside [(] [)].
2	Functions that need a [)] and precede the expression, such as the sin, [2nd] [LOG] [π] or [2nd] [R↔P] [o ′ ″] menu items.
3	Functions entered after the expression, such as [x^2] and angle unit modifiers (°, ′, ″, r).
4	Fractions.
5	Exponentiation ([^]) and roots ([2nd] [$\sqrt[x]{\ }$] [^]).
6	Negation ([(-)]).
7	Permutations (nPr) and combinations (nCr).
8	Multiplication, implied multiplication, and division.
9	Addition and subtraction.
10	Conversions ([2nd] [Ab/c↔d/e] [▸D], [▸D], [▸F] and ▶DMS).
11 (last)	[ENTER] completes all operations and closes all open parentheses.

Order of Operations

[+] [×] [(] [)]

1 + 2 x 3 =

Press	Display
1 [+] 2 [×] 3 [ENTER]	1+2x3 7.

(1 + 2) x 3 =

Press	Display
[(] 1 [+] 2 [)] [×] 3 [ENTER]	(1+2)x3 ↑ 9.

Order of operations used in these examples

1. Expressions in parentheses

2. Multiplication/division

3. Addition/subtraction

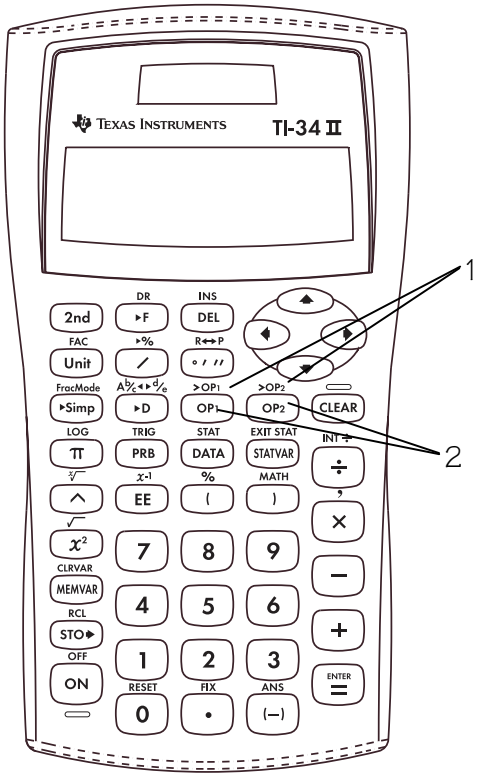
Stored Operations

5

Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

1. 2nd [▸OP1] or 2nd [▸OP2] let you store an operation.
2. OP1 or OP2 recalls and displays the stored operation on the entry line.



Notes

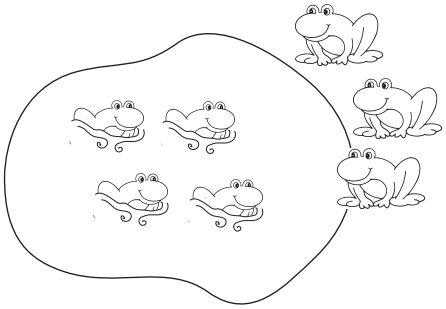
- The examples on the transparency masters assume all default settings.
- The TI-34 II stores two operations, **OP1** and **OP2**. To store an operation to **OP1** or **OP2** and recall it:
  1. Press 2nd [▸OP1] or 2nd [▸OP2].
  2. Enter the operation (any combination of numbers, operators, or menu items and their arguments).
  3. Press ENTER to save the operation to memory.
  4. OP1 or OP2 recalls and displays the operation on the entry line. The TI-34 II automatically calculates the result and displays the counter on the left side of the result line. (You do not have to press ENTER.)

     You can set the TI-34 II to display only the counter and the result (excluding the entry). Press 2nd [▸OP1] or 2nd [▸OP2], press ◀ until the = is highlighted (▤). Repeat to toggle this setting off.

Addition as "counting on"

[OP1] [2nd] [▸OP1 / OP1]

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?

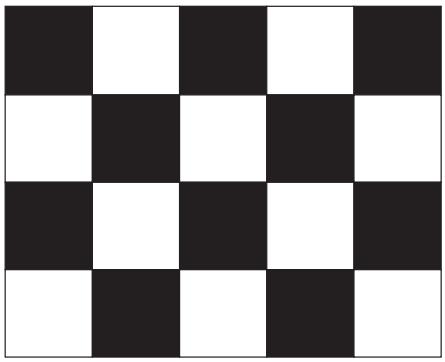


Press	Display
Store the operation: [2nd] [▸OP1 / OP1]	OP1 =
[+] 1 [ENTER]	OP1 = +1
Initialize using 4: 4	4
Add 1 one at a time: [OP1]	4 + 1 → 5
[OP1]	5 + 1 → 6
[OP1]	6 + 1 → 7

Multiplication as "repeated addition"

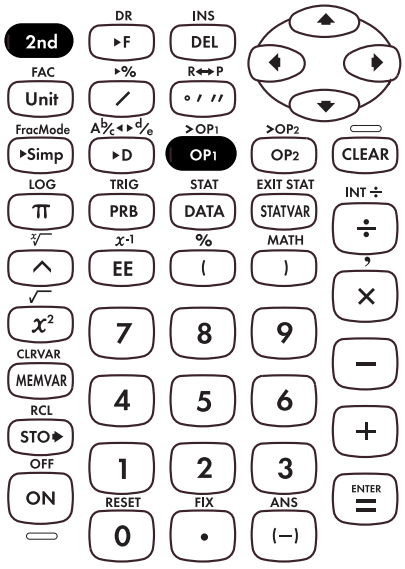
[OP1] [2nd] [▸OP1 / OP1]

Maria put new tile in her kitchen. She made 4 rows with 5 tiles in each row. Use repeated addition to find out how many tiles she used.



Press	Display
Store the operation: [2nd] [▸OP1 / OP1]	OP1 =
[+] 5 [ENTER]	OP1 = +5
Initialize using 0: 0	0
Use the stored operation: [OP1]	0+5 1 5

Continued



Multiplication as "repeated addition" (Continued)

OP1 2nd ▸OP1 OP1

OP1

```
5+5
2                    10
```

OP1

```
10+5                  ↑
3                    15.
```

OP1

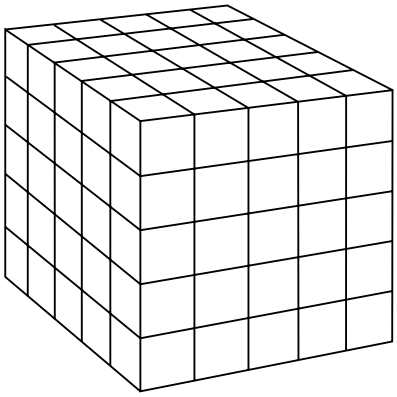
```
15+5                  ↑
4                    20.
```

Powers as "repeated multiplication"

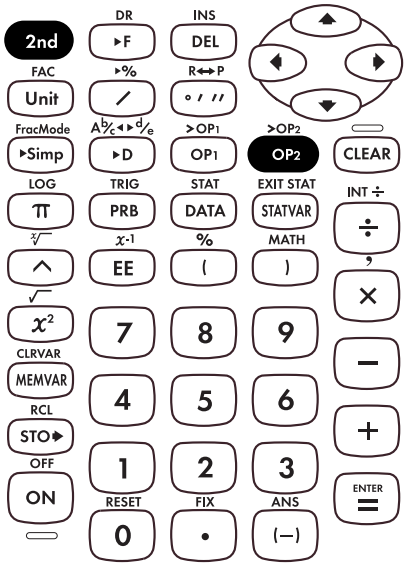
[OP2] [2nd] [▸OP2 / OP2]

Use this formula and repeated multiplication to find the volume of a cube with a base of 5 meters.

$$V = l \times w \times h = 5 \times 5 \times 5 = 5^3$$



Press	Display
Store the operation: [2nd] [▸OP2 / OP2]	OP2 =
[×] 5 [ENTER]	OP2 = x5
Initialize using 1: 1	1
[OP2]	1x5 ↑ 1 5.



Continued

Powers as "repeated multiplication" (Continued)

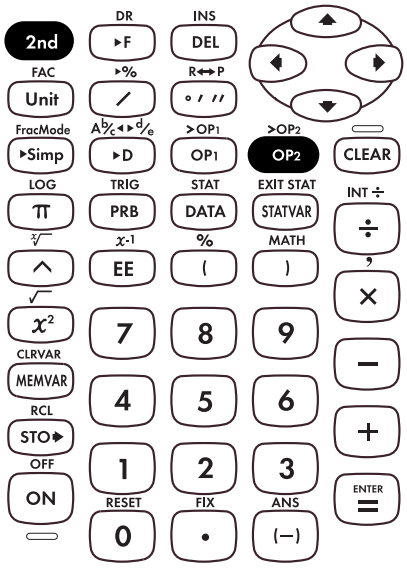
OP2 2nd ▸OP2 OP2

OP2

```
5x5                    ↑
2                  25.
```

OP2

```
25x5                   ↑
3                 125.
```

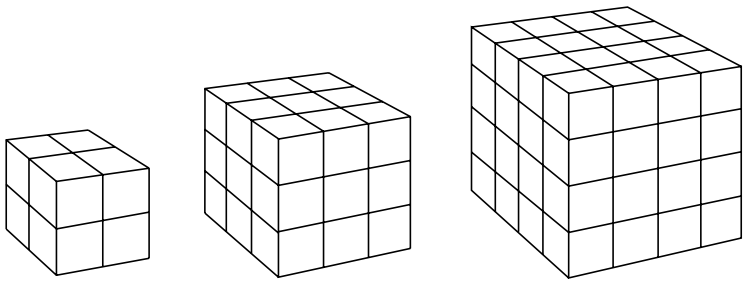


Using ^ as a constant

2nd OP2

Use this formula to find the volume of each cube.

$$V = base^3$$



Store the operation:

2nd OP2

```
OP2=
```

^ 3 ENTER

```
OP2=^3
```

Use the stored operation:

2 OP2

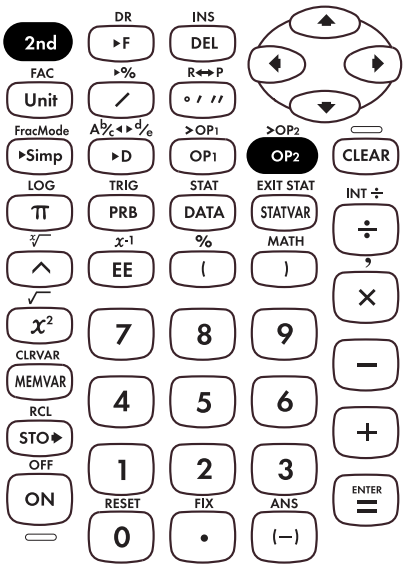
```
2^3                    ↑
1                      8
```

3 OP2

```
3^3                    ↑
1                      27
```

4 OP2

```
4^3                    ↑
1                      64
```



Decimals and Decimal Places

6

Keys

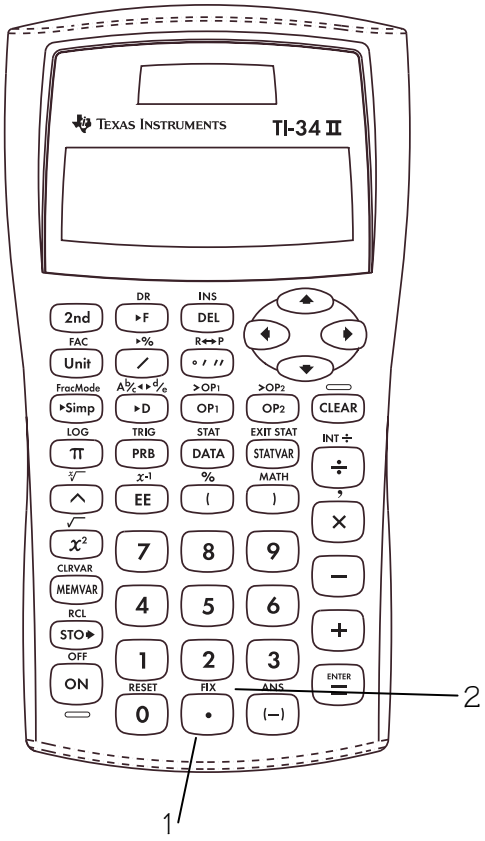
These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

1. [.] enters a decimal point.
2. [2nd] [FIX] displays the following menu, which lets you set the number of decimal places.

   F 0 1 2 3 4 5 6 7 8 9

   F Sets floating decimal (standard) notation. This is the default setting.

   0-9 Sets the number of decimal places.



Notes

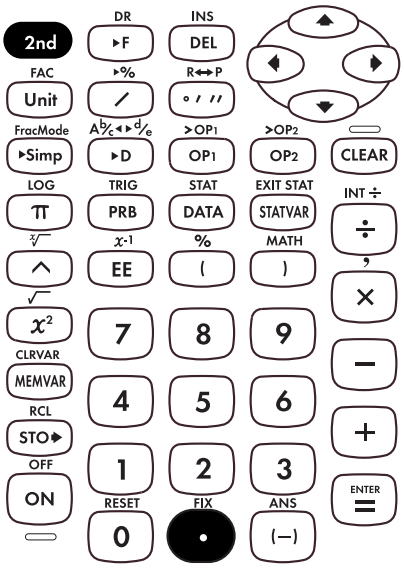
- The examples on the transparency masters assume all default settings.
- [2nd] [FIX] [.] removes the setting and returns to standard notation (floating decimal).
- The **FIX** setting affects all decimal results including the mantissa of scientific notation results.
- The TI-34 II automatically rounds 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 II 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].
- All results are displayed to the FIX setting until you clear the setting by either pressing [2nd][FIX] [.] or selecting F (Floating) on the decimal notation menu. Resetting the calculator also clears the **FIX** setting.
- After pressing [2nd][FIX], you can select the number of decimal places in two ways:
  - Press ◀ or ▶ to move to the number of decimal places you want, and then press [ENTER], or
  - Press the number key that corresponds to the number of decimal places you want.
- **FIX** affects only the results, not the entry.

Decimal, Fix

[•] [2nd] [FIX •]

Round 12.345 to the hundredths place, to the tenths place, and then cancel the FIX setting.

Press	Display
12 [•] 345	12.345
[2nd] [FIX •]	F0123456789 -
2	12.345
[ENTER]	12.345 ↑ 12.35 FIX
[2nd] [FIX •] 1	12.345 ↑ 12.3 FIX
[2nd] [FIX •] [•]	12.345 ↑ 12.345



Memory 7

Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

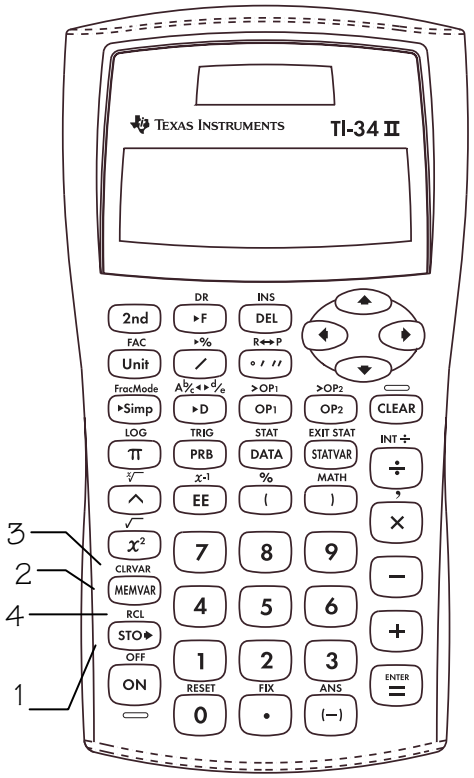
1. [STO▸] displays the following menu of variables:

   A B C D E Lets you select a variable in which to store the displayed value. The new variable replaces any previously stored value.

   rand Lets you set a seed value for random integers.

2. [MEMVAR] displays the following menu of variables:

   A B C D E Lets you view the stored value before pasting it in variable form to the display.



3. [2nd] [CLRVAR] clears all variables.

4. [2nd] [RCL] displays the following menu of variables.

   A B C D E Lets you view the stored value before pasting it to the display.

Notes

- The examples on the transparency masters assume all default settings.
- You can store a real number or an expression that results in a real number to a memory variable.
- When you select a variable using [MEMVAR], the variable (**A**, **B**, **C**, **D**, or **E**) is displayed on the entry line.

  When you select a variable using [2nd] [RCL], the value of the stored variable is displayed on the entry line.
- Resetting the calculator clears all memory variables.
- For more about **rand**, see Chapter 11, *Probability*.

Store, Memory Variable

STO▶ MEMVAR

Test scores: 96, 76, 83.
Weekly scores: 92, 83, 97, and 86.
Find the average of test and weekly scores. Find the final average.

Press	Display
96 + 76 + 83 ENTER	96+76+83 ↑ 255.
÷ 3 ENTER	Ans÷3 ↑ 85.
STO▶ ENTER	Ans→A ↑ 85.
92 + 83 + 97 + 86 ENTER	92+83+97+86 ↑ 358.
÷ 4 ENTER	Ans÷4 ↑ 89.5
+ MEMVAR ENTER ENTER	Ans+A ↑ 174.5
÷ 2 ENTER	Ans÷2 ↑ 87.25

Store, Recall

STO▶ 2nd RCL STO▶

Which would be the better buy: 3 cassette tapes for $7.98, or 4 cassette tapes for $9.48?

Press	Display
7 • 98 ÷ 3 ENTER	7.98÷3 ↑ 2.66
STO▶ ENTER	Ans→A ↑ 2.66
9 • 48 ÷ 4 ENTER	9.48÷4 ↑ 2.37
STO▶ ◗ ENTER	Ans→B ↑ 2.37

View the first price again.

Press	Display
2nd RCL STO▶	A B C D E 2.66

View the second price again.

Press	Display
◗	A B C D E 2.37

Store, Recall

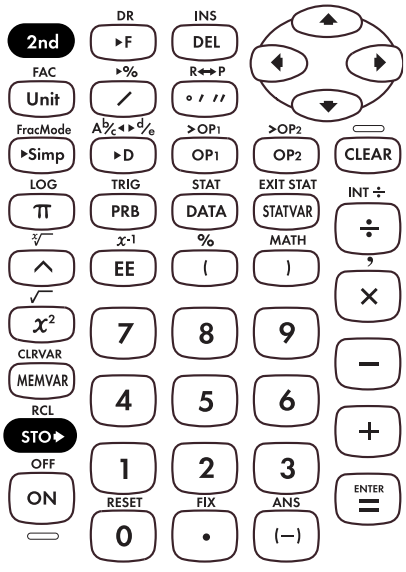
STO▶ 2nd RCL STO▶

Store	Purchase	Qty	Cost
1	shirts	2	$13.98 ea.
2	ties	3	$ 7.98 ea.
3	belt	1	$ 6.98
	suspenders	1	$ 9.98

How much did you spend at each store, and how much did you spend altogether?

Press	Display
2 × 13 • 98 ENTER	2x13.98 ↑ 27.96
STO▶	A B C D E
ENTER	Ans→A ↑ 27.96
3 × 7 • 98 ENTER	3x7.98 ↑ 23.94

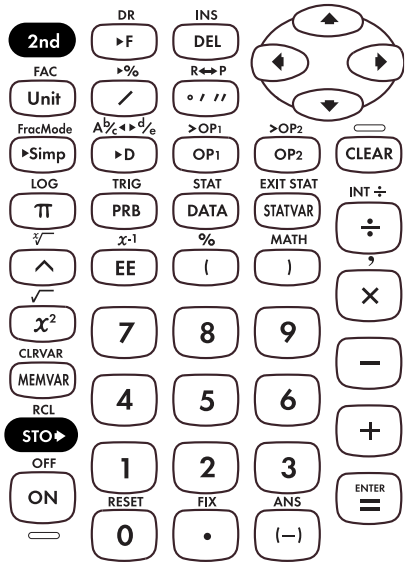
Continued



Store, Recall (Continued)

STO▶ 2nd RCL STO▶

Press	Display
STO▶ ▶ ENTER	Ans→B ↑ 23.94
6 • 98 + 9 • 98 ENTER	6.98+9.98 ↑ 16.96
STO▶ ▶ ▶ ENTER	Ans→C ↑ 16.96
2nd RCL STO▶ ENTER +	27.96+ ↑
2nd RCL STO▶ ▶ ENTER +	←.96+23.94+ ↑
2nd RCL STO▶ ▶ ▶ ENTER ENTER	27.96+23.94 →↑ 68.86



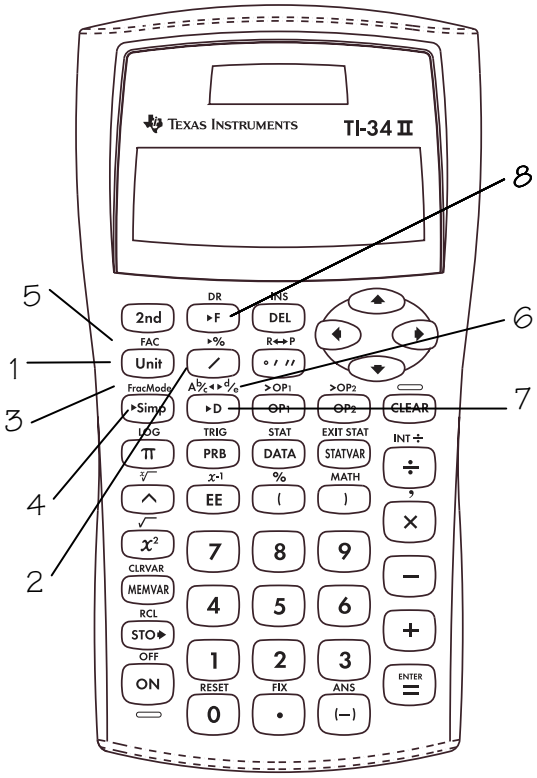
Fractions 8

Fraction Entry Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

1. [UNIT] separates a whole number from the fraction in a mixed number.
2. [/] separates a numerator from the denominator.
3. [2nd] [FracMode] displays a menu of 4 settings that let you specify how fraction results are displayed.

   A␣b/c— displays mixed number results.
   d/e—displays fraction results.
   Manual—displays unsimplified fractions.
   Auto—displays results that are simplified to lowest terms.



Simplification Keys

4. [▸Simp] simplifies a fraction using the lowest common prime factor. If you want to choose the factor (instead of letting calculator choose it), press [▸Simp], enter the factor (an integer), and then press [ENTER].
5. [2nd][FAC] displays **Fac** on the entry line and the divisor used to simplify the last fraction result. (You must be in **Manual** mode.) Press [2nd] [FAC] to toggle back to the simplified fraction.

Conversion Keys

6. [2nd][A b/c ◂▸ d/e] converts between a mixed number and a simple fraction.
7. [▸D] converts a fraction to a decimal, if possible.
8. [▸F] converts a decimal to a fraction, if possible.

Notes

- The examples on the transparency masters assume all default settings.
- To enter a mixed number or a fraction, press [UNIT] between the whole number and the numerator and [/] between the numerator and the denominator.
- You can enter a fraction or mixed number anywhere you can enter a decimal value.
- You can use fractions and decimals together in a calculation.
- Fractional results and entries are automatically reduced to their lowest terms.

(continued)

Notes (continued)

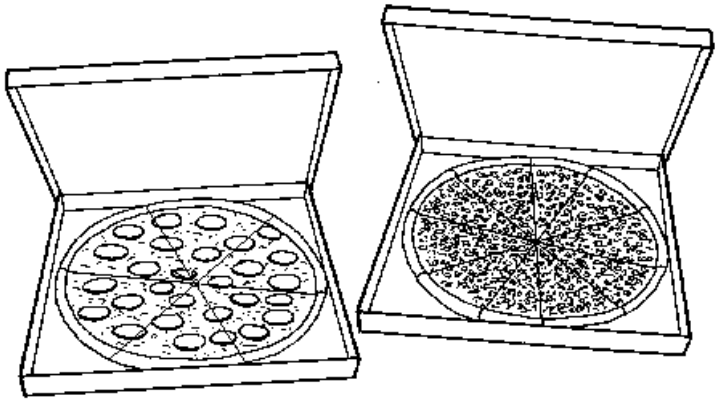
- Calculations involving fractions can show fractional or decimal results.
  - When possible, calculations involving two fractions or a fraction and any integer will display results as fractions.
  - Calculations involving a fraction and a decimal will always display results as decimals.
- For a mixed number, the whole number can be up to 3 digits, the numerator can be up to 3 digits, and the denominator can be up to the value 1,000.
- For a simple fraction, the numerator can be up to 6 digits and the denominator can be up to the value 1,000.

Fractions

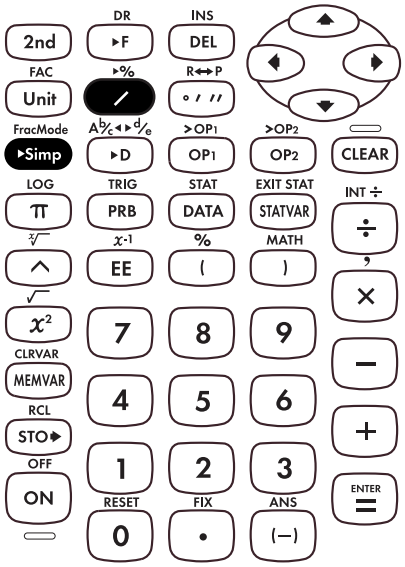
[/] [▸Simp]

At the party, you ate $^{5}/_{6}$ of the pepperoni pizza and $^{1}/_{10}$ of the sausage pizza.

How much pizza did you eat?



Press	Display
	If [2nd][FracMode]=**Auto:**
5 [/] 6 [+] 1 [/] 10 [ENTER]	5/6 + 1/10 ↑ 14/15
	If [2nd][FracMode]=**Manual:**
	5/6 + 1/10 ↑ 28/30 N/D→n/d
[▸Simp] [ENTER]	Ans▸Simp ↑ 14/15

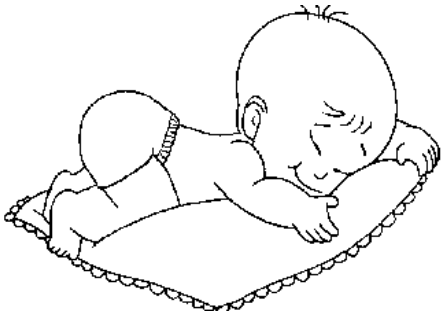


Fractions

UNIT /

A baby weighed 4 3/8 pounds at birth. In the next 6 months, she gained 2 3/4 pounds.

How much does she weigh?



Press **Display**

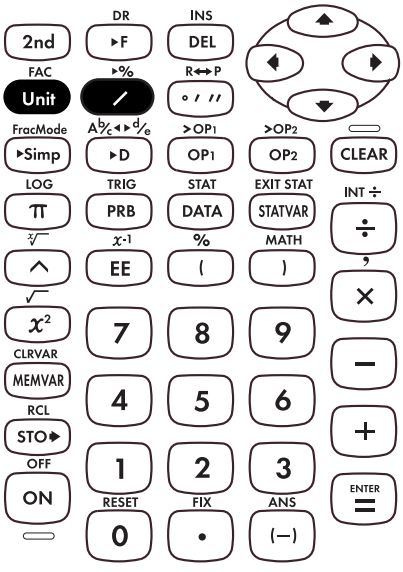
If 2nd [FracMode] = A␣b/c

4 UNIT 3 /
8 + 2 UNIT
3 / 4 ENTER

```
4␣3/8+2␣3/4        ↑
              7␣1/8
```

If 2nd [FracMode] = d/e

```
4␣3/8 + 2␣3/4↑
              57/8
```



Mixed Number to Fraction, Fraction to Mixed Number

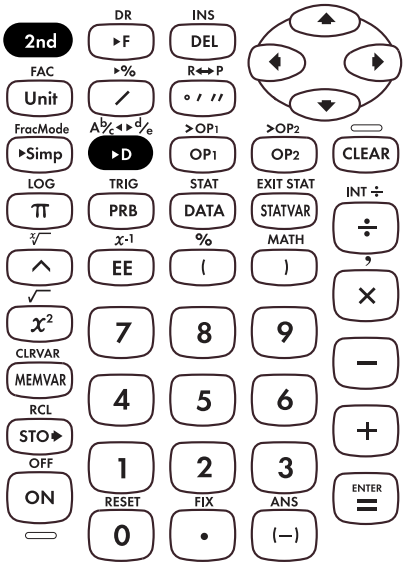
2nd Ab/c◂▸d/e ▸D

Sam wants to make his birthday cake. The recipe calls for 3½ cups of flour. He has only a ½-cup measuring cup. To find out how many times Sam will use his measuring cup, change the mixed number to a fraction.

Press	Display
3 UNIT 1 / 2	3_1/2
2nd Ab/c◂▸d/e ▸D	3_1/2▸A^b/_c◂▸^d/_e
ENTER	3_1/2▸A^b/_c◂▸^d/_e ↑ 7/2

Show the mixed number again.

Press	Display
2nd Ab/c◂▸d/e ▸D ENTER	Ans▸A^b/_c◂▸^d/_e ↑ 3_1/2

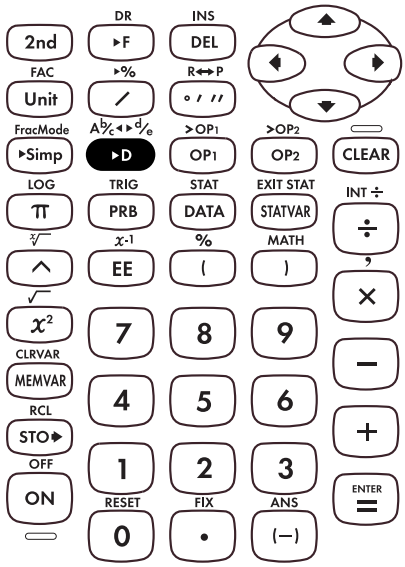


Fraction to Decimal

▸D

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.

Press	Display
5 UNIT 3 / 4 ▸D	5_3/4▸D
ENTER	5_3/4▸D ↑ 5.75



Decimal to Fraction

▸F

Change 2.25 to its fractional equivalent. The display depends on the mode, and you may need to simplify more than once to reduce the fraction to its lowest terms.

Press	Display
2 • 25 ▸F ENTER	2.25▸F ↑ 225/100 N/D→n/d
▸Simp ENTER	Ans▸Simp ↑ 45/20
ENTER	Ans▸Simp ↑ 9/4
2nd Ab/c◂▸d/e ▸D ENTER	Ans▸A^b/c◂▸^d/e ↑ 2 1/4

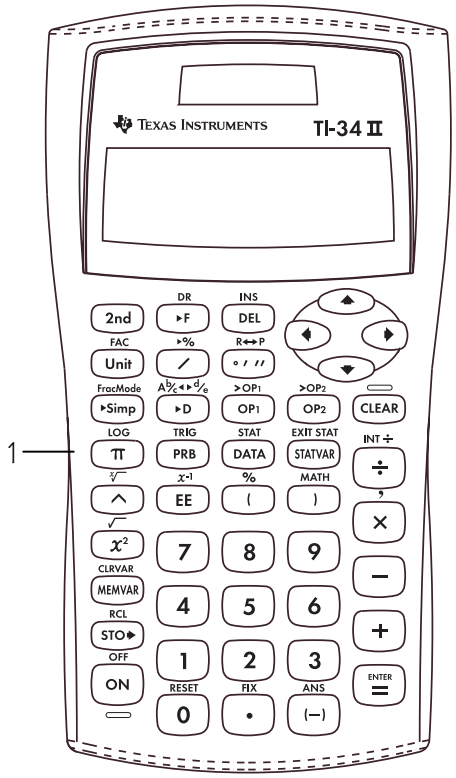
Pi

9

Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

1. [π] enters the value of pi into a calculation. [π] [ENTER] displays the value of pi rounded to 10 digits (3.141592654).



Notes

- The examples on the transparency masters assume all default settings.
- Internally, pi is stored to 13 digits (3.141592653590).
- After pressing [2nd] [FIX], you can select the number of decimal places in two ways:
  - Press ◀ or ▶ to move to the number of decimal places you want, and then press [ENTER], or
  - Press the number key that corresponds to the number of decimal places you want.

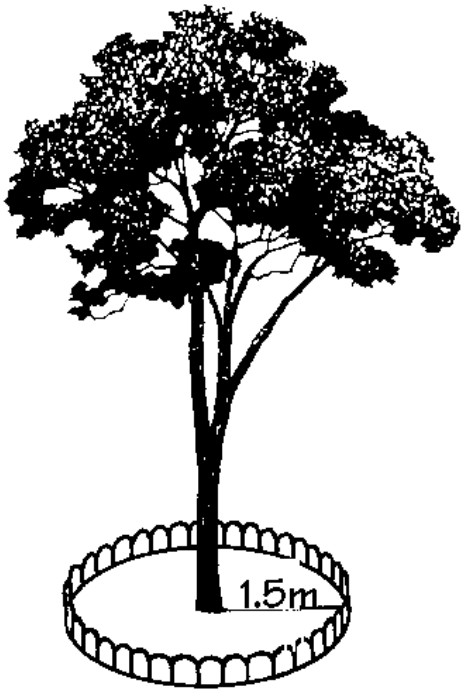
  The transparency masters show both ways.

Circumference

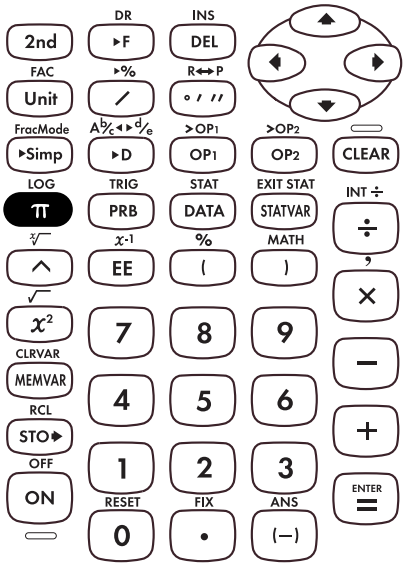
π

Use this formula to find the amount of border you need if you want to put a circular border all the way around the tree.

$$C = 2\pi r = 2 \times \pi \times 1.5m$$



Press	Display
2 × π × 1.5 ENTER	2xπx1.5 ↑ 9.424777961

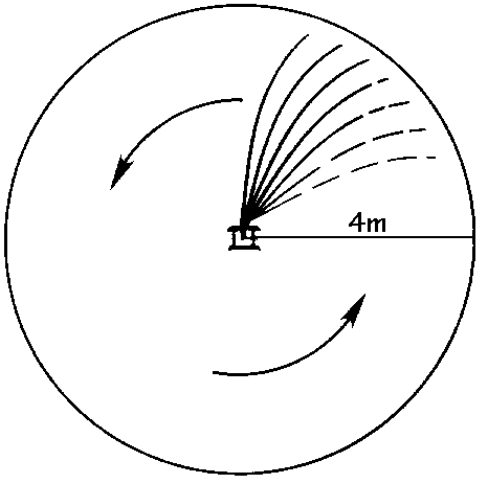


Area

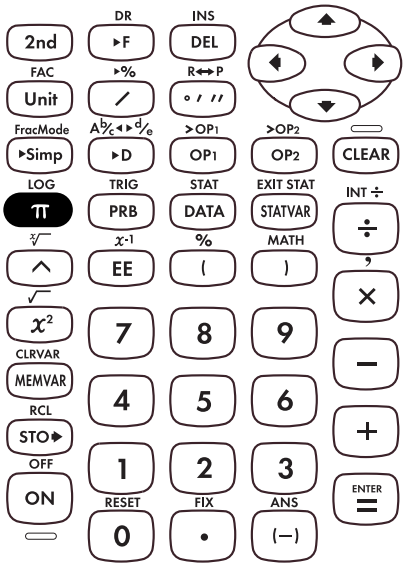
π

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.

$$A = \pi r^2 = \pi \times 4^2$$



Press	Display
π × 4 x^2 ENTER	$\pi \times 4^2$ ↑ 50.26548246
2nd FIX . ▶	F0123456789
ENTER	$\pi \times 4^2$ ↑ 50. FIX
2nd FIX . .	$\pi \times 4^2$ ↑ 50.26548246



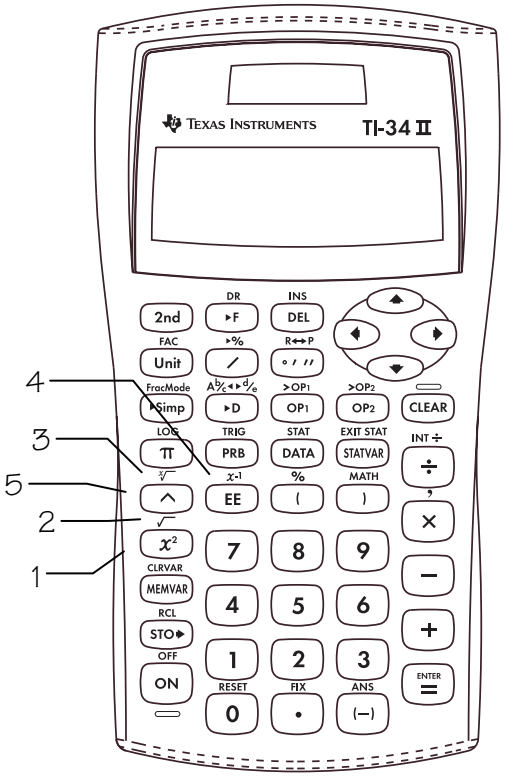
Powers, Roots, and Reciprocals

10

Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

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



Notes

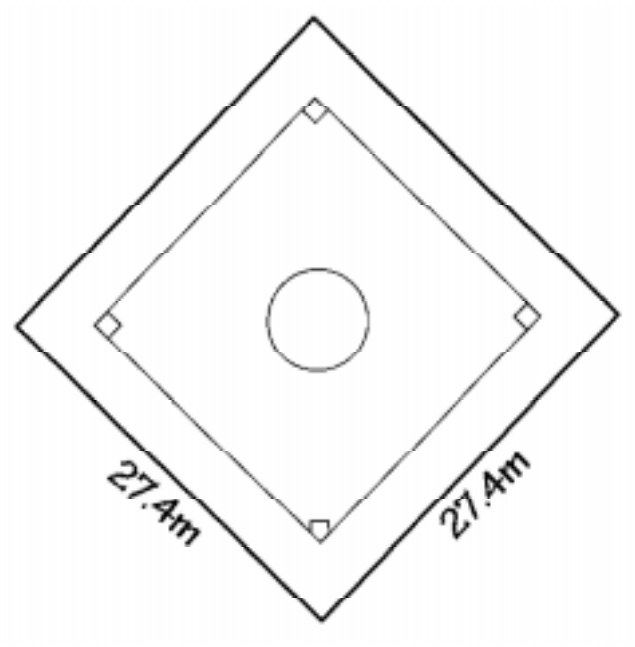
- The examples on the transparency masters assume all default settings.
- To use [^], enter the base, press [^], and then enter the exponent.
- The base (or mantissa) and the exponent may be either positive or negative. Refer to Domain under *Error Messages* in Appendix C for restrictions.
- The result of calculations with [^] must be within the range of the TI-34 II.
- A sign change takes precedence over exponents.
  Example: $-5^2 = -25$
  $(-5)^2 = 25$

Squares

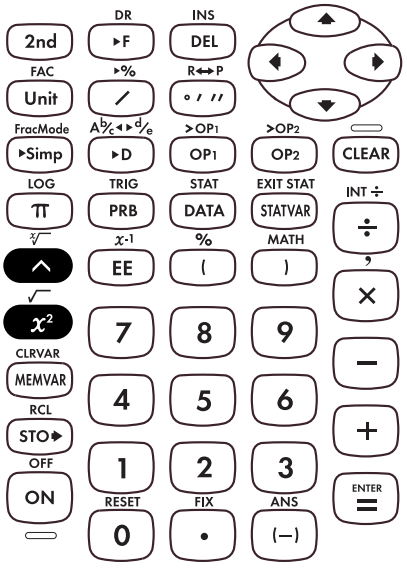
x^2 ^

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

$$A = x^2 = 27.4^2$$



Press	Display
27.4 x^2 ENTER	27.4^2 → 750.76
or	
27.4 ^ 2 ENTER	27.4^2 → 750.76



Square Roots

2nd $\sqrt{\ }$ x^2

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.

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

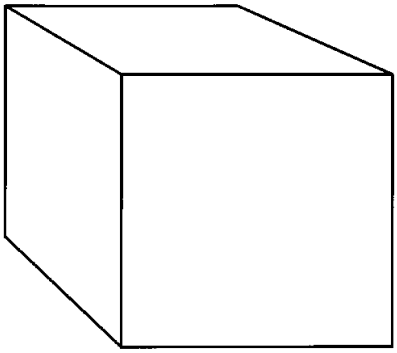
$3m^2$
of carpet

Press	Display
2nd $\sqrt{\ }$ x^2 3) ENTER	√(3) 1.732050808
2nd FIX . 0	√(3) 2.

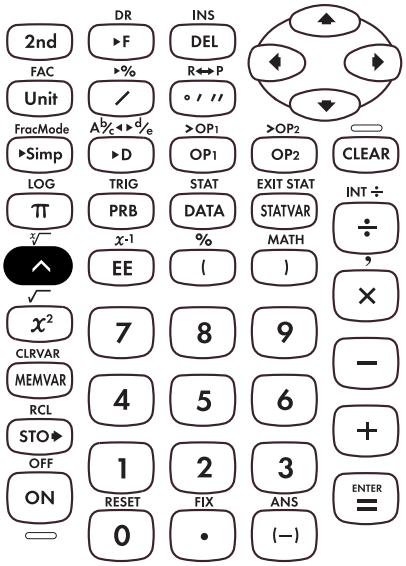
Cubes

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

$$V = L^3 = 2.3^3$$



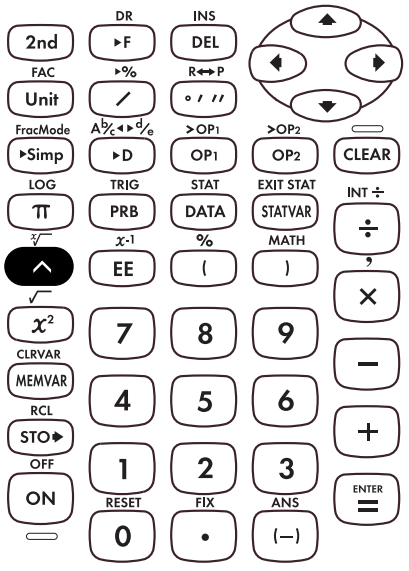
Press	Display
2 [•] 3 [^] 3 ENTER	2.3^3 ↑ 12.167
[▸F] ENTER	Ans▸F ↑ 12⌴167/1000



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 [^] 10 [ENTER]	2^10 → 1024.
2 [^] 15 [ENTER]	2^15 → 32768.

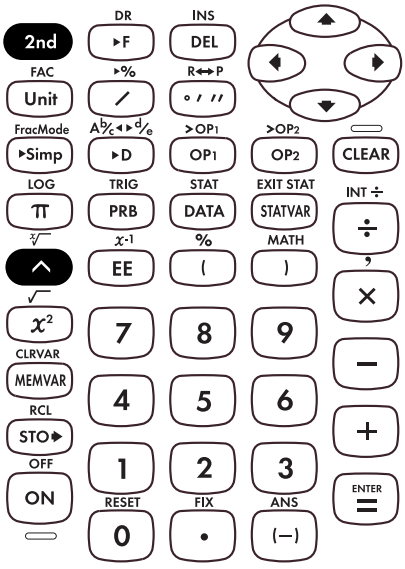


Roots

2nd $\sqrt[x]{\ }$

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

Press	Display
3 2nd $\sqrt[x]{\ }$ 125 ENTER	$3\sqrt[x]{125}$ 5.



Reciprocals

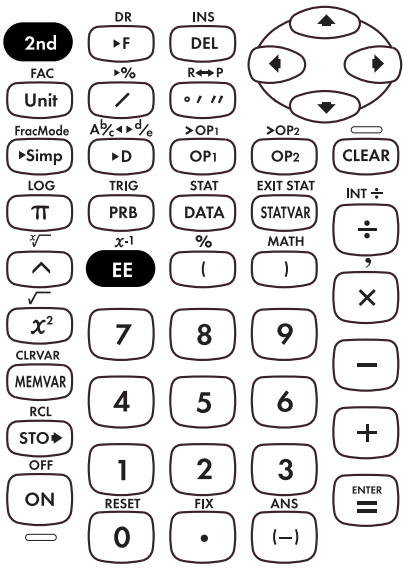
[2nd] [x^{-1} EE]

The chart below shows the amount of time spent building model ships.

Ships	Time Spent Building
Sailing	10 hrs.
Steam	5 hrs.
Luxury	5 1/3 hrs.

How much of each model was completed per hour?

Press	Display
Sailing ship:	
10 [2nd] [x^{-1} EE] [▸F] [ENTER]	10^{-1}▸F ↑ 1/10
Steam ship:	
5 [2nd] [x^{-1} EE] [▸F] [ENTER]	5^{-1}▸F ↑ 2/10 N/D→n/d
[▸Simp] [ENTER]	Ans▸Simp ↑ 1/5
Luxury liner:	
5 [UNIT] 1 [/] 3 [2nd] [x^{-1} EE] [ENTER]	5_1/3^{-1} ↑ 3/16



Probability

11

Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

1. PRB displays the following menu of functions:

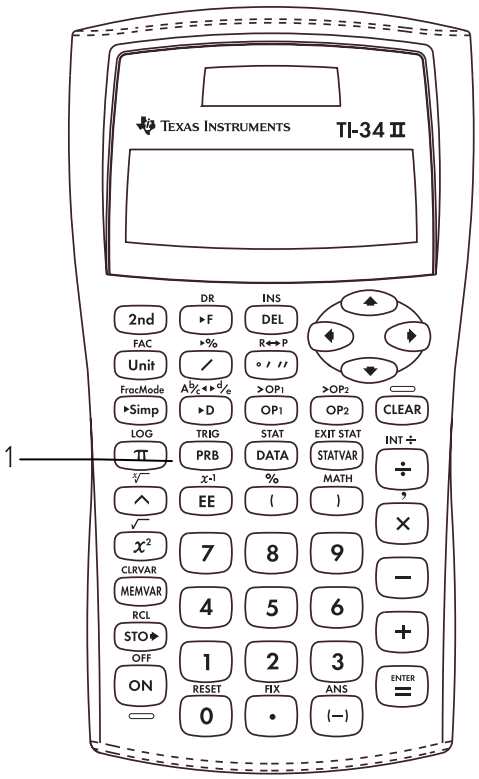
   nPr Calculates the number of possible permutations.

   nCr Calculates the number of possible combinations.

   ! Calculates the factorial.

   RAND Generates a random 10-digit real number between 0 and 1.

   RANDI Generates a random integer between 2 numbers that you specify.



Notes

- The examples on the transparency masters assume all default settings.
- A *combination* is an arrangement of objects in which the order is not important, as in a hand of cards.
- A *permutation* is an arrangement of objects in which the order is important, as in a race.
- A *factorial* is the product of all the positive integers from 1 to *n*, where *n* is a positive whole number ≤ 69.
- To control a sequence of random numbers, you can store (STO▶) an integer to **RAND** just as you would store values to memory variables. The seed value changes randomly every time a random number is generated.
- For **RANDI**, use a comma to separate the two numbers that you specify.

Combination (nCr)

PRB

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.

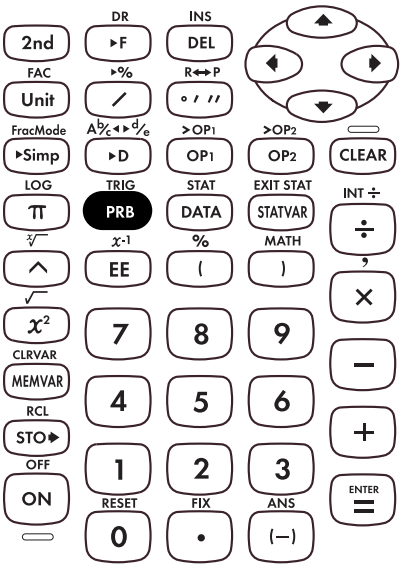
4 nCr 2 = x

A B C D

AB and BA count as only 1 combination.

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

Press	Display
4 PRB ▶	nPr nCr ! → ---
2 ENTER	4 nCr 2 ↑ 6.

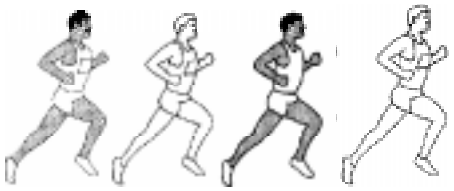


Permutation (nPr)

PRB

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

4 nPr 2 = x

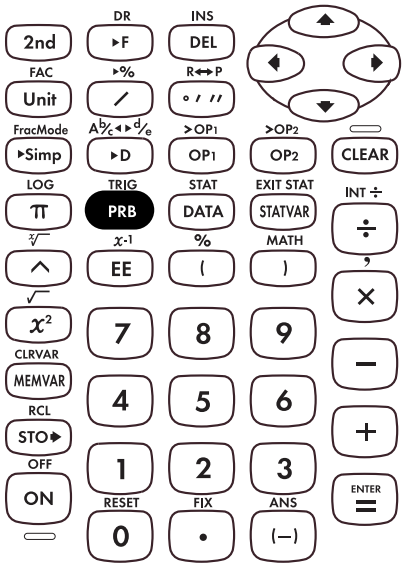


A B C D

AB and BA count as 2 permutations.

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

Press	Display
4 PRB	nPr nCr ! → ---
2 ENTER	4 nPr 2 ↑ 12.



Factorial (!)

PRB

Using the digits 1, 3, 7, and 9 only one time each, how many 4-digit numbers can you form?

4! = x

1	3	7	9
A	**B**	**C**	**D**

ABCD	ABDC	ACBD	ACDB	ADBC	ADCB
BACD	BADC	BCAD	BCDA	BDCA	BDAC
CABD	CADB	CBAD	CBDA	CDAB	CDBA
DABC	DACB	DBAC	DBCA	DCAB	DCBA

Press	Display
4 PRB ▶ ▶	nPr nCr ! → --
ENTER ENTER	4! ↑ 24.

Random (RAND)

PRB

Generate a sequence of random numbers.

Press	Display
PRB ▶ ▶ ▶	←RAND RANDI -----
ENTER ENTER	RAND ↑ 0.839588694
ENTER	RAND ↑ 0.482688185

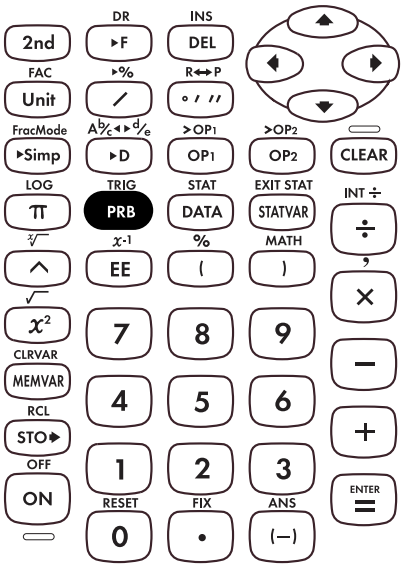
Results will vary.

Random (RAND)

PRB

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

Press	Display
1 STO▶ ◀	← rand 1083958869.
ENTER	1→rand ↑ 1.
PRB ▶ ▶ ▶ ENTER ENTER	RAND ↑ 0.000018633
ENTER	RAND ↑ 0.745579721



Random Integer (RANDI)

PRB

Generate a random integer between 2 and 10.

Press	Display
PRB ◀	← RAND RANDI
ENTER 2	← ANDI(2, 10)
2nd , 10)	
ENTER	RANDI(2,10)→↑ 3.

Results will vary.

Statistics 12

Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

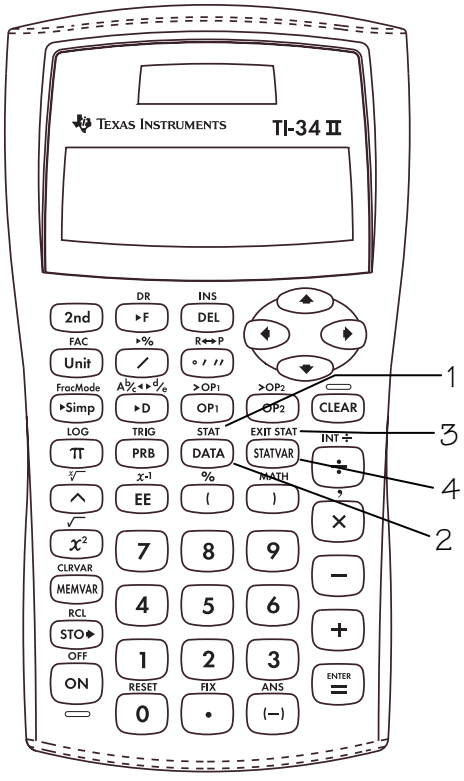
1. 2nd[STAT] displays a menu from which you can select **1-VAR**, **2-VAR** or **CLRDATA**.

   1-VAR Analyzes data from 1 set of data with 1 measured variable: x.

   2-VAR Analyzes paired data with 2 measured variables: x, the independent variable, and y, the dependent variable.

   CLRDATA Clears data values without exiting STAT mode.

2. DATA lets you enter data points (x for 1-VAR stats; x and y for 2-VAR stats).



3. 2nd[EXIT STAT] displays the following menu that lets you clear data values and exit **STAT** mode.

   EXIT ST: Y N

   - Press ENTER when **Y** (yes) is underlined to clear data values and exit STAT mode.
   - Press ENTER when **N** (no) is underlined to return to the previous screen without exiting STAT mode.

4. STATVAR displays the menu of variables with their current values.

   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

   σx or σy 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 (x times y) for all xy pairs in 2 lists

   a Linear regression slope

   b Linear regression y-intercept

   r Correlation coefficient

Notes

- The examples on the transparency masters assume all default settings.
- To save the last data point or frequency value entered, you must press ENTER or ⊙.
- You can change data points once they are entered.

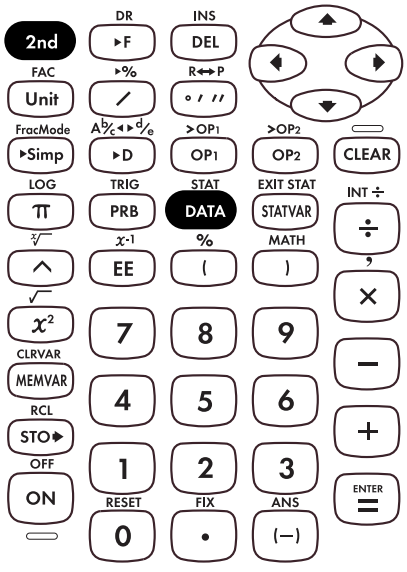
Entering 1-VAR Stat Data

2nd STAT DATA

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

Press	Display
2nd STAT DATA	1-VAR 2-VAR →
ENTER DATA	X1= STAT
85	X1=85 STAT
▼	FRQ=1 STAT
2	FRQ=2 STAT
▼ 97	X2=97 STAT
▼▼ 53	X3=53 STAT
▼▼ 77 ENTER	X4=77 77. STAT

(Continued)

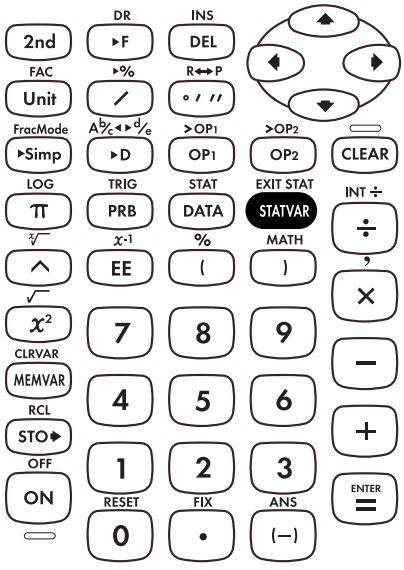


Viewing the Data (Continued)

STATVAR

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).

Press	Display
STATVAR	n $\bar{x}$ Sx σx → 5. STAT
▶	n $\bar{x}$ Sx σx → 79.4 STAT
▶	n $\bar{x}$ Sx σx → 16.39512123 STAT
▶	n $\bar{x}$ Sx σx → 14.66424222 STAT
▶	←Σx Σx² 397. STAT
▶	←Σx Σx² 32597. STAT



Removing Data Points

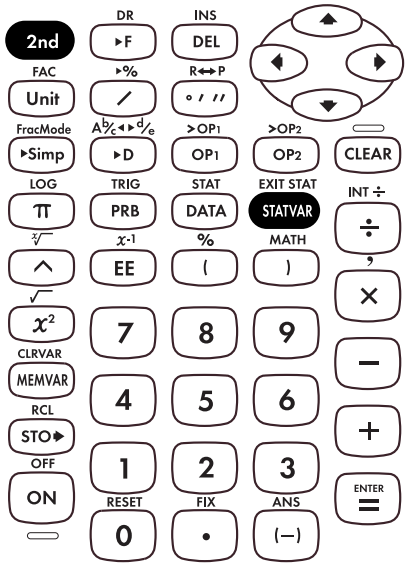
(Continued)

2nd EXIT STAT STATVAR

Return to the first data point. Display the lowest score, drop it, and then find the new mean ($\bar{x}$). Exit STAT mode.

Press	Display
DATA	X1=85 ↕ STAT
▼▼▼▼	X3=53 ↕ STAT
▼ 0 ENTER	FRQ=0 ↕ 0. STAT
STATVAR ▶	n x̄ Sx σx → 86. STAT
2nd EXIT STAT STATVAR	EXIT ST: Y N STAT
ENTER	

To remain in STAT mode and clear data, press 2nd EXIT STAT STATVAR and select CLRDATA.



Entering 2-VAR Stat Data

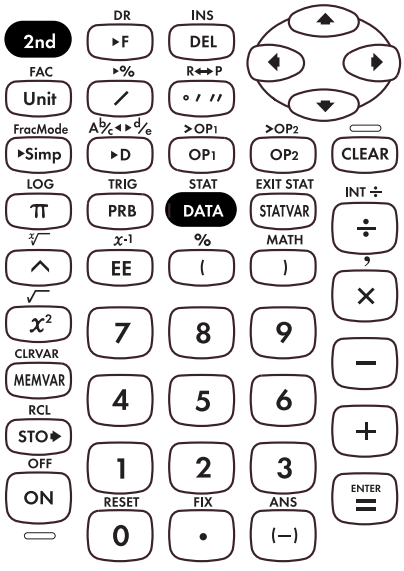
2nd STAT DATA DATA

The table below shows the number of pairs of athletic shoes sold by a small shoe store. Enter this information as the data points.

Month	Total No.(x)	Brand A (y)
April	58 (X1)	35 (Y1)
May	47 (X2)	28 (Y2)

Press	Display
2nd STAT DATA ▶	1-VAR 2-VAR →
ENTER DATA	X1= ↕ STAT
58	X1=58 ↕ STAT
▼ 35	Y1=35 ↕ STAT
▼ 47	X2=47 ↕ STAT
▼ 28	Y2=28 ↕ STAT
ENTER	Y2=28 ↕ 28. STAT

(Continued)



Viewing the Data (Continued)

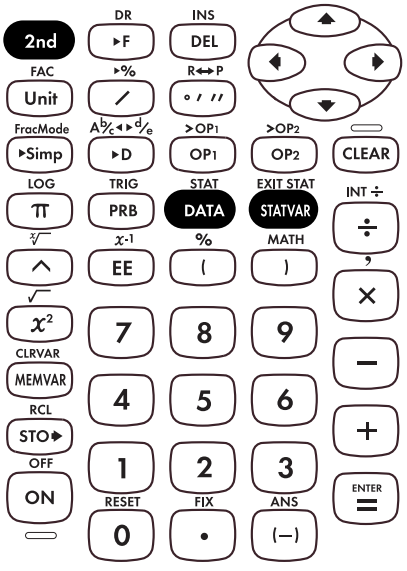
STATVAR

2nd STAT DATA

If the store sells 32 pairs of shoes in June, predict the June sales of Brand A. When finished, exit STAT mode and clear all data points.

Press	Display
STATVAR ◀	← x′ y′ STAT
ENTER 32) ENTER	y(32) 18.45454545 STAT
2nd EXIT STAT STATVAR	EXIT ST: Y N STAT
ENTER	

To remain in STAT mode and clear data, press 2nd STAT DATA and select CLRDATA.



Trigonometry

13

Keys

The numbered paragraph provides an explanation for the corresponding numbered key on the illustration below.

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

   sin calculates the sine.

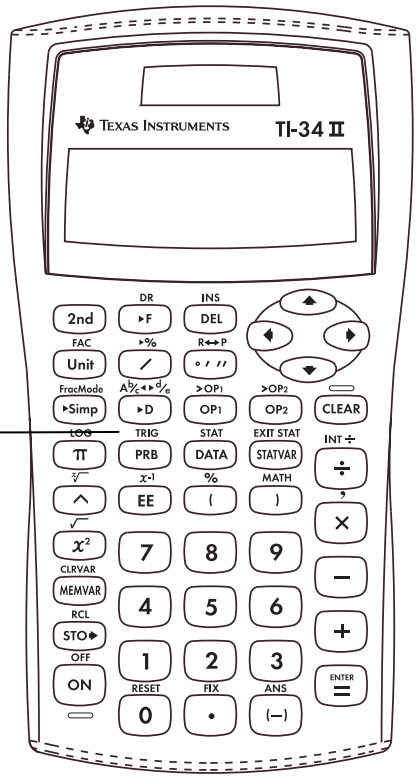
   $\sin^{-1}$ calculates the inverse sine.

   cos calculates the cosine.

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

   tan calculates the tangent.

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



Notes

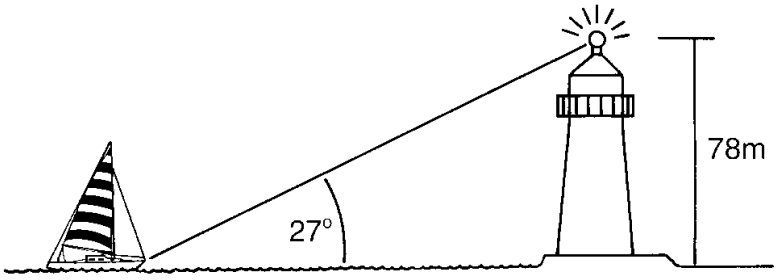
- The examples on the transparency masters assume all default settings.
- Before starting a trigonometric calculation, be sure to select the appropriate angle-unit setting (degree or radian—See Activity 16, *Angle Settings and Conversions*). The calculator interprets values according to the current angle-unit setting.
-) ends a trig function.

Tangent

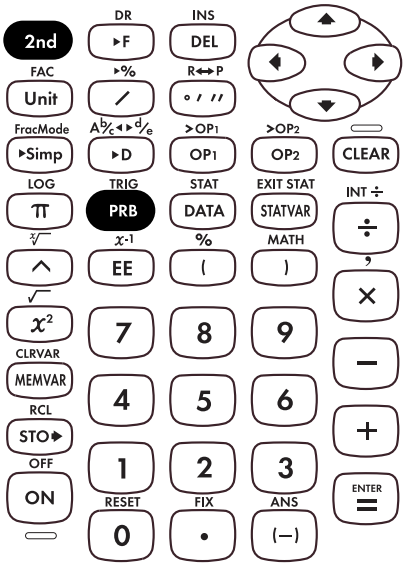
2nd TRIG PRB

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

D = 78/TAN 27



Press	Display
78 ÷ 2nd TRIG PRB ◀ ◀ 27) ENTER	78÷tan (27) ↑ 153.0836194
2nd FIX . ▶	F0123456789
ENTER	78÷tan (27) ↑ 153. FIX
2nd FIX . .	78÷tan (27) ↑ 153.0836194

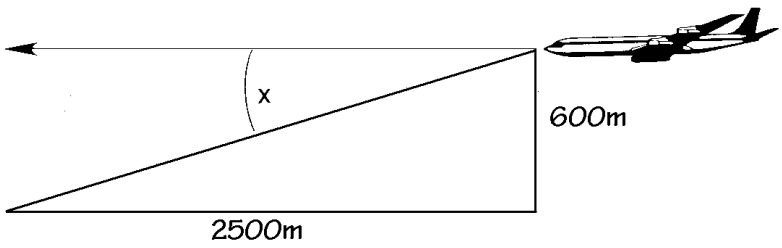


Inverse Tangent

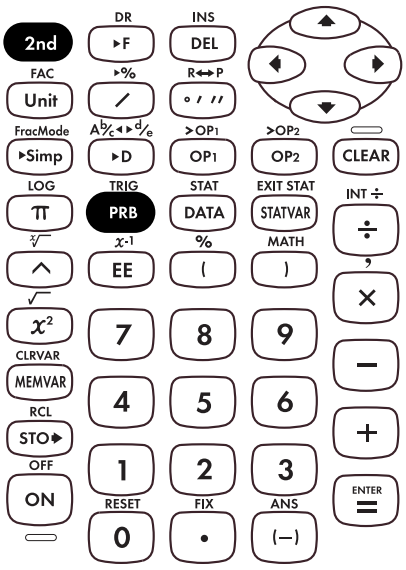
2nd TRIG PRB

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

TAN x = 600/2500



Press	Display
2nd TRIG PRB ◀	tan⁻¹(600÷25 → 13.49573328
600 ÷	
2500)	
ENTER	
2nd FIX . ▶ ▶	F0123456789
ENTER	tan⁻¹(600÷25→↑ 13.5 FIX
2nd FIX . .	tan⁻¹(600÷25→↑ 13.49573328

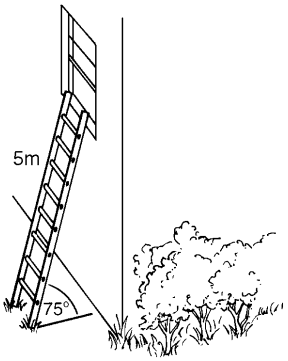


Cosine

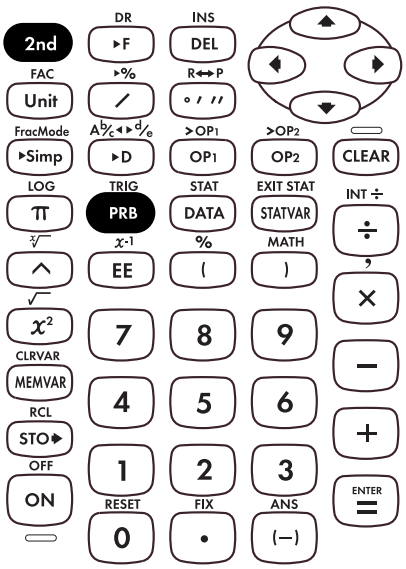
2nd TRIG PRB

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

D = 5 x COS 75



Press	Display
5 2nd TRIG PRB ▶ ▶ 75) ENTER	5cos(75) ↑ 1.294095226
2nd FIX . ▶	F0123456789 FIX
ENTER	5cos(75) ↑ 1. FIX
2nd FIX . .	5cos(75) ↑ 1.294095226

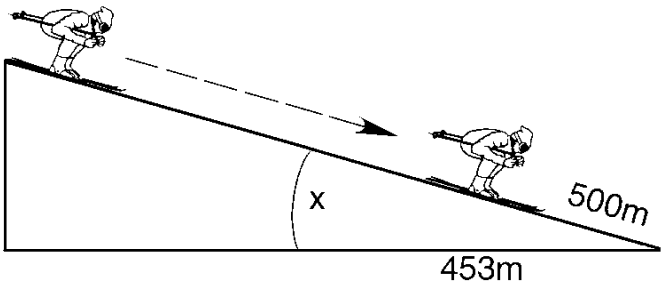


Inverse Cosine

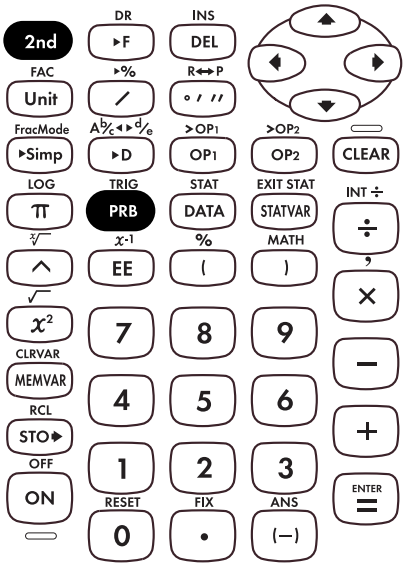
2nd TRIG PRB

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

$$\cos x = 453/500$$



Press	Display
2nd TRIG PRB ▶ ▶ ▶ 453 ÷ 500) ENTER	cos⁻¹(453÷50 → 25.04169519
2nd FIX . ▶ ▶	F0123456789
ENTER	cos⁻¹(453÷50→ ↑ 25.0 FIX
2nd FIX . .	cos⁻¹(453÷50→ ↑ 25.04169519

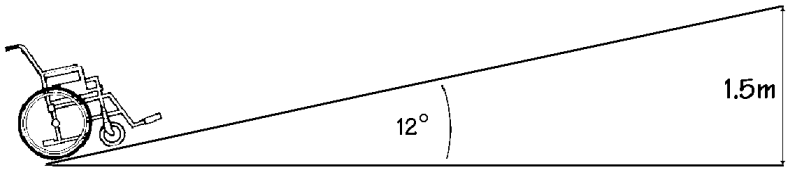


Sine

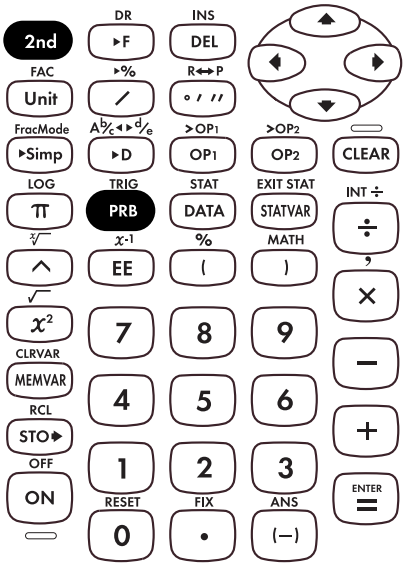
2nd TRIG PRB

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

D = 1.5/SIN 12



Press	Display
1 . 5 ÷	1.5÷sin(12)→ ↑ 7.214601517
2nd TRIG PRB 12)	
ENTER	
2nd FIX . ▶	F0123456789
ENTER	1.5÷sin(12) ↑ 7. FIX
2nd FIX . .	1.5÷sin (12) ↑ 7.214601517

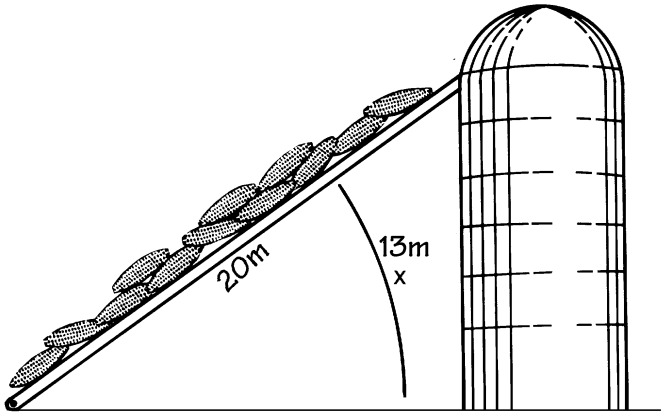


Inverse Sine

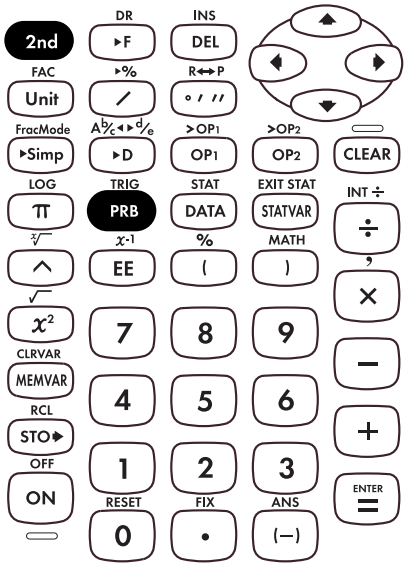
2nd TRIG PRB

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

SIN x = 13/20



Press	Display
2nd TRIG PRB ▶ 13 ÷ 20) ENTER	$\sin^{-1}(13\div20)\rightarrow$ ↑ 40.54160187
2nd FIX . ▶▶	F0123456789
ENTER	$\sin^{-1}(13\div20)\rightarrow$ ↑ 40.5 FIX
2nd FIX . .	$\sin^{-1}(13\div20)\rightarrow$ ↑ 40.54160187



Notation

14

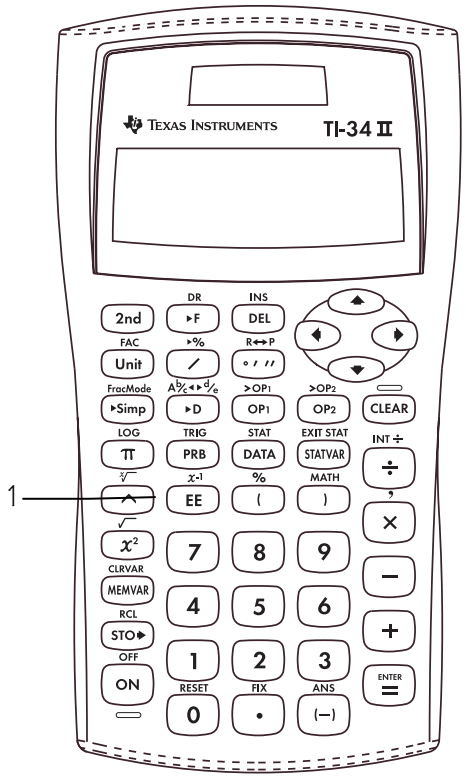
Keys

The numbered paragraph provides an explanation for the corresponding numbered key on the illustration below.

1. [EE] lets you enter a value in scientific notation.

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. Press [(–)] before entering a negative exponent.
- Results requiring more than 10 digits are automatically displayed in scientific notation.
- For the decimal notation mode, refer to [2nd] [FIX] in Chapter 6, *Decimals and Decimal Places*.
- These modes affect only the display of results.



Exponent

EE

The Earth is 1.496×10^8 kilometers from the Sun. Jupiter is 7.783×10^8 kilometers from the Sun. Enter the numbers in scientific notation and determine how far away the Earth is from Jupiter.

Press	Display
7 [.] 783 [EE] 8 [−] 1 [.] 496 [EE] 8 [ENTER]	7.783E8-1.4 →↑ 628700000.

Logarithms and Antilogarithms

15

Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

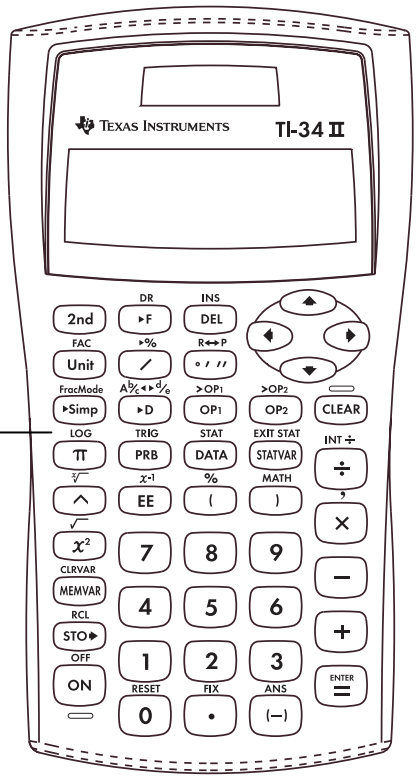
1. 2nd [LOG] displays a menu of all log functions.

   log calculates the common logarithm (base 10).

   10^ calculates the common antilogarithm (10 raised to the power of the value entered).

   ln calculates the natural logarithm (base e, where e = 2.718281828459).

   e^ calculates the natural antilogarithm (e raised to the power of the value).



Notes

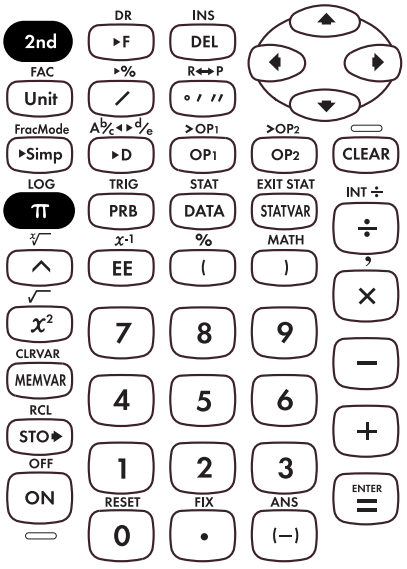
- The examples on the transparency masters assume all default settings.
-) ends a logarithmic function.

Common Logarithm, Natural Logarithm

2nd LOG (π)

Find log 23 rounded to 4 decimal places. Then find ln 23 rounded to 4 decimal places and return to floating decimal notation.

Press	Display
2nd LOG (π) 23) ENTER	log(23) ↑ 1.361727836
2nd FIX (.)	F0123456789
4	log(23) ↑ 1.3617 FIX
2nd LOG (π) ▶▶ 23) ENTER	ln(23) ↑ 3.1355 FIX
2nd FIX (.) (.)	ln(23) ↑ 3.135494216

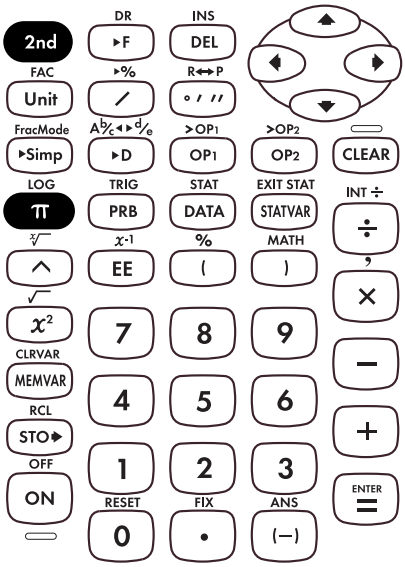


Common Antilogarithm, Natural Antilogarithm

2nd LOG π

Find the antilogarithm of 3.9824 rounded to 4 decimal places. Then find the natural antilogarithm of 3.9824 rounded to 4 decimal places. When finished, return to floating decimal notation.

Press	Display
2nd LOG π ▶	10^(3.9824) ↑
3 . 9824	9602.846792
) ENTER	
2nd FIX .	F0123456789
4	10^(3.9824) ↑
	9602.8468
	FIX
2nd LOG π ◀	e^(3.9824) ↑
3 . 9824	53.6456
	FIX
) ENTER	
2nd FIX . .	e^(3.9824) ↑
	53.64562936



Angle Settings and Conversions 16

Keys

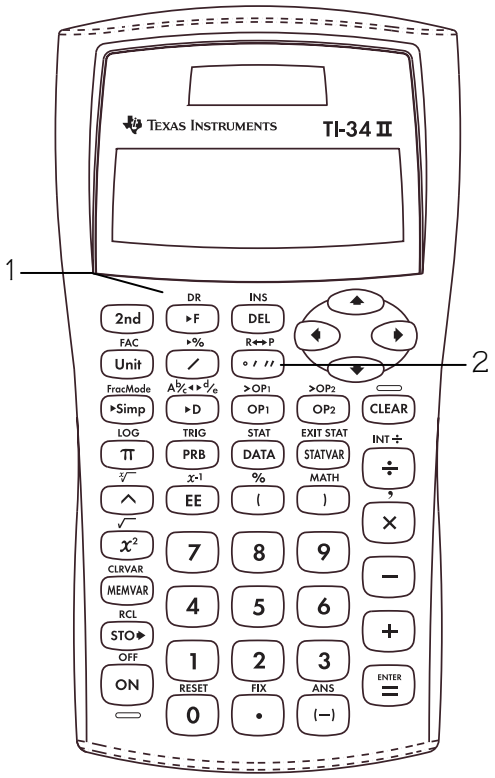
These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

1. [2nd] [DR] displays a menu that lets you change the angle mode setting to DEG and RAD without affecting the value in the display.

   DEG Sets Degree mode.

   RAD Sets Radian mode.

   The default setting is DEG.



2. [°′″] displays a menu that lets you specify the unit of an angle.

   ° Specifies degrees.

   r Specifies radians.

   ▸DMS Specifies degrees (°), minutes (′), and seconds (″). It also lets you convert an angle from decimal degrees to DMS notation.

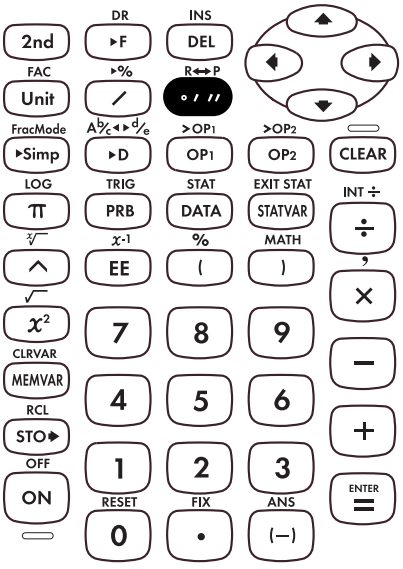
Notes

- The examples on the transparency masters assume all default settings.
- Angles with a trig function ignore the angle mode setting and display results in the original unit. Otherwise, angles (without a trig function) are converted and displayed according to the angle mode setting.
- You enter decimal-degree angles the same as you would any other number.
- For decimal/DMS conversions, the calculator interprets all values as degrees, regardless of the angle-unit setting.
- DMS angles are entered as **°** (degrees), **′** (minutes), and **″** (seconds).

Degrees, Minutes, and Seconds to Decimal

You watched 2 videos that were 2:05 (2 hours and 5 minutes) and 1:46 (1 hour and 46 minutes) in length. How long did you watch videos?

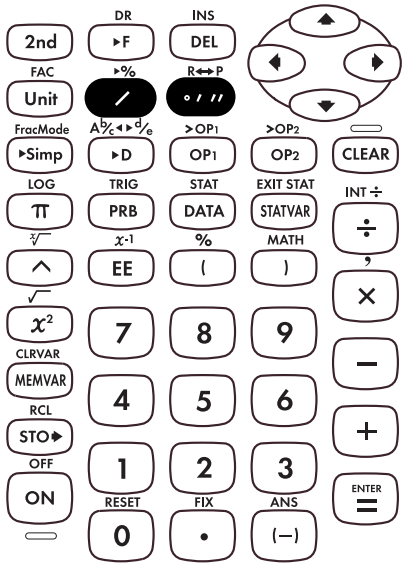
Press	Display
2 [°′″]	0° 0′ 0″ r →
[ENTER]	2°
5 [°′″] [▶]	0° 5′ 0″ r →
[ENTER] [+] 1 [°′″] [ENTER]	2° 5′+1°
46 [°′″] [▶] [ENTER] [ENTER]	2°5′+1°46′ 3.85
[°′″] [◀]	← ▶DMS
[ENTER] [ENTER]	Ans▶DMS 3° 51′ 0″



Fraction to Degrees, Minutes, and Seconds

How much is $^2/_3$ of an hour in hours, minutes, and seconds?

Press	Display
2 [/] 3	2/3
[°′″] ◀	← ▶DMS
[ENTER] [ENTER]	2/3▶DMS ↑ 0° 40′ 0″

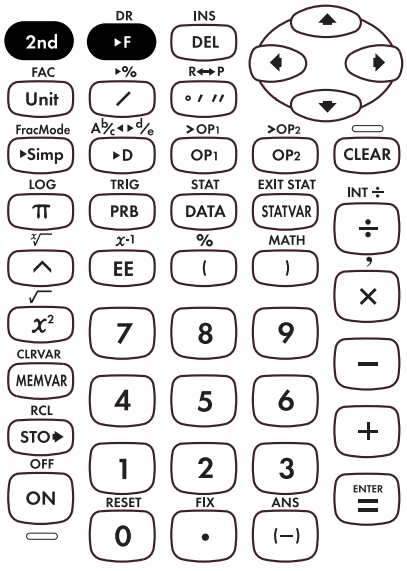


Degrees, Radians

2nd DR ▸F

Calculate the sine of 30 in degrees and radians and then return to degrees.

Press	Display
2nd TRIG PRB 30) ENTER	sin(30) 0.5
2nd DR ▸F ◗	DEG RAD
ENTER ENTER	sin(30) ↑ -0.988031624 RAD
2nd DR ▸F ◖	DEG RAD RAD
ENTER ENTER	sin(30) ↑ 0.5



Polar and Rectangular Conversions 17

Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

1. 2nd [R↔P] displays the following menu that lets you convert rectangular coordinates (X,Y) to polar coordinates (r,θ) or vice versa.

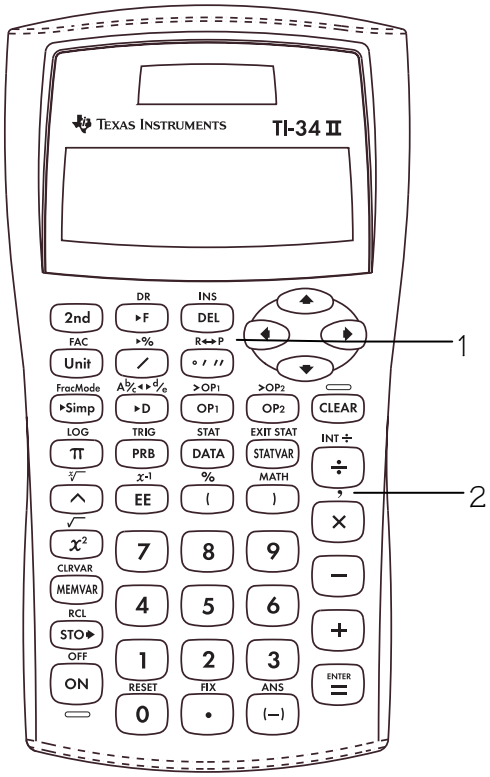
   R▶Pr Converts rectangular coordinate to polar coordinate r.

   R▶Pθ Converts rectangular coordinate to polar coordinate θ.

   P▶Rx Converts polar coordinate to rectangular coordinate X.

   P▶Ry Converts polar coordinate to rectangular coordinate Y.

2. 2nd [,] enters a comma.



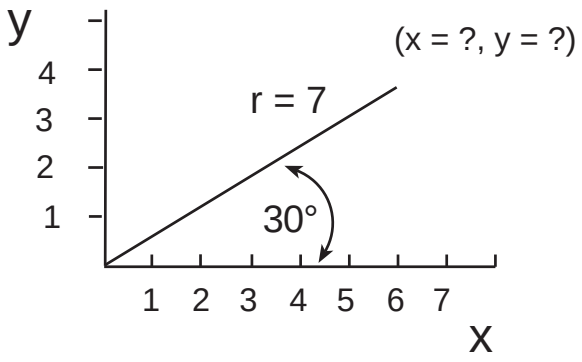
Notes

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

Polar to Rectangular

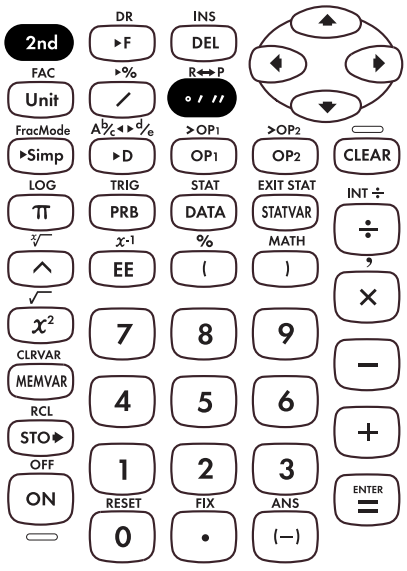
2nd R↔P

Convert the polar ordered pair (7,30) to rectangular using the (°) angle unit.



Press	Display
2nd R↔P ▶ ▶	← P▶Rx P▶Ry
7 2nd , × 30) ENTER	P▶Rx(7,30) 6.062177826
2nd R↔P ◀	← P▶Rx P▶Ry
7 2nd , × 30) ENTER	P▶Ry(7,30) 3.5

The rectangular ordered pair is (6.062177826, 3.5).



Math Menu 18

Keys

These numbered paragraphs provide explanations for the corresponding numbered keys on the illustration below.

1. 2nd[MATH] displays a menu with various math functions. Some functions require you to enter two values, real numbers, or expressions that equal a real number.

   abs(n) Displays absolute value of *n*.

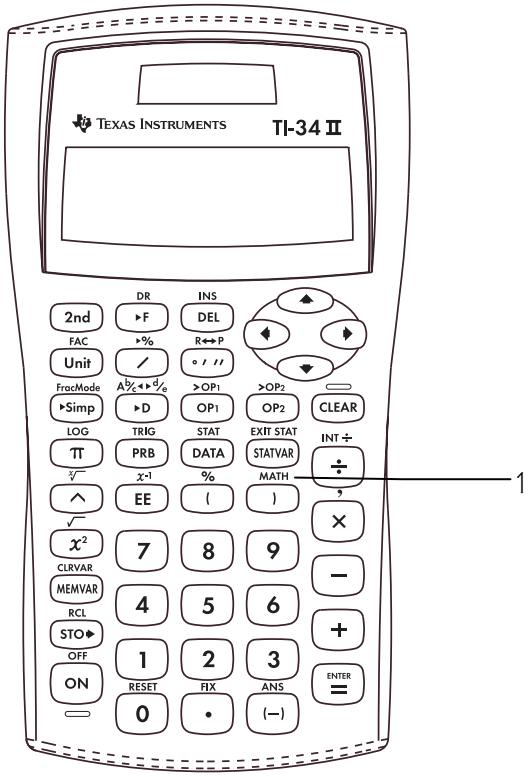
   round(n,digits) Rounds *n* to specified number of digits.

   iPart (n) Returns only the integer (iPart) of *n*.

   fPart(n) Returns only the fractional part of *n*.

   min(n_1,n_2) Returns the minimum (min) of two values, n_1 and n_2.

   max(n_1, n_2) Returns the maximum of two values, n_1 and n_2.



   lcm (n_1,n_2) Returns the least common multiple (lcm) of two values, n_1 and n_2.

   gcd (n_1, n_2) Returns the greatest common divisor (gcd) of two values, n_1 and n_2

   n^3 Calculates the cube of *n*.

   $\sqrt[3]{(n)}$: Calculates the cube root of *n*.

   remainder(n_1,n_2): Returns the remainder resulting from the division of two values, n_1 and n_2.

Notes

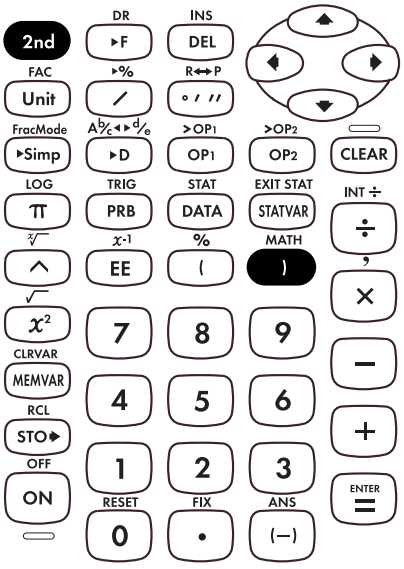
- The example on the transparency master assumes all default settings.
- To use the functions, select the math function from the menu, and then enter the value.
- 2nd[,] must separate the two values.
- The closing parenthesis following function names is optional.

Absolute Value

2nd MATH)

Find the absolute value of -35.

Press	Display
2nd MATH)	abs round
ENTER	abs(
(-) 35)	abs(-35)
ENTER	abs(-35) 35

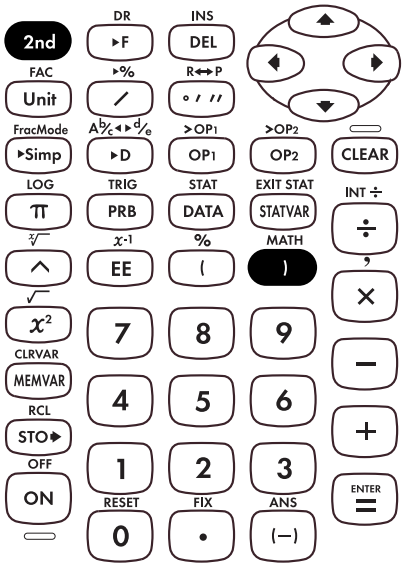


Rounding a number

2nd MATH)

Round π to three digits.

Press	Display
2nd MATH) ▶	abs round →
π 2nd , × 3) ENTER	round(π,3) ↑ 3.142

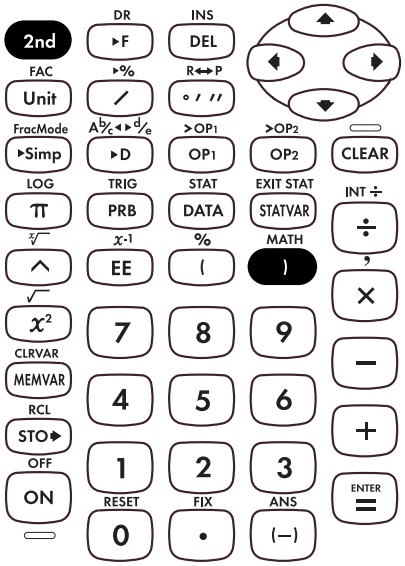


Integer and Fractional Part

2nd MATH)

Display the integer and fractional part of $4\frac{3}{8}$.

Press	Display
2nd MATH) ▶ ▶	← iPart fPart →
4 UNIT 3 / 8) ENTER	iPart(4 3/8 →↑ 4.
2nd MATH) ▶ ▶ ▶ 4 UNIT 3 / 8) ENTER	fPart(4 3/8 →↑ 3/8



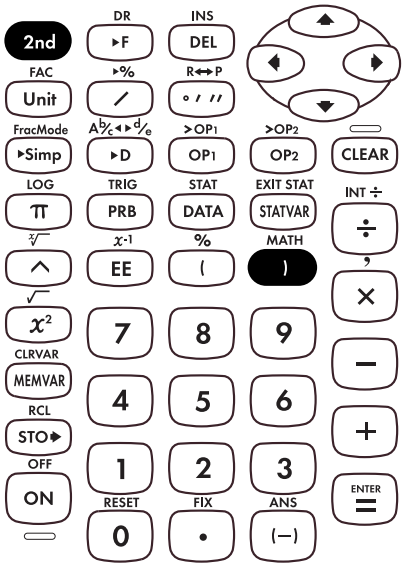
Minimum and Maximum

2nd MATH)

Using **max**, put the following list of numbers in ascending order: $^{14}/_{17}$, $^{7}/_{9}$, $^{3}/_{5}$, $^{13}/_{15}$.

Press	Display
2nd MATH)	← min max →
▶ ▶ ▶ ▶ ▶	
7 / 9	max(7/9,14/ ↑ 14/17
2nd , × 14 /	
17) ENTER	
▲ ▶ ▶ ▶ ▶ ▶	max(7/9,3/5 →↑ 7/9
CLEAR 3 /	
5) ENTER	
▲ ▶ ▶ ▶ ▶ ▶	max(7/9,13/ ↑ 13/15
CLEAR 13 /	
15) ENTER	
▲ ▶ CLEAR	max(14/17,1 →↑ 13/15
14 / 17	
2nd , × 13 /	
15) ENTER	

The list in ascending order: {$^{3}/_{5}$, $^{7}/_{9}$, $^{14}/_{17}$, $^{13}/_{15}$}



Least Common Multiple

2nd MATH)

Use **lcm** to add 1/4 + 5/6. Then verify your answer. (Set FracMode to d/e using 2nd FracMode ▸Simp = d/e.)

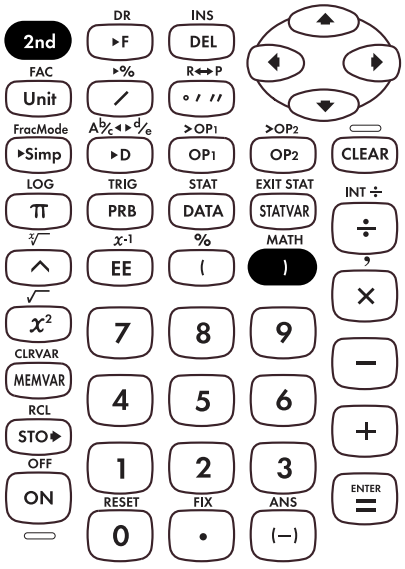
Press	Display
2nd MATH) ◀◀◀◀◀	← lcm gcd →
4 2nd , × 6) ENTER	lcm(4,6) 12

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

Verify:

Press	Display
1 / 4 + 5 / 6 ENTER	1/4+5/6 13/12

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

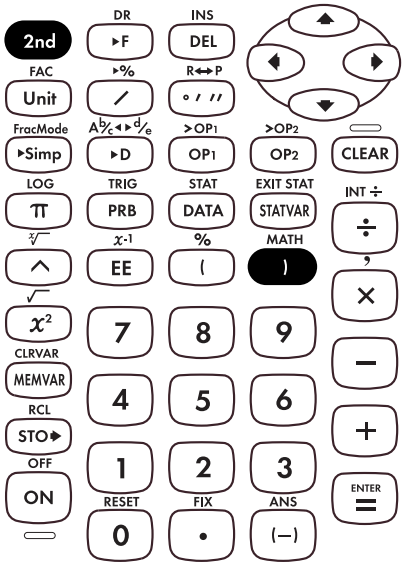


Greatest Common Divisor

2nd MATH)

Find the greatest common divisor for the fraction, 27/36. Then verify your answer. (Set FracMode to Auto.)

Press	Display
2nd MATH) ◀ ◀ ◀ ◀	← lcm gcd →
27 2nd , × 36) ENTER	gcd(27,36) 9.
27 / 36 ÷ 9 / 9 ENTER	27/36÷9/9 3/4

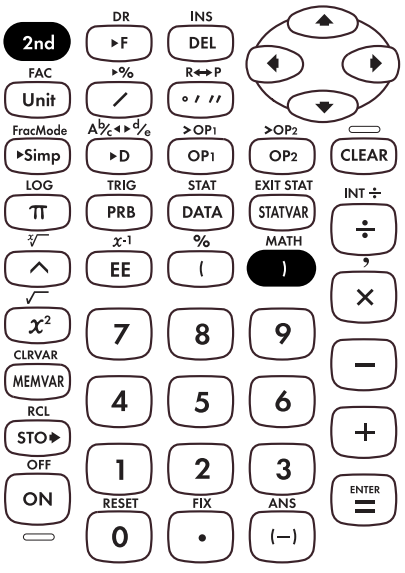


Cube and Cube Root

2nd MATH)

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

Press	Display
34 2nd MATH) ◀ ◀ ◀	← 3 3√ →
ENTER ENTER	34³ 39304.
2nd MATH) ◀ ◀ ENTER	← 3 3√ →
2nd ANS (−) ENTER	3√(Ans 34.



Remainder

2nd MATH)

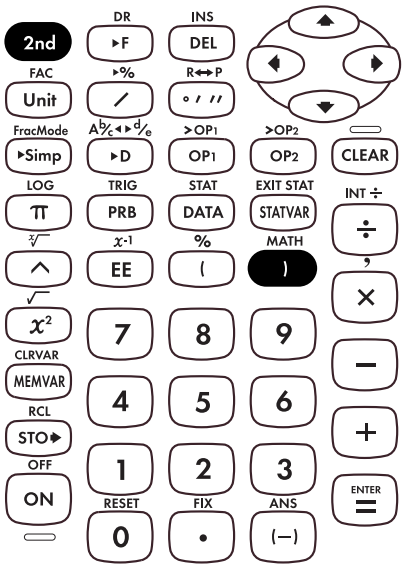
You have 16 tables, each of which seats 8 people. If you need seats for 164 people, how many additional 8-person tables do you need and how many extra seats will you have?

Press	Display
16 × 8 ENTER	16x8 128.
2nd MATH) ◀	←remainder
164 2nd , ×	remainder(1 →↑
128) ENTER	36.

You have 36 extra people.

36 ÷ 8 ENTER	36÷8 4.5
8 × 4 ENTER	8x4 32.
2nd MATH) ◀ 36 2nd , × 32) ENTER	remainder(3 →↑ 4.

You will have 4 seats left over.



Quick Reference to Keys

A

Key	Function
◀ ▶	Moves the cursor left and right so you can scroll the entry line. Press 2nd ◀ or 2nd ▶ to scroll to the beginning or end of the entry line.
▲ ▼	Moves the cursor up and down so you can see previous entries. Press 2nd ▲ or 2nd ▼ to scroll to the beginning or end of the history.
+ − × ÷	Adds, subtracts, multiplies, and divides.
0 – 9	Enters the digits 0 through 9.
(	Opens a parenthetical expression.
)	Closes a parenthetical expression.
x^2	Squares the value.
π	Enters the value of pi rounded to 10 digits (3.141592654).
.	Enters a decimal point.
(−)	Indicates the value is negative.
/	Separates the numerator from the denominator in a fraction.
^	Raises a value to a specified power.
° ′ ″	Displays the following menu that lets you specify the unit of an angle. **°** Specifies degrees **′** Specifies minutes **″** Specifies seconds **r** Specifies radians **▶DMS** Lets you convert an angle from decimal degrees to **DMS** notation (degrees, minutes, and seconds).
2nd	Turns on the **2nd** indicator and accesses the function shown above the next key that you press.
2nd [%]	Changes a real number to percent. Results display according to the decimal notation mode setting.
2nd [▶%]	Converts a real number or a fraction to percent.
2nd [,]	Enters a comma.
2nd [x^{-1}]	Calculates the reciprocal.
2nd [√‾]	Calculates the square root.
2nd [$\sqrt[x]{\ }$]	Calculates the specified root (x) of the value.

Key	Function
[2nd] [A b/c ◂▸ d/e]	Converts a simple fraction to a mixed number or a mixed number to a simple fraction.
[2nd] [ANS]	Recalls the most recently calculated result, displaying it as **Ans**.
[CLEAR]	Clears characters and error messages on the entry line. Once the display is clear, it moves the cursor to the last entry in history.
[2nd] [CLRVAR]	Clears all memory variables.
[▸D]	Converts a fraction to a decimal, if possible.
[DATA]	Lets you enter the statistical data points (*x* for **1-VAR** stats; *x* and *y* for **2-VAR** stats).
[DEL]	Deletes the character at the cursor. If you hold [DEL] down, it deletes all characters to the right. Then every time you press [DEL], it deletes 1 character to the left of the cursor.
[2nd][DR]	Displays a menu that lets you change the Angle mode to degrees (**DEG**) or radians (**RAD**).
[EE]	Enters a value in scientific notation.
[ENTER]	[ENTER] completes the operation or executes the command.
[2nd] [EXIT STAT]	Displays the following menu that lets you clear data values and exit **STAT** mode. **EXIT ST:** Y N Press [ENTER] when **Y** (yes) is underlined to clear data values and exit **STAT** mode. Press [ENTER] when **N** (no) is underlined to return to the previous screen without exiting **STAT** mode.
[▸F]	Converts a decimal to a fraction, if possible.
[2nd][FAC]	Displays **Fac** on the entry line and the divisor used to simplify the last fraction result.
[2nd] [FIX]	Displays the following menu that lets you set the number of decimal places. **F 0 1 2 3 4 5 6 7 8 9** **F** Sets floating decimal (standard) notation **0-9** Sets number of decimal places

Key	Function
2nd[FracMode]	Displays a menu of four display mode settings that determine how fraction results are displayed: **A␣b/c** displays mixed number results. **d/e** (default) displays fraction results. **Manual** (default) displays unsimplified fractions. **Auto** displays fraction results that are simplified in lowest terms.
2nd [INS]	Lets you insert a character at the cursor.
2nd[INT÷]	Divides two positive integers and displays the quotient, **Q**, and the remainder, **R**. (Only the quotient is stored to **ANS**.)
2nd[LOG]	Displays a menu of all log functions: **log** Calculates the logarithm to base 10 **10^** Calculates the common antilogarithm (10 to the given power) **ln** Calculates the natural logarithm (base e, where e=2.718281828459) **e^** Raises e to the given power
2nd[MATH]	Displays a menu with various math functions: **abs(#)** Displays absolute value of #. **Round(#,digits)** Rounds # to specified number of digits. **iPart(#)** Returns only the integer part (**iPart**) or **fPart(#)** fractional part (**fPart**) of #. **Min($\#_1$, $\#_2$)** Returns the minimum (**min**) or **Max($\#_1$, $\#_2$)** maximum (**max**) of two values, $\#_1$ and $\#_2$. **lcm($\#_1$, $\#_2$)** Finds the least common multiple (**lcm**) of two values, X_1 and X_2. **gcd($\#_1$, $\#_2$)** Finds the greatest common divisor (**gcd**) of two values, X_1 and X_2. **#^{3}** Calculates the cube of #. $\sqrt[3]{\#}$ Calculates the cube root of #. **remainder($\#_1$,$\#_2$)** Returns the remainder resulting from the division of two values, $\#_1$ by $\#_2$.

Key	Function
[MEMVAR]	Displays the following menu of variables. **A B C D E** Lets you view the stored value before pasting it to the display.
[2nd] [OFF]	Turns off the calculator and clears the display.
[ON]	Turns on the calculator.
[2nd] [▸OP1]	Stores an operation for later recall.
[OP1]	Recalls and displays the operation stored in [OP1].
[2nd] [▸OP2]	Stores a second operation for later recall.
[OP2]	Recalls and displays the operation stored in [▸OP2].
[PRB]	Displays the following menu of functions: **nPr** Calculates the number of possible permutations. **nCr** Calculates the number of possible combinations. **!** Calculates the factorial. **RAND** Generates a random 10-digit real number between 0 and 1. **RANDI** Generates a random integer between 2 numbers that you specify. Separate the 2 numbers with a comma.
[2nd] [RCL]	Recalls the stored values to the display.
[2nd] [RESET]	Displays the **RESET** menu. **RESET: N Y** Press [ENTER] when **N** (no) is underlined to return to the previous screen without resetting the calculator. Press [ENTER] when **Y** (yes) is underlined to reset the calculator. The message **MEM CLEARED** is displayed. Also, press [ON] and [CLEAR] simultaneously to reset the calculator immediately. No menu or message is displayed.
[2nd] [R⬌P]	Displays the following menu that lets you convert rectangular coordinates (x,y) to polar coordinates (r,θ) or vice versa. **R▸Pr** Converts rectangular coordinate to polar coordinate r. **R▸Pθ** Converts rectangular coordinate to polar coordinate θ. **P▸Rx** Converts polar coordinate to rectangular coordinate x. **P▸Ry** Converts polar coordinate to rectangular coordinate y.

Key	Function
[▸Simp]	Simplifies a fraction.
[2nd] [STAT]	Displays the following menu from which you can select **1-VAR**, **2-VAR**, or **CLRDATA**. **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. **CLRDATA** — Clears data values without exiting **STAT** mode.
[STATVAR]	Displays the following menu of stat variables with their current values. **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 **σx or σy** — Population standard deviation of x or y **Σx or Σ y** — 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 (x **x** y) for all xy pairs in 2 lists ***a*** — Linear regression slope ***b*** — Linear regression y-intercept **r** — Correlation coefficient The following variables are used to calculate predicted values based on the correlation when a given value is input. **x′ or y′** — Calculates the predicted value of x or y, respectively, when given value of y or x, respectively, is input.
[STO▸]	Displays the following menu of variables. **A B C D E** — Lets you select a variable in which to store the displayed value. The new variable replaces any previously stored value. **rand** — Lets you set a seed value for random integers.

Key	Function
2nd[TRIG]	Displays a menu of all trig functions: **sin** Calculates the sine. **sin^{-1}** Calculates the inverse sine. **cos** Calculates the cosine. **cos^{-1}** Calculates the inverse cosine. **tan** Calculates the tangent. **tan^{-1}** Calculates the inverse tangent.
UNIT	Separates a whole number from the fraction in a mixed number.

Display Indicators

B

Indicator	Meaning
2nd	2nd function.
FIX	Fixed-decimal setting.
STAT	Statistical mode.
DEG, RAD	Angle mode (degrees or radians).
x10	Precedes the exponent in scientific notation.
↑ ↓	An entry is stored in history before and/or after the active screen. Press ▲ and ▼ to scroll.
← →	An entry or menu displays beyond 11 digits. Press ◀ or ▶ to scroll.

Error Messages

C

Message	Meaning
ARGUMENT	A function does not have the correct number of arguments.
DIVIDE BY 0	• You attempted to divide by 0. • In statistics, **n** = 1.
DOMAIN	You specified an argument to a function outside the valid range. For example: • For $\sqrt[x]{}$: $x = 0$ or $y < 0$ and x is not an odd integer. • For y^x: y and $x = 0$; $y < 0$ and x is not an integer. • For $\sqrt{x}$: $x < 0$. • For **LOG** or **LN**: $x \leq 0$. • For **TAN**: $x = 90°, -90°, 270°, -270°, 450°$, etc. • For **SIN**$^{-1}$ or **COS**$^{-1}$: $\lvert x \rvert > 1$. • For **nCr** or **nPr**: **n** or **r** are not integers ≥ 0. • $\lvert \theta \rvert >$ **1 E**^{10}, where θ is an angle in a trig or **R▶Pr** function.
EQUATION LENGTH ERROR	An entry exceeds the digit limits (88 for entry line and 47 for Stat or Constant entry lines); for example, combining an entry with a constant that exceeds the limit.
FRQ DOMAIN	**FRQ** value (in **1-VAR** statistics) < 0.
OVERFLOW	For x**!**: x is not an integer between 0 and 69.
STAT	• You pressed [STAT VAR] with no defined data points. • You pressed [DATA], [STAT VAR], or [2nd] [EXIT STAT] when not in **STAT** mode. • Statistical analyses do not have at least 2 data points (**n** > 1).
SYNTAX	The command contains a syntax error—entering more than 23 pending operations, 8 pending values, or having misplaced functions, arguments, parentheses, or commas.

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D

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