Texas Instruments

TI-30X II

TI-30X IIS:

A Guide for Teachers

Developed by
Texas Instruments Incorporated

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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-30X IIS section of this guide.

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About the Teacher Guide

How the Teacher Guide is Organized

This guide consists of two sections: Activities and How to Use the TI-30X IIS. The Activities section is a collection of activities for integrating the TI-30X IIS into mathematics instruction. The How To Use the TI-30X IIS section 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-30X IIS 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-30X IIS key presses.
- A student activity sheet.

How to Use the TI-30X IIS

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-30X IIS, 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 circled on the TI-30X IIS 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 relevant 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] and then selecting Y (yes).

Conventions Used in the Teacher Guide

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

  For example: [SIN^{-1}]

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

  For example: $\frac{\text{SIN}^{-1}}{\text{SIN}}$

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use our e-mail address: ti-cares@ti.com
visit our TI calculator home page: www.ti.com/calc
or, call our toll-free number:
1-800-TI-CARES (1-800-842-2737)

Two-Line Display

The first line (entry line) displays an entry of up to 88 digits (47 digits for the stat and constant entry lines). 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, negative sign, **x10** indicator, and 2-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-30X IIS 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 (page 41).

Because operations inside parentheses are performed first, you can use ( ) 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-30X IIS keys display menus: MEMVAR, 2nd [RCL], STO▶, 2nd [STAT], STATVAR, 2nd [EXIT STAT], PRB, DRG, 2nd [R↔P], °′″ 2nd [SCI/ENG], 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-30X IIS 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-30X IIS is turned off. To recall the value of **Ans**:

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

Resetting the TI-30X IIS

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

Resetting the calculator:

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

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

Automatic Power Down™(APD™)

If the TI-30X IIS remains inactive for about 5 minutes, APD turns it off automatically. Press [ON] after APD. The display, pending operations, settings, and memory are retained.

Table of Contents

Activities

The Better Batter — The FIX Key

Overview

Students use 2nd [FIX] on the TI-30X IIS to change numbers to different place values. Students calculate batting averages using the TI-30X IIS and then round their answers to 3 decimal places.

Math Concepts

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

Materials

- TI-30X IIS
- pencil
- student activity

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-30X IIS.

   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 page 3 for solutions.

1. Enter the first number.

   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. Press ENTER.

   4.39865
   4.3987

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 _____

Problems

1. Round the following numbers to 3 decimal places.

   a. 2.35647 _____

   b. 15.3633 _____

   c. 0.02698 _____

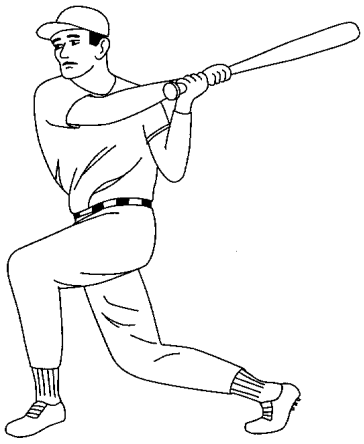
2. Using the TI-30X IIS, round the following numbers to 4 decimal places.

   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-30X IIS
- pencil
- student activity

Introduction

Set up the activity by telling your students:

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

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

   a. 93 000 000 — 9.3×10^7

   b. 384 000 000 000 — 3.84×10^{11}

   c. 0.00000000000234 — 2.34×10^{-12}

   d. 0.0000000157 — 1.57×10^{-8}

2. Have students change the following numbers into scientific notation using the TI-30X IIS.

   a. 12 000 000 — 1.2×10^7

   b. 974 000 000 — 9.74×10^8

   c. 0.0000034 — 3.4×10^{-6}

   d. 0.000000004 — 4×10^{-9}

   Note: Answers assume the default floating decimal setting.

   1. Enter the first number.
      12000000
   2. Press [2nd] [SCI/ENG].
      FLO SCI ENG
   3. Press ▶ [ENTER] [ENTER].
      12000000
      1.2x10^07

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*

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

   1. Enter **5.8**; press [2nd] [EE].
      5.8E
   2. Enter **7**; press [2nd] [SCI/ENG].
      FLO SCI ENG
   3. Press ◀.
      FLO SCI ENG
   4. Press [ENTER] [ENTER].
      5.8E7
      58000000.

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-30X IIS, 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

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

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 _____

Problems

1. Write the following numbers in scientific notation.

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

2. Using the TI-30X IIS, change the following numbers into scientific notation.

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

3. Using the TI-30X IIS, 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-30X IIS, find the total distance that you need to travel.

   _____

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

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

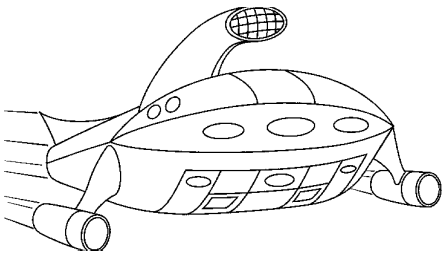
   _____

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-30X IIS
- pencil
- student activity

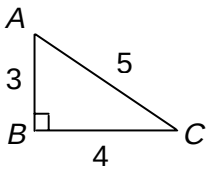
Introduction

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 = 0.60*
   b. cos C *4 ÷ 5 = 0.80*
   c. tan C *3 ÷ 4 = 0.75*
   d. sin A *4 ÷ 5 = 0.80*
   e. cos A *3 ÷ 5 = 0.60*
   f. tan A *4 ÷ 3 = 1.33*



To set 2 decimal places:

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

2. Have students find the value of each ratio using the TI-30X IIS. Round to the nearest 10 thousandth.

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

To find sin 71°:

1. Press SIN.
   sin(
2. Enter **71**; press) ENTER.
   sin(71)
   0.945518576
3. Press 2nd [FIX] **4**.
   sin(71)
   0.9455

3. Have students find the measure of each angle using the TI-30X IIS. 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 find B when sin B=0.4567:

1. Press 2nd [SIN^{-1}].
   sin^{-1}(
2. Enter **.4567**; press) ENTER.
   sin^{-1}(.4567)
   27.1744
3. Press 2nd [FIX] **0**.
   sin^{-1}(.4567)
   27.

Trig Functions (Continued)

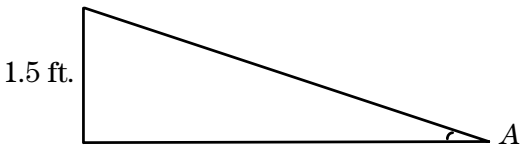
Activity

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] [TAN-1].
   tan-1(
2. Enter **1.5** [÷] **20** and press [)] [ENTER].
   tan-1(1.5/20)
   4.3

1. Press [2nd] [TAN-1].
   tan-1(
2. Enter **1.5 ÷ 15** and press [ENTER].
   tan-1(1.5/15
   5.7

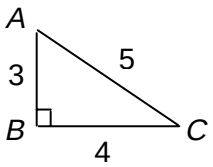
Trig Functions

Name _____

Date _____

Problems

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-30X IIS, 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-30X IIS, 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 trigonometric 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-30X IIS
- pencil
- student activity

Introduction

Discuss finding averages with your students.

Activity

Present the following problem to students:

You and your friend are having a contest. The one who 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-30X IIS. Remember to enter 2 as the frequency for 98 and 1 for all others.

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 STAT VAR ▶ to select $\bar{x}$, the average. Write it down.

   n $\bar{x}$ Sx σx

   92.6

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?

The score you need: 98

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

1. Press [2nd] [STAT] ▶ ▶ [ENTER] to select **CLRDATA**.
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
   93.0

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 _____

Problems

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?

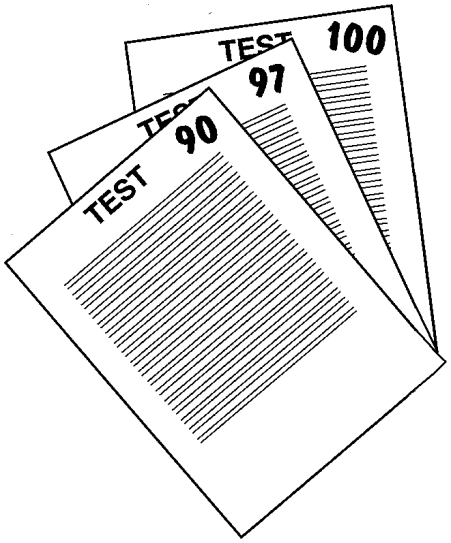
   Your average _____

   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 _____

   The score you need _____



Heart Rates — 1-Variable Statistics

Overview

Students use the statistics functions of the TI-30X IIS calculator to investigate the effect of exercise on heart rate.

Math Concepts

- mean, minimum, maximum, and range

Materials

- TI-30X IIS
- stopwatch or a watch with a second hand
- student activity

Introduction

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

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

Activity

Have students complete the following investigation to check their estimations.

1. Have students check their resting heart rate by timing their pulse for 1 minute. (You could have them time for 10 seconds and then multiply by 6, but this could be the quietest minute of your day!)

2. Collect data on the chart. Enter each student's heart rate and a mark in the frequency column. As other students have the same heart rate, add another tally mark in the frequency column.

3. Enter the heart rate data into the TI-30X IIS.

   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 ⊙.

   For example, assume a class of 22 students:

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

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 the first frequency and press ⊙.
5. Continue entering until you have entered all the heart rates and frequencies.

Heart Rates — 1-Variable Statistics (Continued)

4. Check the statistics calculations. After students display **Σx** (Sigma x), explain that **Σx** is the sum of all the heart rates. Ask students:
   - *How many heartbeats were there in one minute?*
   - *Is the average heart rate higher or lower than you expected?*

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

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

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

1. Press [STAT VAR].

   n x̄ Sx σx
   22.

   n should equal the total number of student sampled.

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

   n x̄ Sx σx
   62.

3. Press ▶ ▶ ▶ to **Σx**.

   Σx Σx²
   1370.

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

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

Heartbeats per minute (jumping)	Frequency

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

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

10. 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.

Heart Rates — 1-Variable Statistics

Name _____

Date _____

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

Resting **Running** **Jumping**

12. How are the histograms the same? How are they different? _____

_____

_____

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

_____

_____

WNBA Stats — 2-Variable Statistics

Overview

Students use WNBA statistics to explore the relationship between 2 variables. They use the TI-30X IIS to compute the regression equation and evaluate some values.

Math Concepts

- 2-variable statistics

Materials

- TI-30X IIS
- pencils
- student activity

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 a player gets? Or is it related to the player's field goal percentage?

Procedure

1. Put the calculator in **STAT** mode and choose **2-VAR** statistics.

   1. Press [2nd] [STAT] and then ▶.

      1-VAR 2-VAR

   2. Press [ENTER] to select **2-VAR**.

2. Using the table in the activity (page 26), enter the data. Enter points per game as the **X**-variable and minutes per game (playing time) as the **Y**-variable.

   1. Press [DATA].

      X1=

   2. Enter **10.1** (points per game for the first player, Rhonda Mapp).

      X1=10.1

   3. Press ▼.

      Y1=1

   4. Enter **21.7** (minutes per game for Rhonda Mapp).

      Y1=21.7

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

   6. Enter data for each player in the table. Press ▼ after entering each data point.

`

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.

1. Press [2nd] [FIX].
   F0123456789
2. Press **2**.

1. Press [STATVAR].
   n x̄ Sx σx ȳ
   12.00
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 **Σx**.
   Sy σy Σx
   112.00

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*

1. Press ▶ until you get to **a**. This is the slope of the line of best fit.
   ΣXY a b r
   1.56
2. Press ▶ to **b**. This is the y-intercept of the line.
   Σ XY a b r
   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*

3. Press ▶ to **r**. This is the correlation coefficient.
   ΣXY a b r
   0.91

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

1. Press ▶ ▶ to **y′**.
   x′ 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 2 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 a player gets? Or is it related to the player's 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
1. Rhonda Mapp	.506	10.1	4.3	21.7
2. Vicky Bullet	.441	13.3	6.5	31.6
3. Janeth Arcain	.426	6.8	3.6	21.9
4. Cynthia Cooper	.446	22.7	3.7	35
5. Elena Baranova	.420	12.9	9.3	33.6
6. Malgozata Dydek	.482	12.9	7.6	28
7. Heidi Burge	.509	6.7	3.3	16.7
8. Keri Chaconas	.297	4.8	.8	13.2
9. Rebecca Lobo	.484	11.7	6.9	29.2
10. Coquese Washington	.294	1.9	.9	8.1
11. Toni Foster	.467	4.9	1.9	13.6
12. 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 table 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 per game 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.

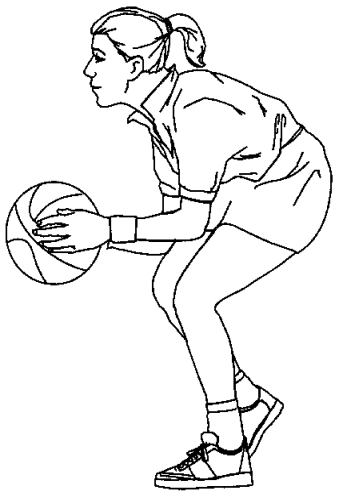
   _____

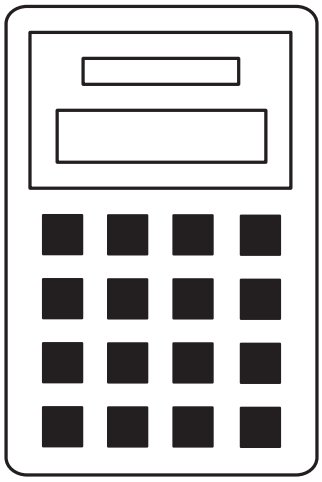
8. Write the correlation coefficient.

   _____

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

   _____



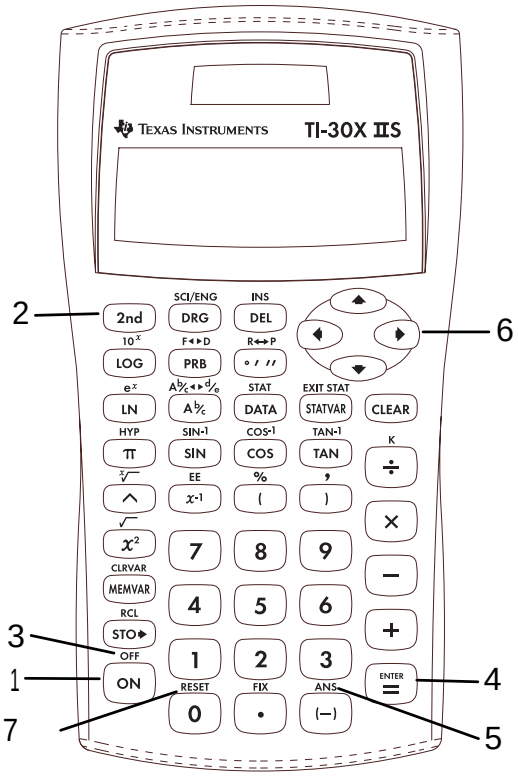


How to Use the TI-30X IIS

Keys

1. [ON] turns on the calculator.
2. [2nd] turns on the 2nd indicator and accesses the function shown above the next key you press.
3. [2nd] [OFF] turns off the calculator and clears the display.
4. [ENTER] completes the operation or executes the command.
5. [2nd] [ANS] recalls the most recently calculated result and displays it as Ans.
6. ◀ 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.

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

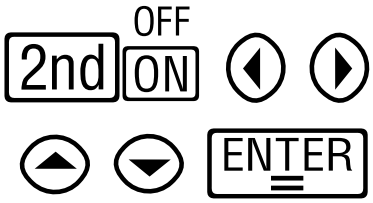
   Note: Pressing [ON] and [CLEAR] simultaneously resets the calculator immediately. No menu or message is displayed.

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 (DEG) mode.
  - Clears memory variables, pending operations, entries in history, statistical data, constants, and Ans (Last Answer).
- The entry line can contain up to 88 characters. When ← or → appear in the display, the entry line contains more characters to the left or right. When ↑ or ↓ appear, more characters are located above or below the entry line.
- Press [ON] after Automatic Power Down™ (APD™). The display, pending operations, settings, and memory are retained.

Second, Off, Arrows, Equals

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 DEG
◀ ◀ ◀ ◀ 1 ▶ ▶ 6 ENTER	41−26 15. DEG
81 + 57 ENTER	81+57 138. DEG
OFF 2nd ON ON	 DEG
▲ ▲ ▼	81+57 DEG

Reset

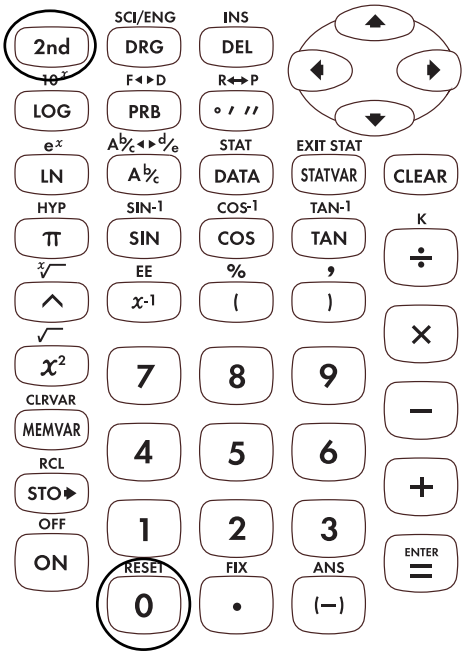
Reset the calculator.

RESET
2nd 0

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

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

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

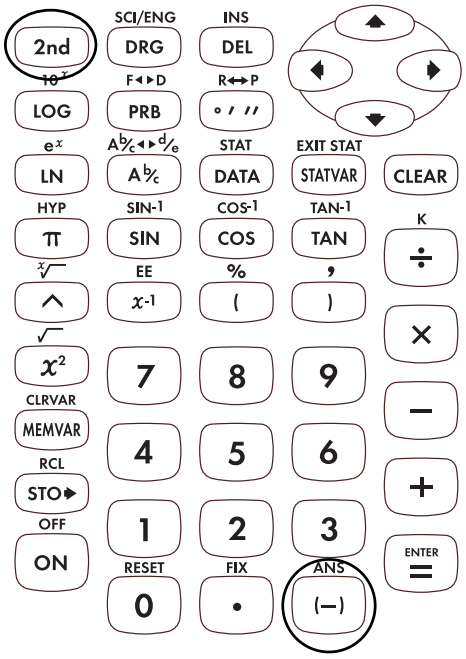


Last Answer (Ans)

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

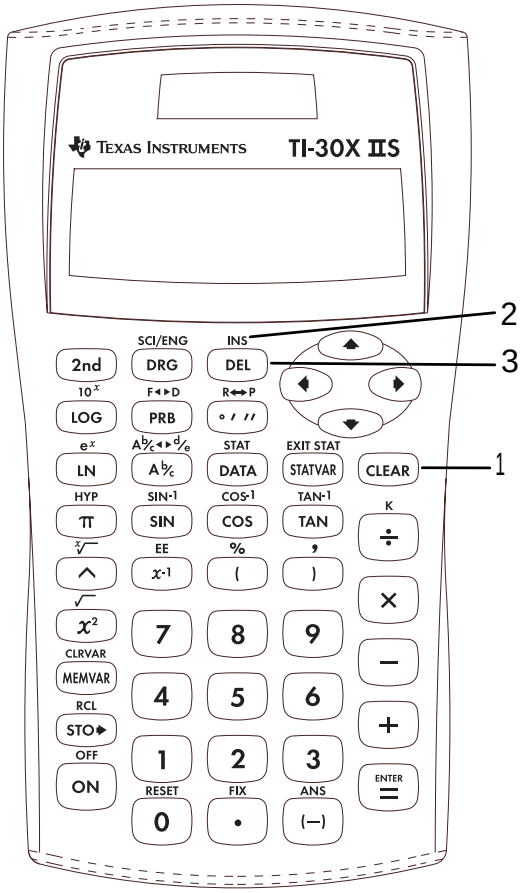
Press	Display
2 [+] 2 [ENTER]	2+2 4. DEG
[2nd] [ANS] [(–)] [x^2] [ENTER]	Ans^2 16. DEG

[2nd] [ANS] [(–)]



Keys

1. CLEAR clears characters and error messages. Once the display is clear, it moves the cursor to the most recent entry.
2. 2nd [INS] lets you insert a character at the cursor.
3. DEL deletes the character at the cursor. Hold DEL down to delete all characters to the right. Then, each time you press DEL, it deletes 1 character to the left of the cursor.



Notes

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

Delete and Insert

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

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

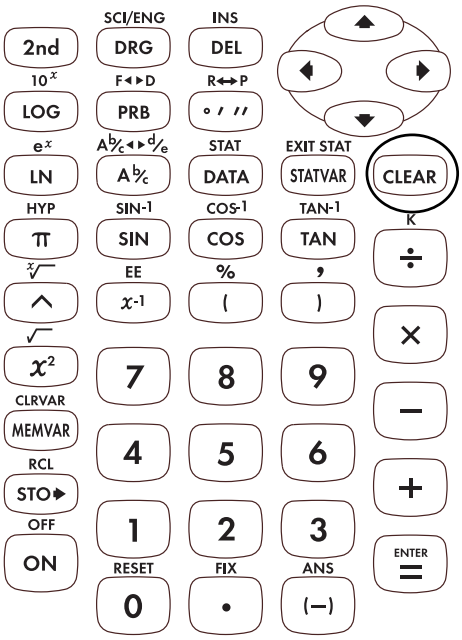
INS
[DEL] [2nd] [DEL]

Clear

Enter 21595.
Clear the 95.
Clear the entry.

CLEAR

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

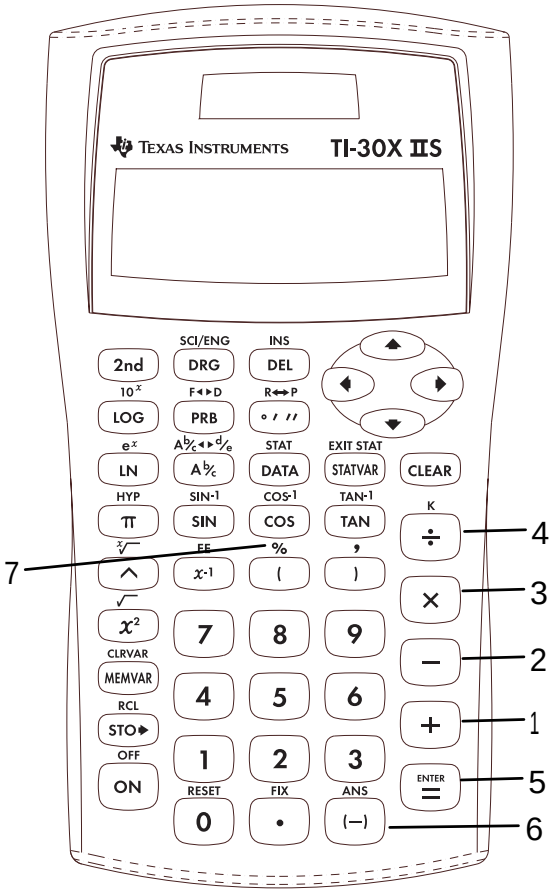


Keys

1. [+] adds.
2. [−] subtracts.
3. [×] multiplies.
4. [÷] divides.
5. [ENTER] completes the operation or executes the command.
6. [(−)] lets you enter a negative number.
7. [2nd] [%] changes a real number to a percent.

Notes

- The examples on the transparency masters assume all default settings.
- The TI-30X IIS allows implied multiplication. Example: 3 (4+3) = 21
- Do not confuse [(−)] with [−]. [−] allows subtraction.
- Results of percent calculations display according to the decimal notation mode setting.



Add, Subtract, Multiply, Divide, Equals

Find: $2 + 54 - 6 =$

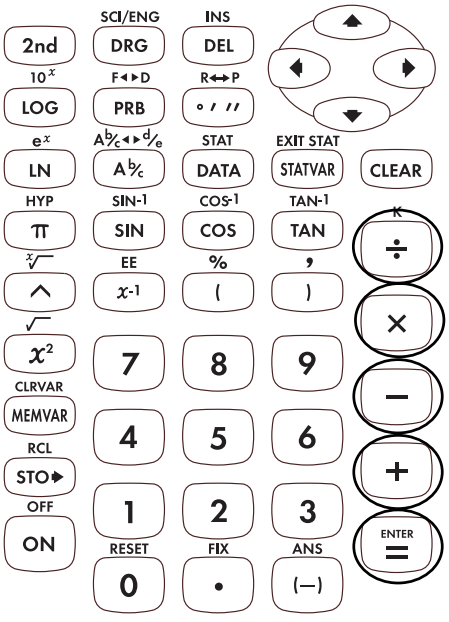
$16 \times 21 =$

$78 \div 2 =$

$12 \times (5 + 6) =$

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

[+] [−] [×] [÷] [ENTER]

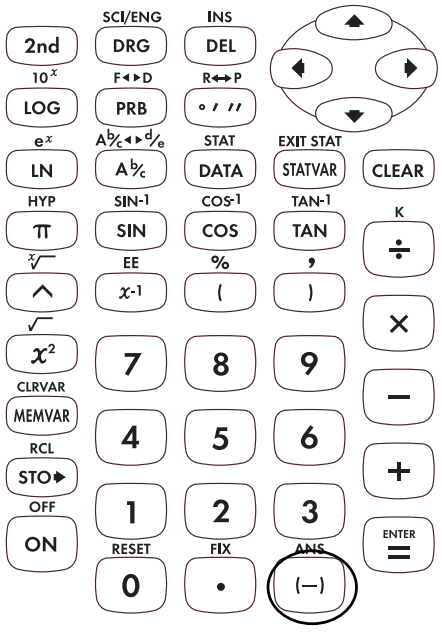


Negative Numbers

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. DEG

(−)

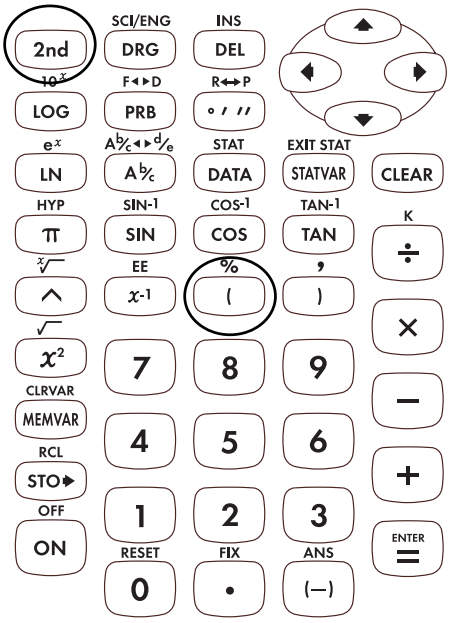


Percent

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

Press	Display
15	15 DEG
2nd [%] (× 80 ENTER	15%*80 12. DEG

2nd [%] (



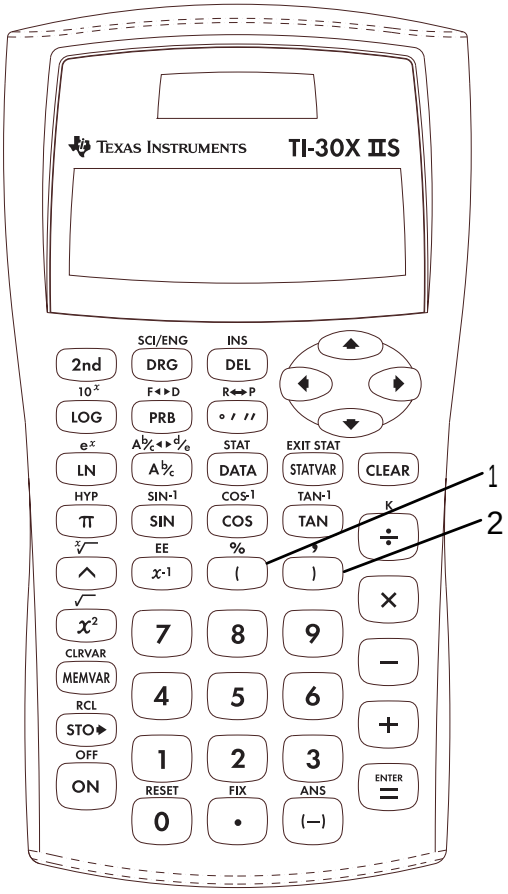
Order of Operations and Parentheses 4

Keys

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-30X IIS 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



1 (first)	Expressions inside ( )
2	Functions that need a) and precede the expression, such as the SIN, LOG, or 2nd R↔P o ′ ″ menu items
3	Functions entered after the expression, such as x^2 and angle unit modifiers (°, ′, ″, r, g)
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 A b/c ◂▸ d/e A b/c, 2nd F◂▸D PRB, and ▶DMS)
11 (last)	ENTER completes all operations and closes all open parentheses.

Order of Operations

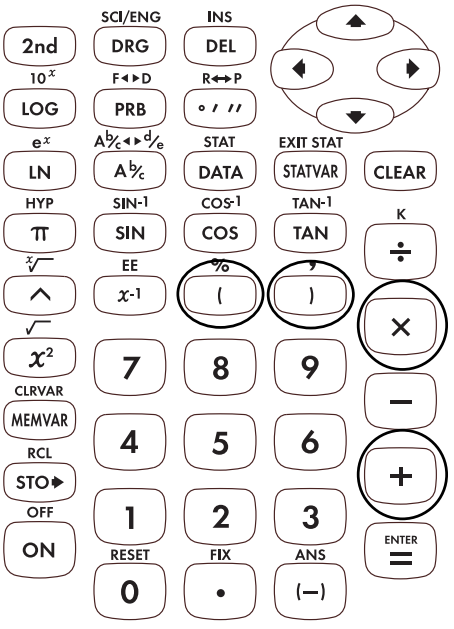
$1 + 2 \times 3 =$

Press	Display
1 [+] 2 [×] 3 [ENTER]	1+2*3 → 7. DEG

$(1 + 2) \times 3 =$

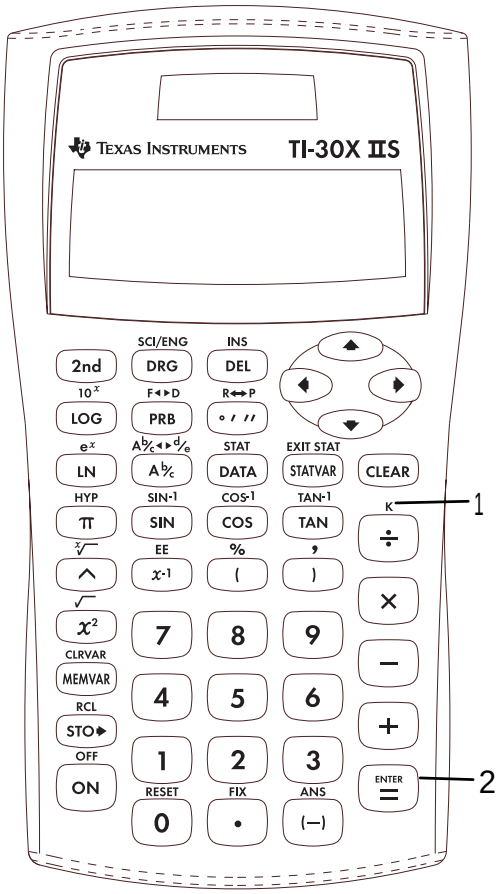
Press	Display
[(] 1 [+] 2 [)] [×] 3 [ENTER]	(1+2)*3 → 9. DEG

[+] [×] [(] [)]



Keys

1. 2nd [K] turns on the constant mode and lets you define a constant. A K displays when the constant mode is on.
2. ENTER places the contents of K at the end of the expression in the display.



Notes

- The examples on the transparency masters assume all default settings.
- All functions, except statistics, work in constant mode.
- To enter a constant:
  1. Press 2nd [K]. If a constant is already stored, press CLEAR to clear it.
  2. Enter your constant (any set of operations, functions, and values).
  3. Press ENTER to turn on the constant mode. K appears in the display.
  4. Press CLEAR to clear the display.
  5. Enter an initial value. If you do not enter a value, 0 is assumed, and Ans will appear in the display.
  6. Press ENTER to place the contents of K at the end of the expression and evaluate it.
  7. Continue pressing ENTER to repeat the constant.

     The result is stored in Ans, which is displayed, and the constant is used to evaluate the new expression.

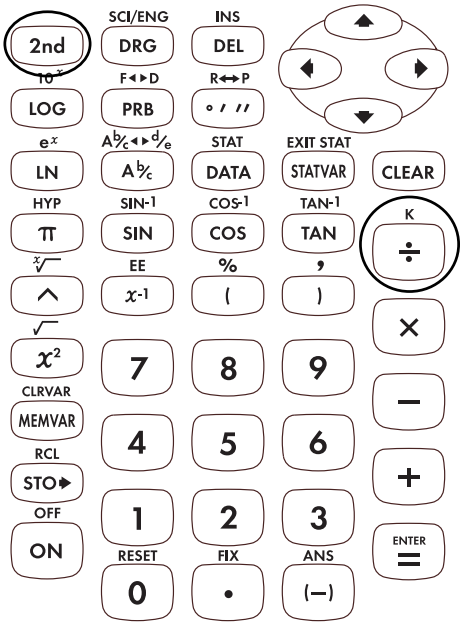
Constant

Three people babysit for $3.25 each per hour. First person works 16 hours. Second person works 12 hours. Third person works 17 hours. How much did each person earn?

Press	Display
2nd K ÷	K = DEG
× 3.25 ENTER	K = *3.25 DEG K
CLEAR	▮ DEG K
16 ENTER	16*3.25 52. DEG K
12 ENTER	12*3.25 39. DEG K
17 ENTER	17*3.25 55.25 DEG K
2nd K ÷	▮ DEG K

(Constant mode is off.)

2nd K ÷



Decimals and Decimal Places 6

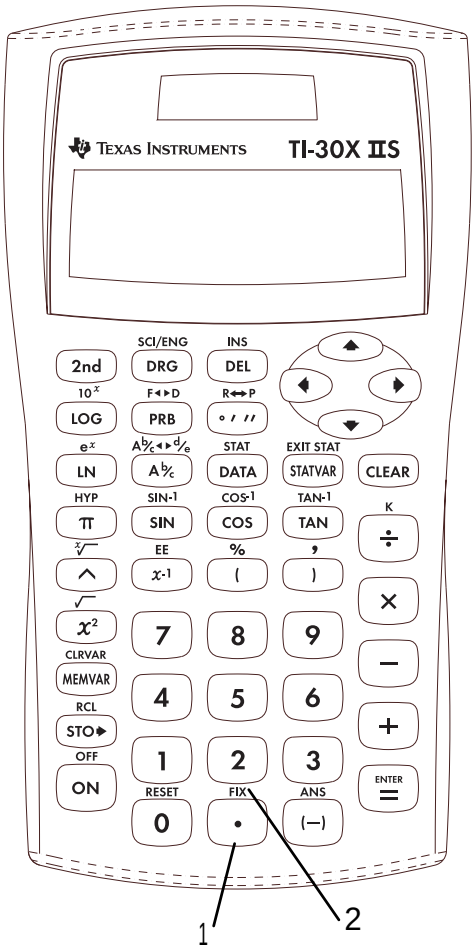
Keys

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.

   0-9 — Sets the number of decimal places.



Notes

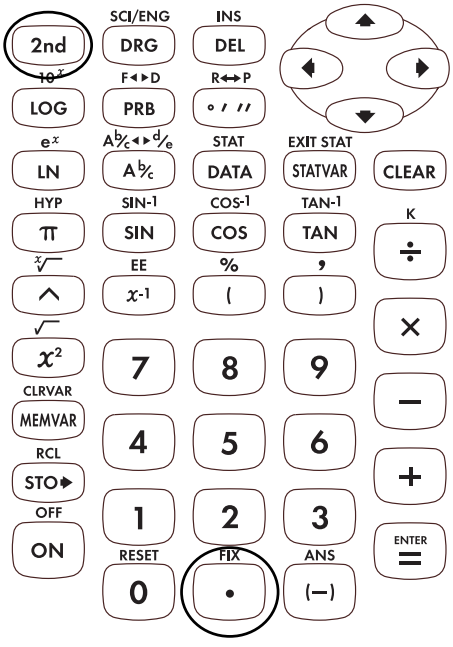
- The examples on the transparency masters assume all default settings.
- [2nd] [FIX] [·] removes the setting and returns to standard notation (floating decimal).
- The FIX setting affects all decimal results and the mantissa of scientific and engineering notation results.
- The TI-30X IIS automatically 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-30X IIS 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 2 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

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

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

[•] [2nd] FIX [•]



Keys

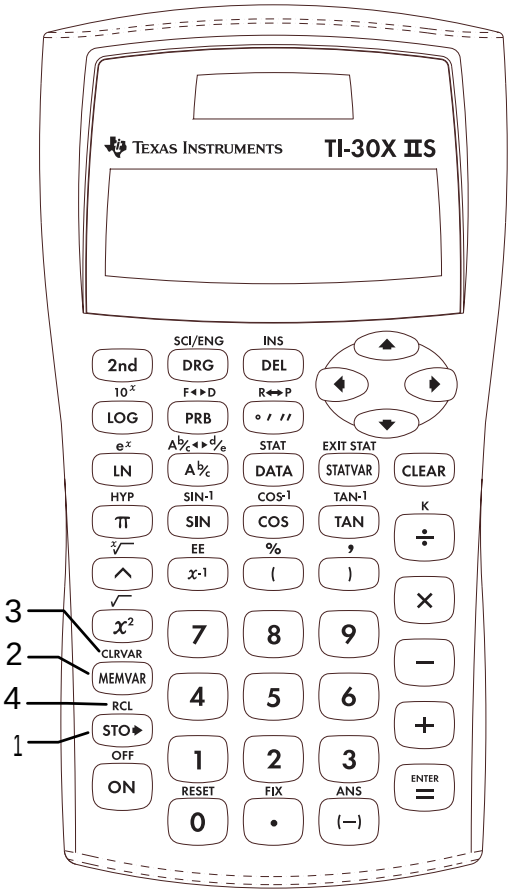
1. STO▶ displays the following menu of variables.

   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 name (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 (page 68).

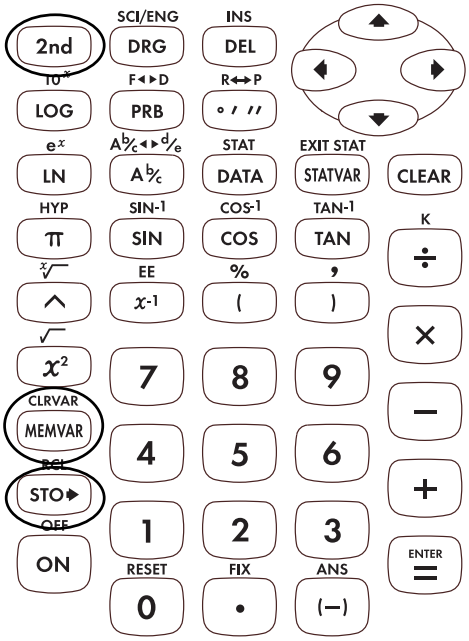
Store, Memory Variable, Clear Variable

Test scores: 96, 76, 85.
Weekly scores: 92, 83, 97, and 86.
Find the average of test and weekly scores. Find the final average.

Press	Display
96 + 76 + 85 ENTER	96+76+85 257. DEG
÷ 3 ENTER	Ans/3 85.66666667 DEG
STO▶ ENTER	Ans→A 85.66666667 DEG
92 + 83 + 97 + 86 ENTER	92+83+97+86 358. DEG
÷ 4 ENTER	Ans/4 89.5 DEG
+ MEMVAR ENTER ENTER	Ans+A 175.1666667 DEG
÷ 2 ENTER	Ans/2 87.58333333 DEG

STO▶ MEMVAR

CLRVAR
2nd MEMVAR



Store, Recall

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 DEG
[STO▶] [ENTER]	Ans→A 2.66 DEG
9 [·] 48 [÷] 4 [ENTER]	9.48 / 4 2.37 DEG
[STO▶] [◐] [ENTER]	Ans→B 2.37 DEG

View the first price again.

[2nd] [RCL] [STO▶]

A B C D E
2.66
DEG

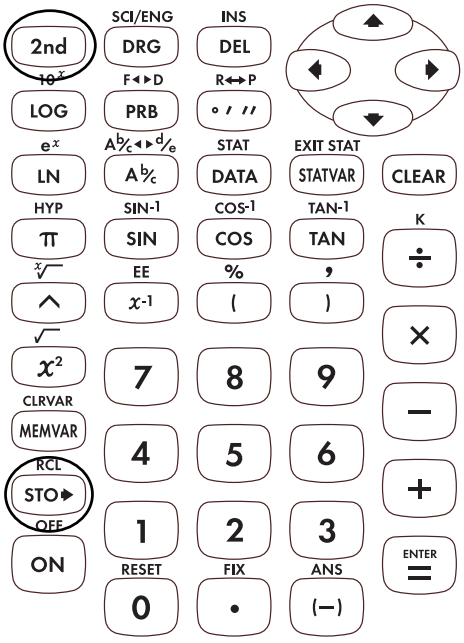
View the second price again.

[◐]

A B C D E
2.37
DEG

[STO▶]

[2nd] [RCL] [STO▶]



Store, Recall

Shop	Purchases	Qty	Cost
A	shirts	2	$13.98 ea.
B	ties	3	$7.98 ea.
C	belt	1	$6.98
	suspenders	1	$9.98

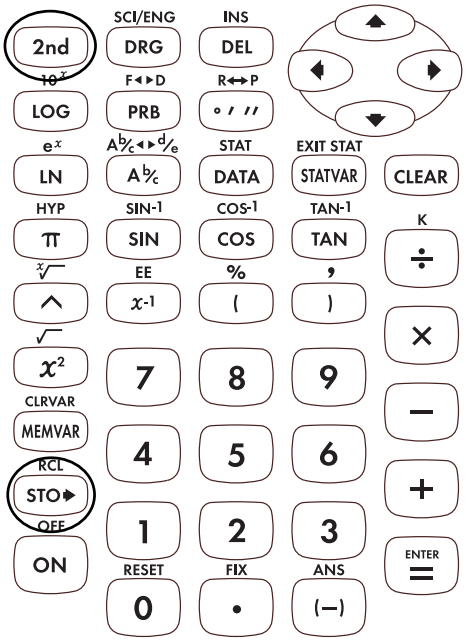
How much did you spend at each shop, and how much did you spend altogether?

Press	Display
2 × 13 • 98 ENTER	2*13.98 → 27.96 DEG
STO▶	→ A B C D E → DEG
ENTER	Ans→A → 27.96 DEG
3 × 7 • 98 ENTER	3*7.98 → 23.94 DEG

STO▶

RCL

2nd STO▶



Continued

Store, Recall (Continued)

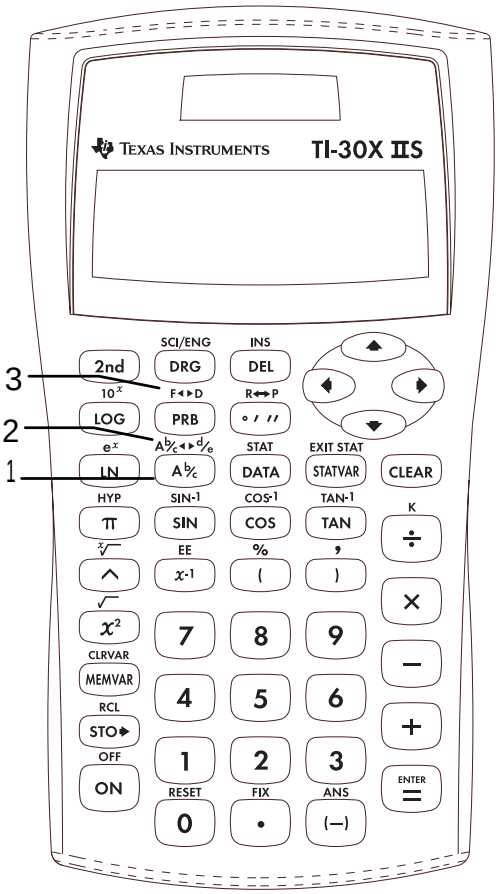
Press	Display
STO▶ ▶ ENTER	Ans→B 23.94 DEG
6 . 98 + 9 . 98 ENTER	6.98+9.98 16.96 DEG
STO▶ ▶ ▶ ENTER	Ans→C 16.96 DEG
RCL 2nd STO▶ ENTER +	27.96+ DEG
RCL 2nd STO▶ ▶ ENTER +	←.96+23.94+ DEG
RCL 2nd STO▶ ▶ ▶ ENTER ENTER	27.96+23.94 → 68.86 DEG

STO▶

RCL 2nd STO▶

Keys

1. [A b/c] lets you enter mixed numbers and fractions.
2. [2nd] [A b/c ↔ d/c] converts a simple fraction to a mixed number or a mixed number to a simple fraction.
3. [2nd] [F ↔ D] converts a fraction to its decimal equivalent or changes a decimal to its fractional equivalent, if possible.

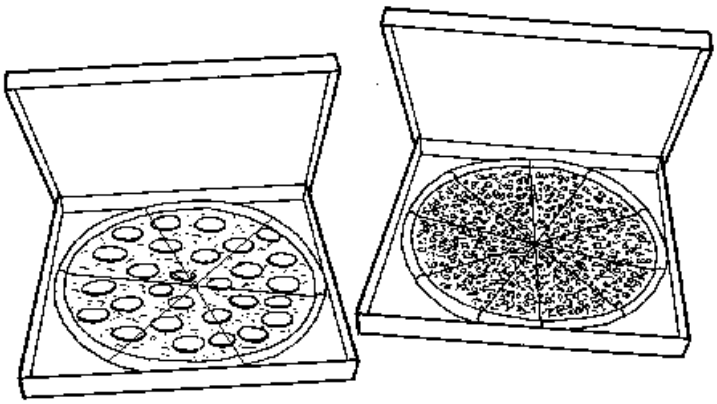


Notes

- The examples on the transparency masters assume all default settings.
- To enter a mixed number or a fraction, press [A b/c] 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.
- Fractional calculations can show fractional or decimal results.
  - When possible, calculations involving 2 fractions or a fraction and any integer will display fractional results.
  - 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 any number through 1000.
- For a simple fraction, the numerator can be up to 6 digits and the denominator can be any number through 1000.

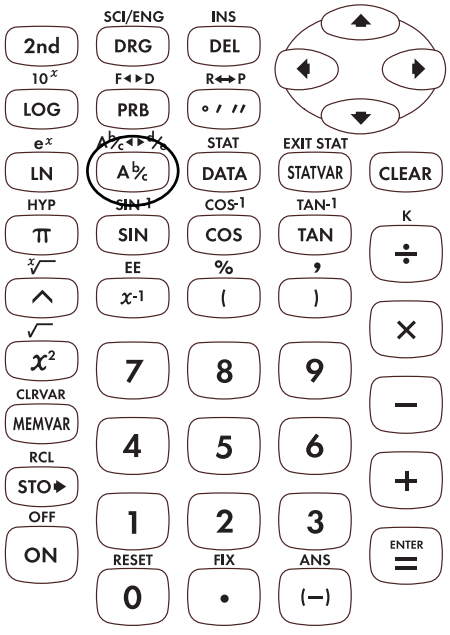
Fractions

At the party, you ate 5/6 of the pepperoni pizza and 1/10 of the sausage pizza. How much pizza did you eat?



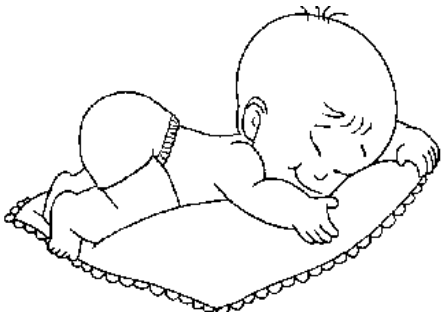
Press	Display
5 [Ab/c] 6 [+] 1 [Ab/c] 10 [ENTER]	5_6+1_10 ↑ 14/15 DEG

[Ab/c]



Mixed Numbers

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
4 [Ab/c] 3 [Ab/c] 8 [+] 2 [Ab/c] 3 [Ab/c] 4 [ENTER]	4⌟3⌟8+2⌟3⌟4 = 7⌟1/8 DEG

[Ab/c]

\

Mixed Number to Fraction, Fraction to Mixed Number

Sam is making his birthday cake. The recipe calls for 3 1/2 cups of flour. He has only a 1/2-cup measuring cup. To find out how many times Sam must use his measuring cup, change the mixed number to a fraction.

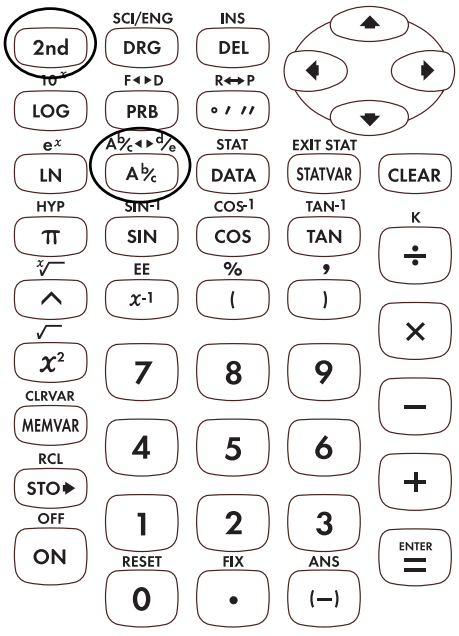
$$3\ 1/2 \div 1/2 = 7$$

Press	Display
3 [Ab/c] 1 [Ab/c] 2	3 _ 1 _ 2 DEG
[2nd] [Ab/c] (Ab/c◂▸d/e)	3 _ 1 _ 2 ▸ A^b/c ◂▸ d/e DEG
[ENTER]	3 _ 1 _ 2 ▸ A^b/c ◂▸ d/e ↑ 7/2 DEG

Show the mixed number again.

Press	Display
[2nd] [Ab/c] (Ab/c◂▸d/e) [ENTER]	Ans ▸ A^b/c ◂▸ d/e ↑ 3 _ 1/2 DEG

[2nd] [Ab/c] (Ab/c◂▸d/e)

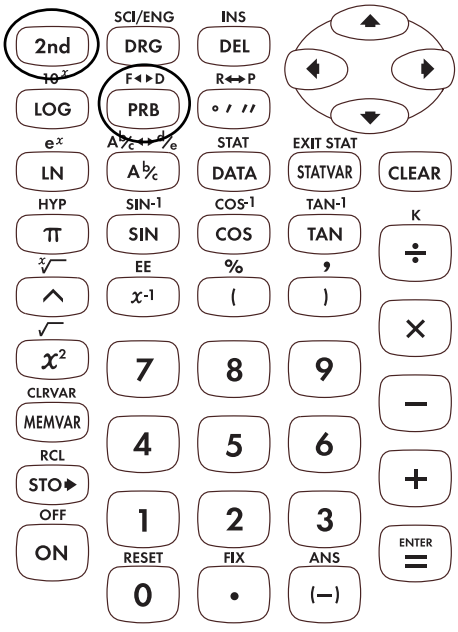


Fraction to Decimal

Juan swims 20 laps in 5.72 minutes. Mary swims 20 laps in 5 3/4 minutes. Change Mary's time to a decimal to determine who swims faster.

Press	Display
5 [A b/c] 3 [A b/c]	5 _ 3 _ 4 ▸ F ◂▸ D DEG
4 [2nd] [F◂▸D] [PRB]	
[ENTER]	5 _ 3 _ 4 ▸ F ◂▸ D ↑ 5.75 DEG

[2nd] [F◂▸D] [PRB]

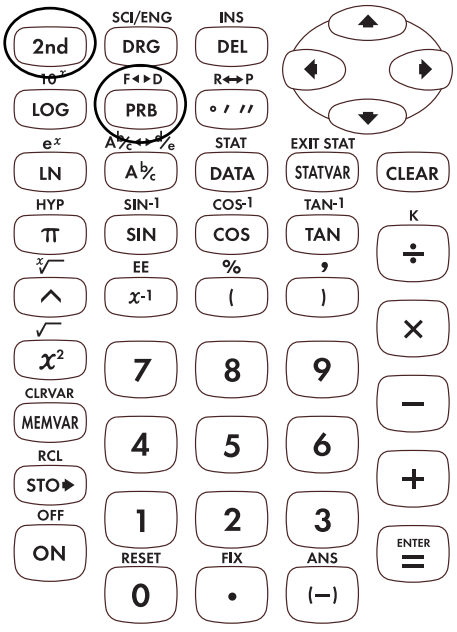


Decimal to Fraction

Change 2.25 to its fractional equivalent.

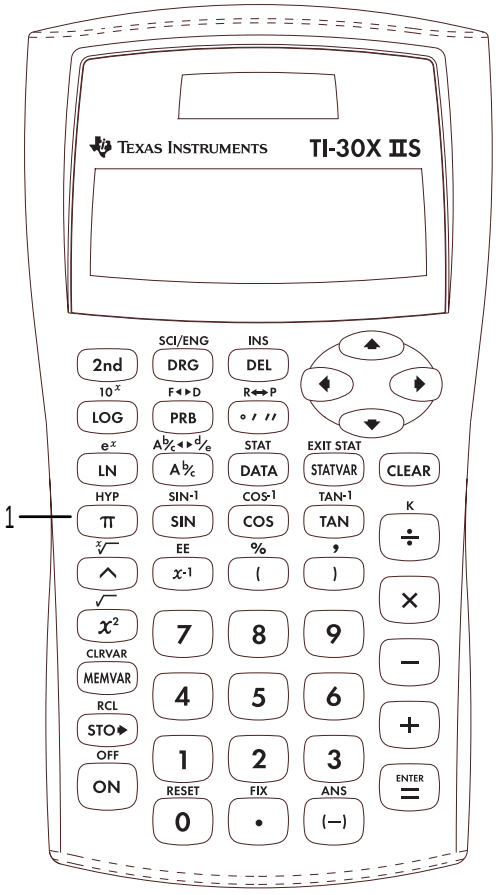
Press	Display
2 [.] 25 F◂▸D 2nd PRB ENTER	2.25▸F◂▸D 2 1/4 DEG

F◂▸D
2nd PRB



Keys

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



Notes

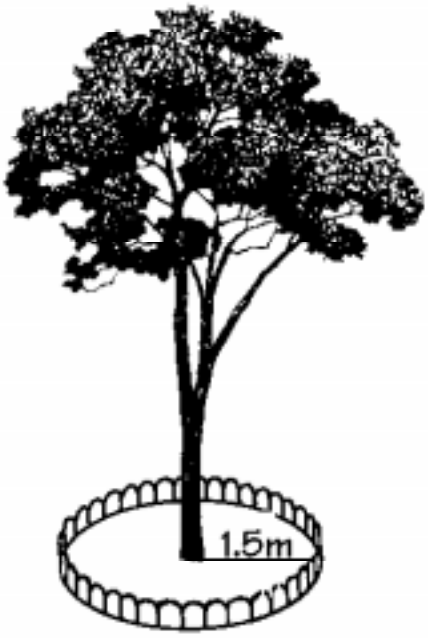
- The examples on the transparency masters assume all default settings.
- Internally, pi is stored to 13 digits (3.141592653590).
- After pressing [2nd] [FIX], you can select the number of decimal places in 2 ways:
  - Press ◀ or ▶ to move to the number of decimal places you want, and then press [ENTER],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

  The transparency masters show both ways.

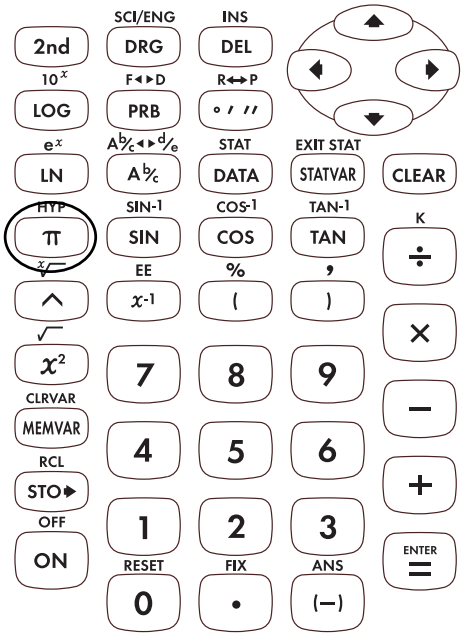
Circumference

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.

$$C = 2\pi r = 2 \times \pi \times 1.5\text{m}$$



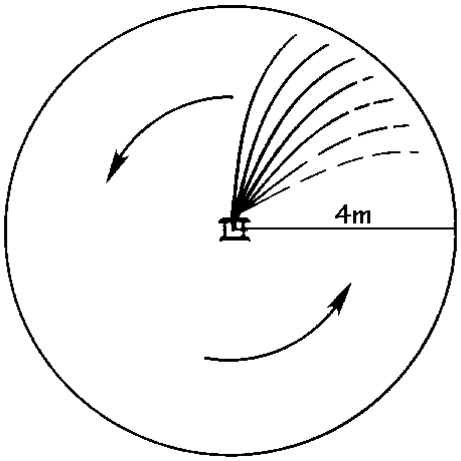
Press	Display
2 × π × 1.5 ENTER	2*π*1.5 9.424777961 DEG



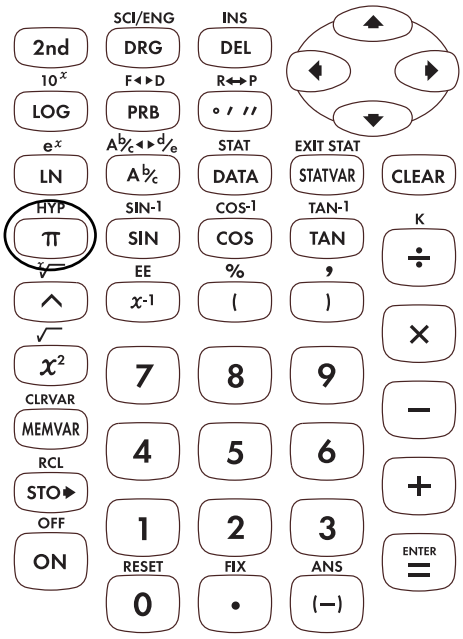
Area

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

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



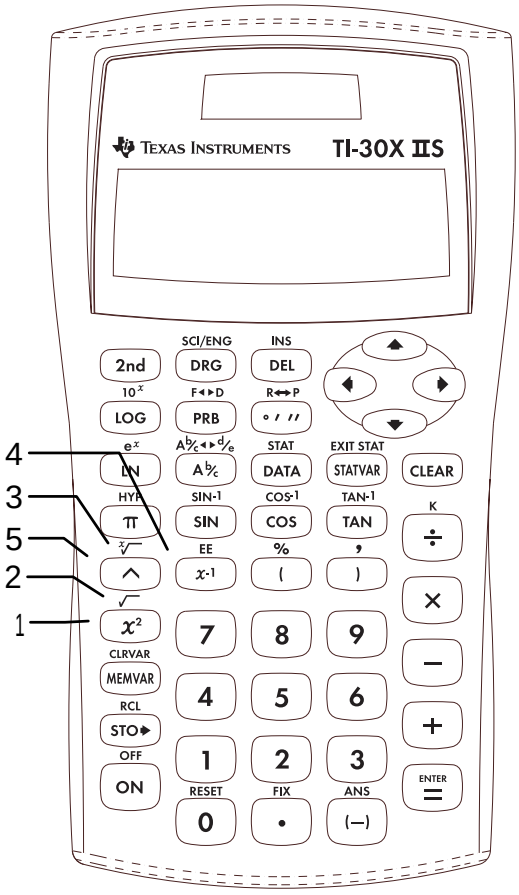
Press	Display
π × 4 x^2 ENTER	π*4² 50.26548246 DEG
2nd FIX • ▶	F0123456789 DEG
ENTER	π*4² 50. FIX DEG
2nd FIX • •	π*4² 50.26548246 DEG



Powers, Roots, and Reciprocals 10

Keys

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. x^{-1} calculates the reciprocal.
5. $\wedge$ raises a value to a specified power.



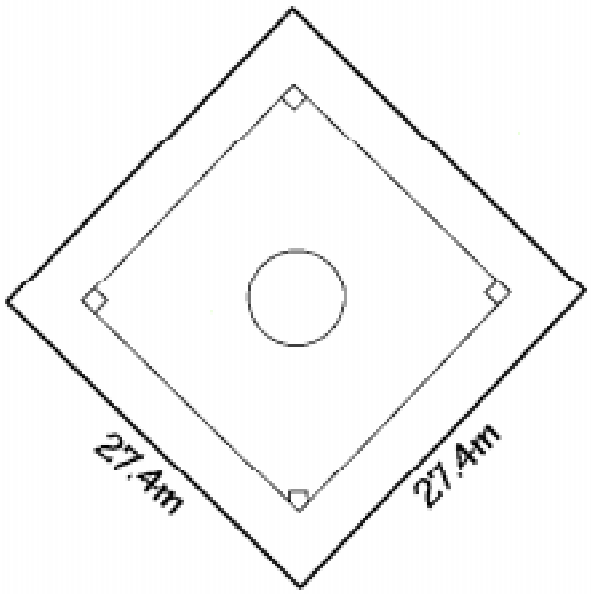
Notes

- The examples on the transparency masters assume all default settings.
- To use $\wedge$, enter the base, press $\wedge$, and then enter the exponent.
- The base (or mantissa) and the exponent may be either positive or negative. Refer to Domain under Error Messages in Appendix C (page C-1) for restrictions.
- The result of calculations with $\wedge$ must be within the range of the TI-30X IIS.
- A sign change takes precedence over exponents.
  Example: $-5^2 = -25$
  $(-5)^2 = 25$

Squares

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

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



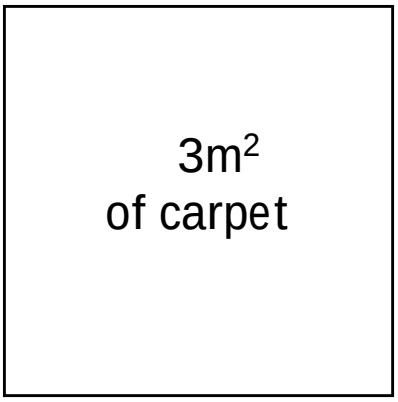
Press	Display
27.4 x^2 ENTER	27.4² → 750.76 DEG
or	
27.4 ^ 2 ENTER	27.4^2 → 750.76 DEG

x^2 ^

Square Roots

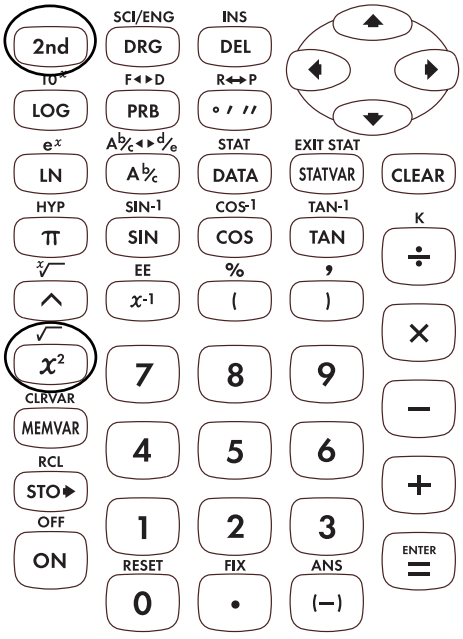
Use this formula to find the length of the side of a square clubhouse if $3m^2$ of carpet would cover the floor. Round your answer to 0 decimal places.

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



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

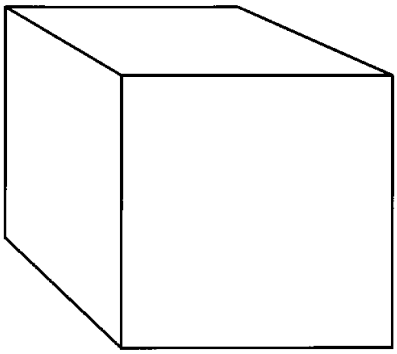
2nd $\sqrt{\ }$ x^2



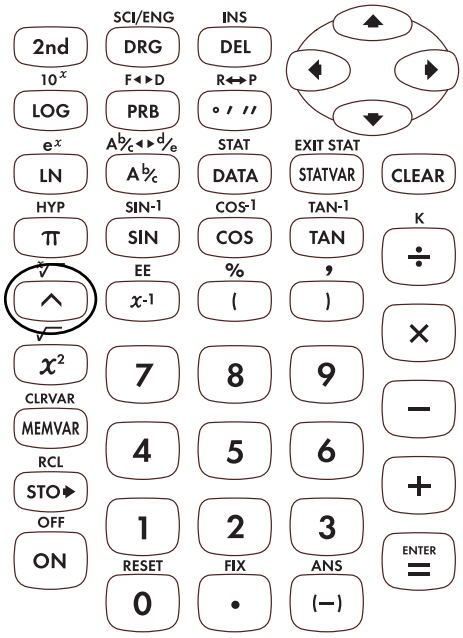
Cubes

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

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



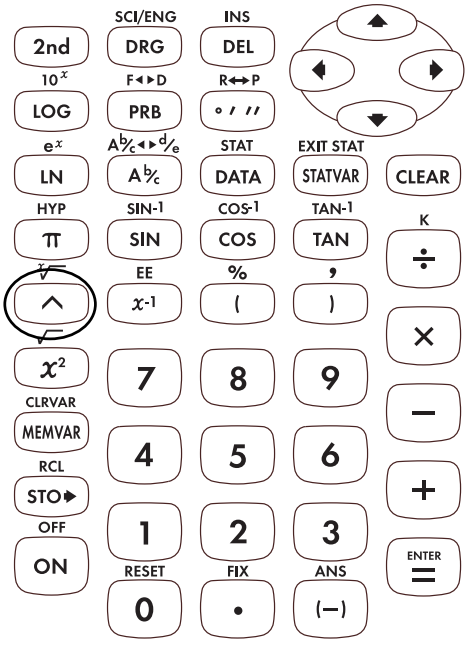
Press	Display
2 [•] 3 [^] 3 ENTER	2.3^3 = 12.167 DEG
F↔D 2nd PRB ENTER	Ans▶F↔D = 12_167/1000 DEG



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. DEG
2 [^] 15 [ENTER]	2^15 → 32768. DEG

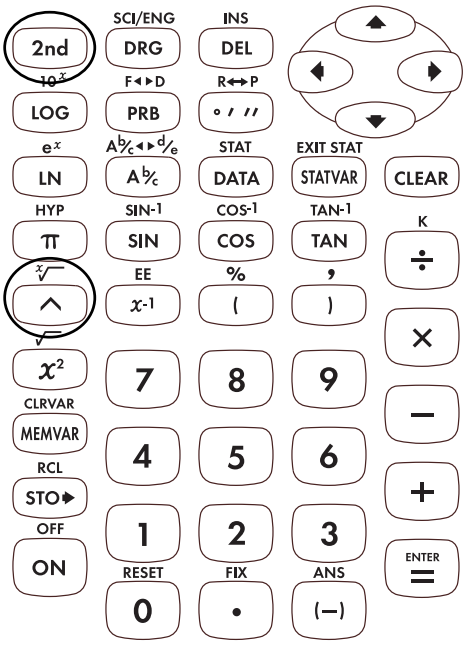


Roots

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. DEG

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



Reciprocals

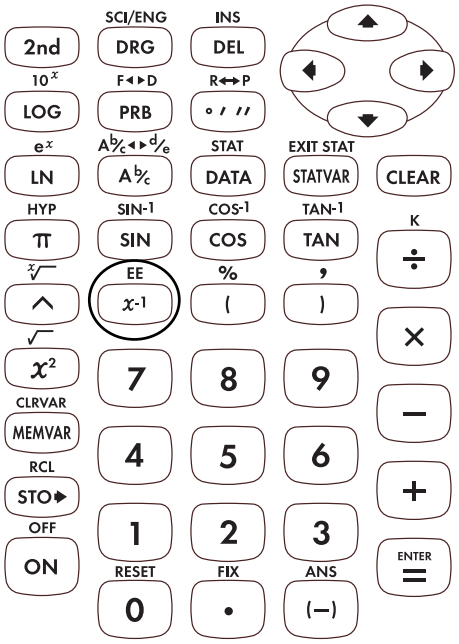
The chart below shows the amount of time spent building model ships.

Ships	Time Spent Building	Portion Completed Per Hour
Sailing	10 hrs.	?
Steam	5 hrs.	?
Luxury	$5\ 1/3$ hrs.	?

How much of each model was completed per hour?

x^{-1}

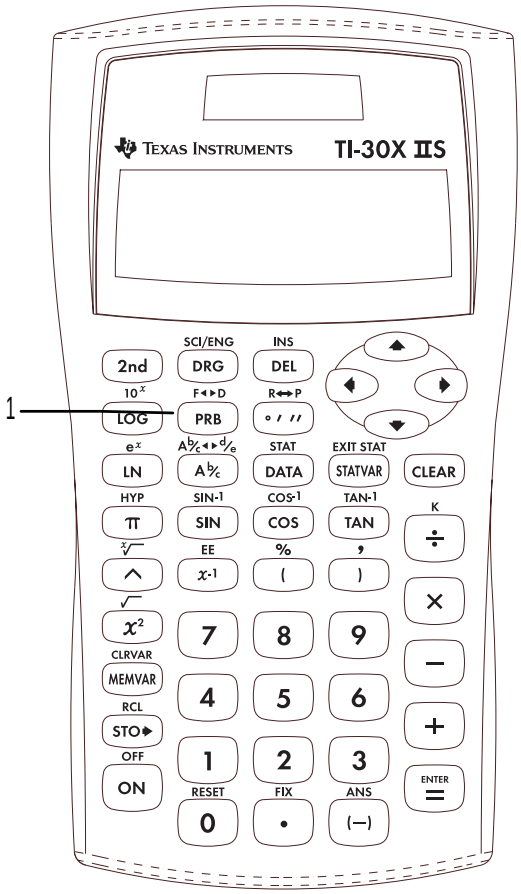
Press	Display
Sailing ship:	
10 x^{-1} 2nd F↔D PRB ENTER	10⁻¹▶F↔D 1/10 DEG
Steam ship:	
5 x^{-1} 2nd F↔D PRB ENTER	5⁻¹▶F↔D 1/5 DEG
Luxury liner:	
5 A b/c 1 A b/c 3 x^{-1} ENTER	5 1 3⁻¹ 3/16 DEG



Keys

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 when a random number is generated.
- For RANDI, use a comma to separate the 2 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.

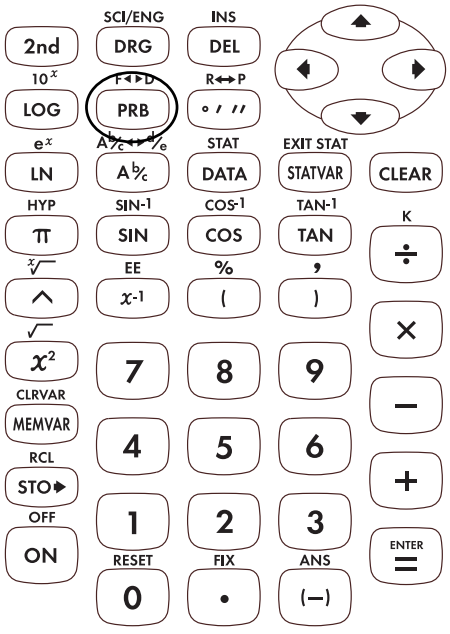
4 nCr 2 = x

A B C D

AB and BA count as only 1 combination.

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

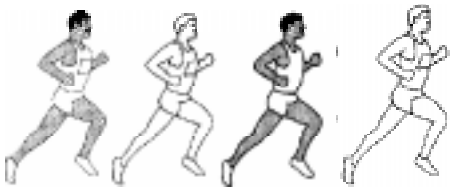
Press	Display
4 PRB ▶	nPr nCr ! → DEG
2 ENTER	4 nCr 2 ↑ 6. DEG



Permutation (nPr)

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



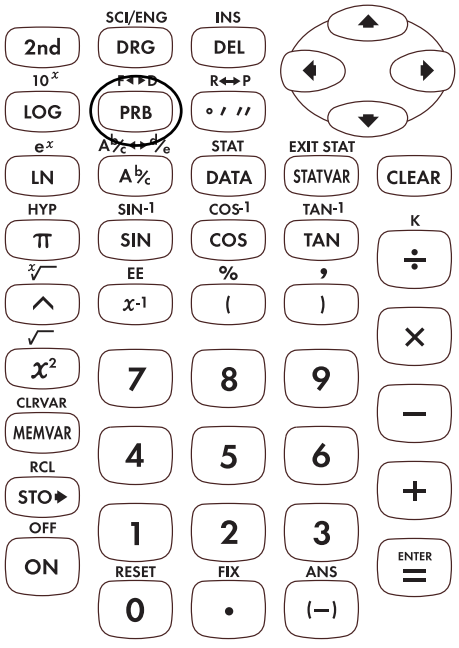
A B C D

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 ! → DEG
2 ENTER	4 nPr 2 ↑ 12. DEG

PRB



Factorial (!)

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

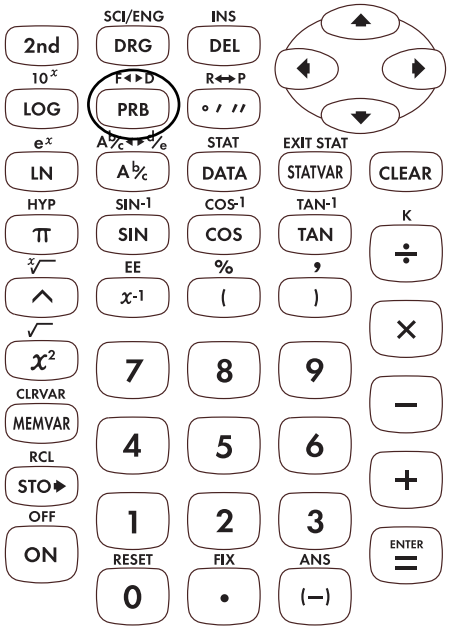
4! = x

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 ! → DEG
ENTER ENTER	4! ↑ 24. DEG

PRB



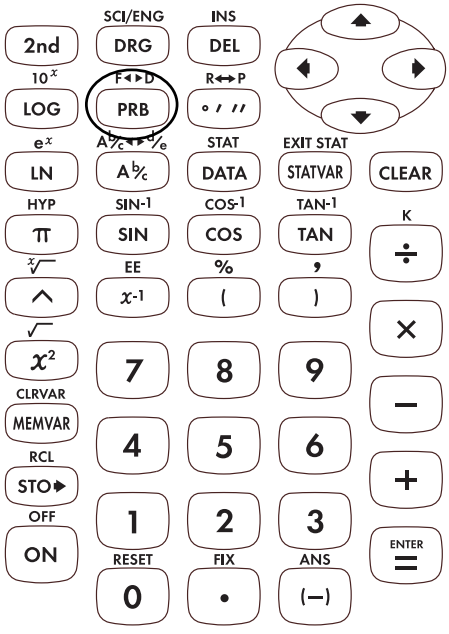
Random (RAND)

Generate a sequence of random numbers.

PRB

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

Results will vary.

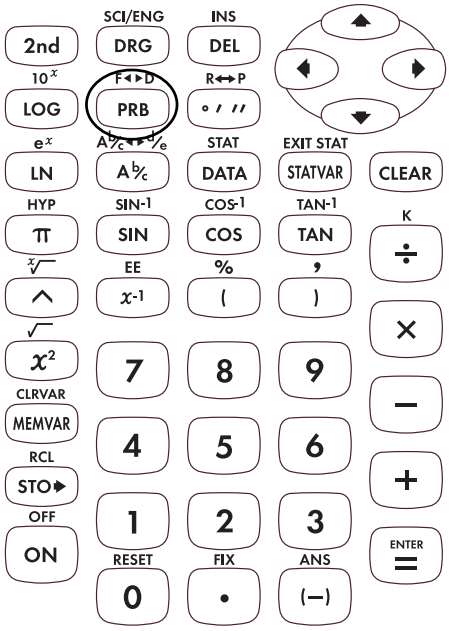


Random (RAND)

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

PRB

Press	Display
1 STO▶ ◀	← rand 310000. DEG
ENTER	1→rand 1. DEG
PRB ▶ ▶ ▶ ENTER ENTER	RAND 0.000018633 DEG
ENTER	RAND 0.745579721 DEG



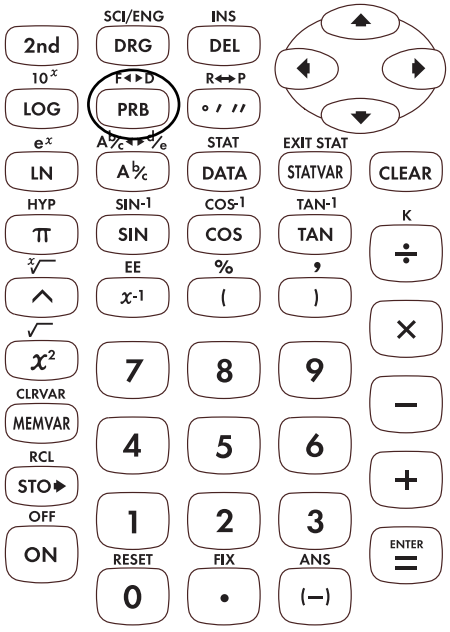
Random Integer (RAND)

Generate a random integer from 2 through 10.

PRB

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

Results will vary.

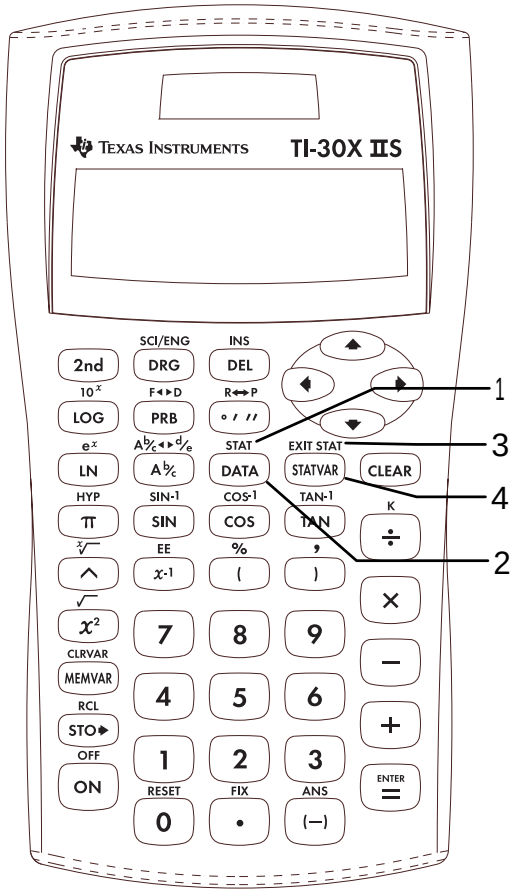


Keys

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 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.

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.

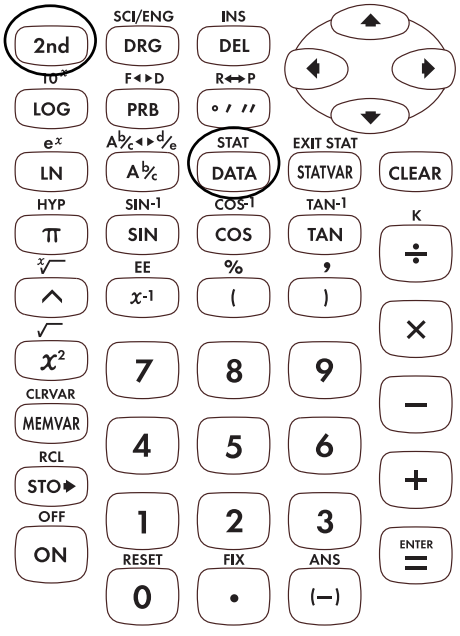
Entering 1-VAR Stat Data

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

Press	Display
2nd STAT (DATA)	1-VAR 2-VAR → DEG
ENTER DATA	X_1= STAT DEG
85	X_1=85 STAT DEG
▼	FRQ=1 STAT DEG
2	FRQ=2 STAT DEG
▼ 97	X_2=97 STAT DEG
▼ ▼ 53	X_3=53 STAT DEG
▼ ▼ 77 ENTER	X_4=77 77. STAT DEG

Continued

2nd STAT (DATA) DATA



Viewing the Data (Continued)

Find the number of data points (**n**), the mean ($\bar{x}$), the sample standard deviation (**Sx**), the population standard deviation (σ**x**), the sum of the scores (Σ**x**), and the sum of the squares (Σ**x²**).

STATVAR

Press	Display
STATVAR	$\underline{n}\ \bar{x}\ Sx\ \sigma x$ → 5. STAT DEG
▶	$n\ \underline{\bar{x}}\ Sx\ \sigma x$ → 79.4 STAT DEG
▶	$n\ \bar{x}\ \underline{Sx}\ \sigma x$ → 16.39512123 STAT DEG
▶	$n\ \bar{x}\ Sx\ \underline{\sigma x}$ → 14.66424222 STAT DEG
▶	← $\underline{\Sigma x}\ \ \Sigma x^2$ 397. STAT DEG
▶	← $\Sigma x\ \ \underline{\Sigma x^2}$ 32597. STAT DEG

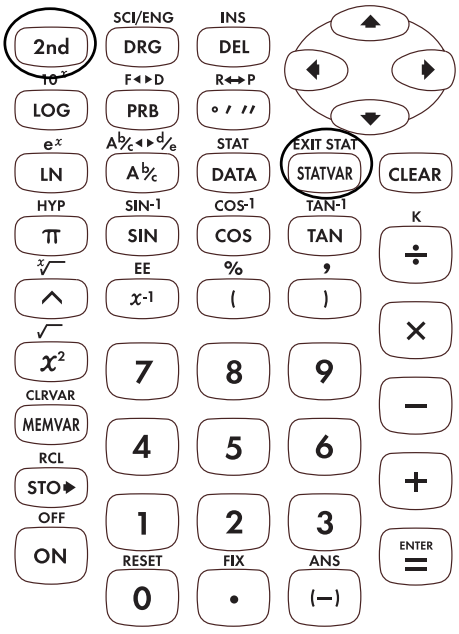
Continued

Removing Data Points (Continued)

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

Press	Display
DATA	X_1=85 STAT DEG
▼ ▼ ▼ ▼	X_3=53 STAT DEG
▼ 0 ENTER	FRQ=0 0. STAT DEG
STATVAR ▶	n $\bar{x}$ Sx σx → 86. STAT DEG
EXIT STAT 2nd STATVAR	EXIT ST: Y N STAT DEG
ENTER	▮ DEG

EXIT STAT
2nd STATVAR



Entering 2-VAR Stat Data

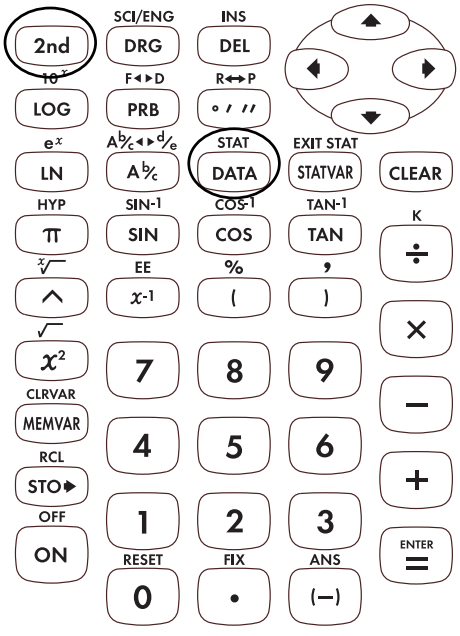
The table below shows the number of pairs of athletic shoes sold by a small shoe store. Enter this data as the data points.

Month	Total No.(x)	Brand A (y)
April	58 (x1)	35 (y1)
May	47 (x2)	28 (y2)

Press	Display
STAT 2nd DATA ▶	1-VAR 2-VAR → DEG
ENTER DATA	X_1= STAT DEG
58	X_1=58 STAT DEG
▼ 35	Y_1=35 STAT DEG
▼ 47	X_2=47 STAT DEG
▼ 28	Y_2=28 STAT DEG
ENTER	Y_2=28 28. STAT DEG

Continued

STAT 2nd DATA DATA



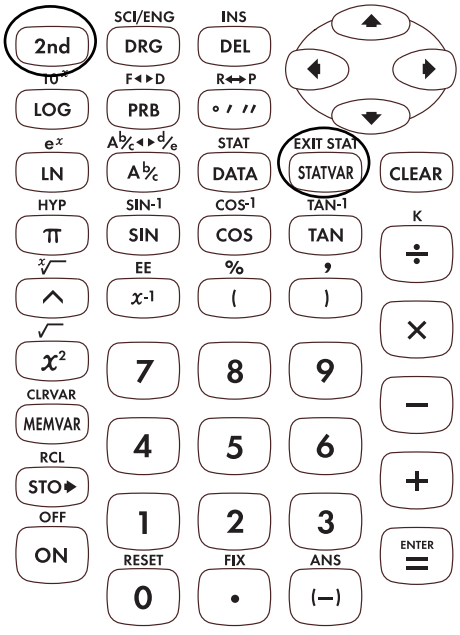
Viewing the Data (Continued)

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 DEG
ENTER 32) ENTER	y'(32) 18.45454545 STAT DEG
EXIT STAT 2nd STATVAR	EXIT ST: Y N STAT DEG
ENTER	 DEG

STATVAR

EXIT STAT
2nd STATVAR

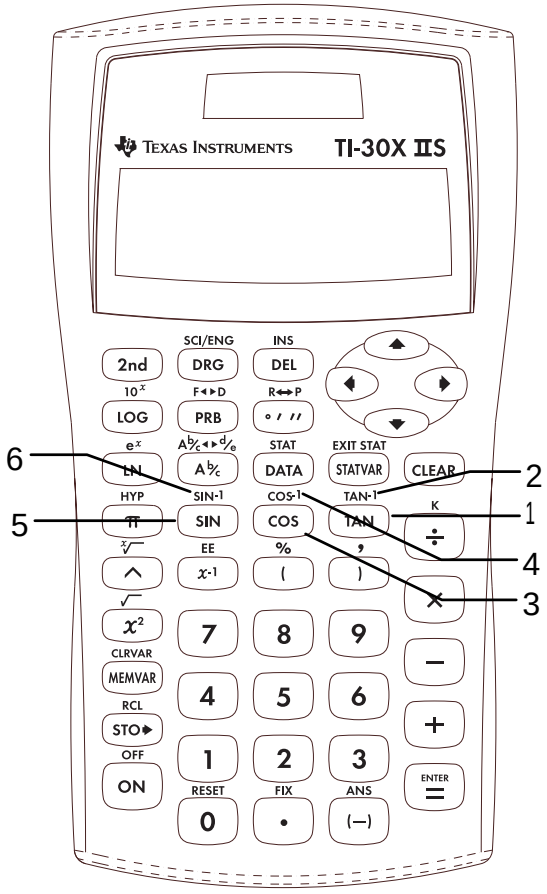


Keys

1. [TAN] calculates the tangent.
2. [2nd] [TAN-1] calculates the inverse tangent.
3. [COS] calculates the cosine.
4. [2nd] [COS-1] calculates the inverse cosine.
5. [SIN] calculates the sine.
6. [2nd] [SIN-1] calculates the inverse sine.

Notes

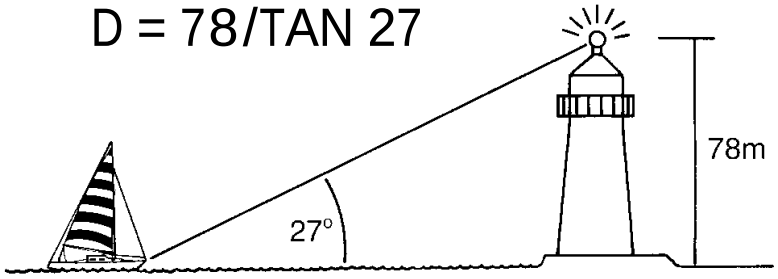
- The examples on the transparency masters assume all default settings.
- Before starting a trigonometric calculation, be sure to select the appropriate angle mode setting (degree, radian, or gradient—See Chapter 16, Angle Settings and Conversions). The calculator interprets values according to the current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



Tangent

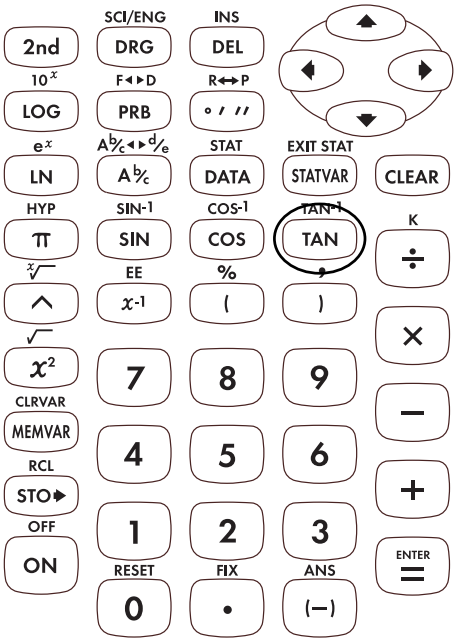
Use this formula to find the distance from the lighthouse to the boat. Round your answer to the nearest whole number, and then return to floating decimal mode.

D = 78/TAN 27



TAN

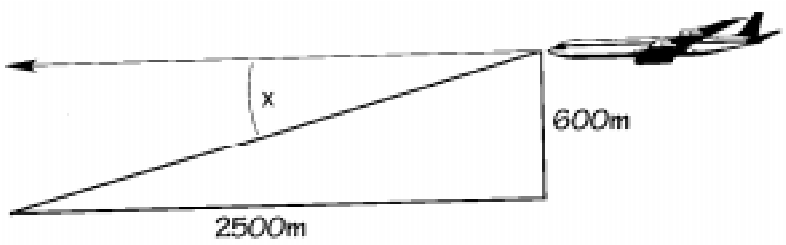
Press	Display
78 ÷ TAN 27) ENTER	78/tan (27) 153.0836194 DEG
FIX 2nd · ▶	F0123456789 DEG
ENTER	78/tan (27) 153. FIX DEG
FIX 2nd · ·	78/tan (27) 153.0836194 DEG



Inverse Tangent

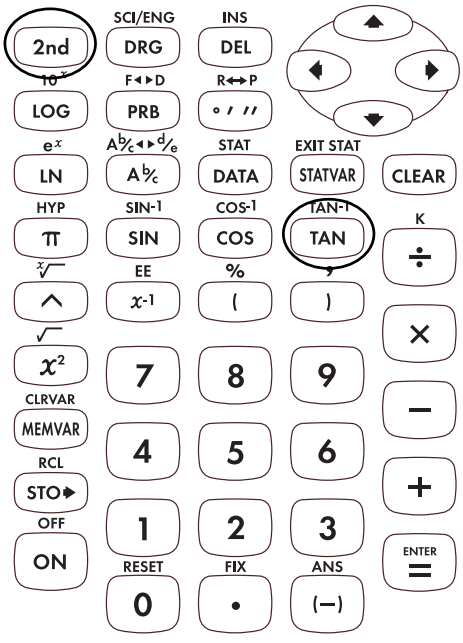
Use this formula to find the angle of depression. Round your answer to the nearest tenth, and then return to floating decimal mode.

TAN x = 600/2500



Press	Display
2nd TAN (TAN-1) 600 ÷ 2500) ENTER	tan-1 (600/25 → t 13.49573328 DEG
2nd FIX · ▶ ▶	F0123456789 DEG
ENTER	tan-1 (600/25 → t 13.5 FIX DEG
2nd FIX · ·	tan-1 (600/25 → t 13.49573328 DEG

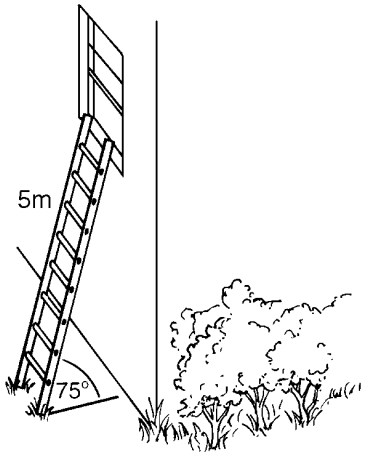
2nd TAN (TAN-1)



Cosine

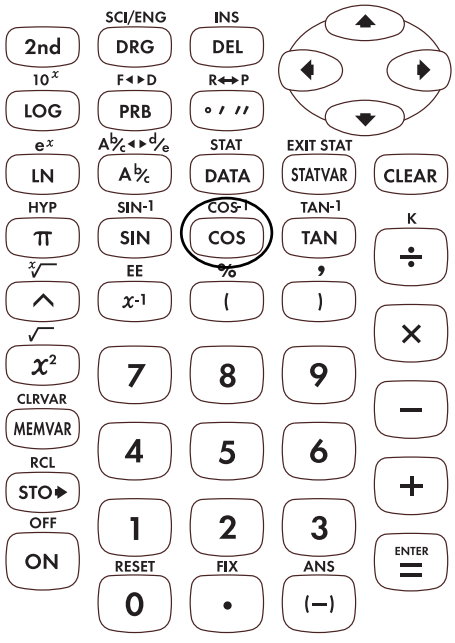
Use this formula to find how far the base of the ladder is from the house. Round your answer to the nearest whole number, and then return to floating decimal mode.

$$D = 5 \times \cos 75$$



Press	Display
5 × COS 75) ENTER	5*cos (75) 1.294095226 DEG
FIX 2nd · ▶	F0123456789 DEG
ENTER	5*cos (75) 1. FIX DEG
FIX 2nd · ·	5*cos (75) 1.294095226 DEG

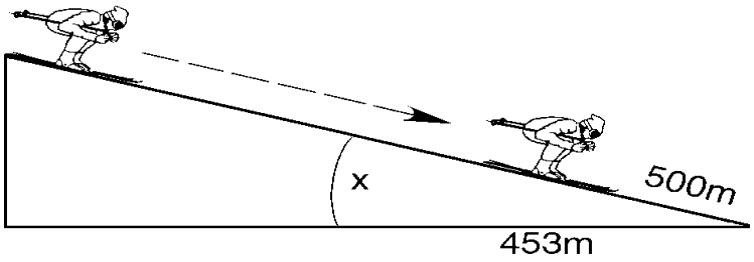
COS



Inverse Cosine

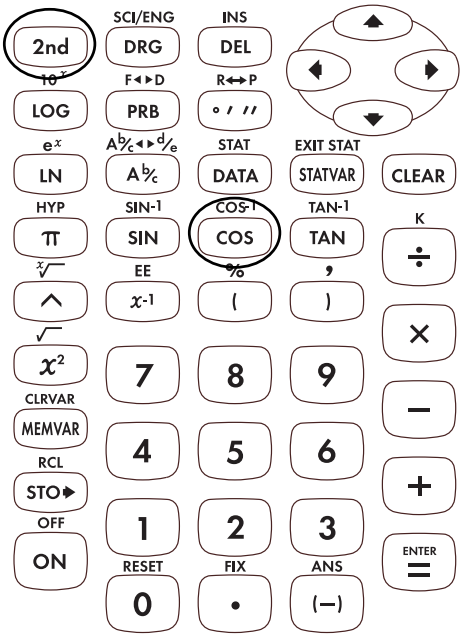
Use this formula to find the angle of the ski jump. Round your answer to the nearest tenth, and then return to floating decimal mode.

$$\cos x = 453/500$$



Press	Display
2nd COS (COS⁻¹) 453 ÷ 500) ENTER	cos⁻¹(453/500 → 25.04169519 DEG
2nd · (FIX) ▶ ▶	F0123456789 DEG
ENTER	cos⁻¹(453/500 → 25.0 DEG
2nd · (FIX) ·	cos⁻¹(453/500 → 25.04169519 DEG

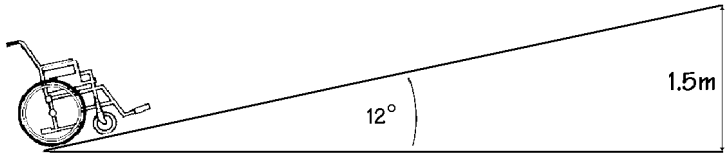
2nd COS (COS⁻¹)



Sine

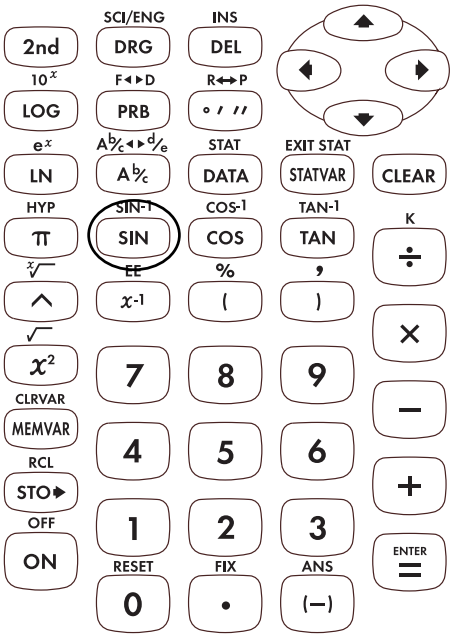
Use this formula to find the length of the ramp. Round your answer to the nearest whole number, and then return to floating decimal mode.

$$D = 1.5/\sin 12$$



SIN

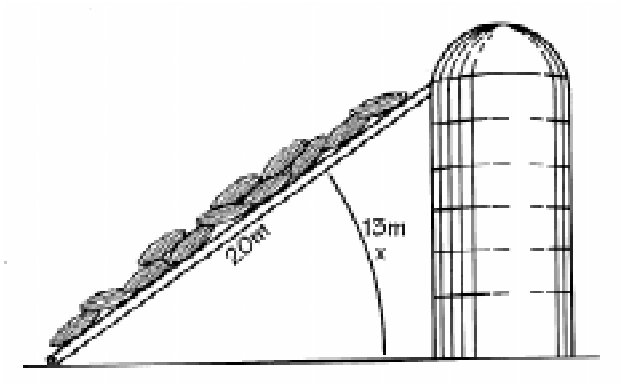
Press	Display
1 . 5 ÷ SIN 12) ENTER	1.5/sin (12) → t 7.214601517 DEG
FIX 2nd . ▶	F0123456789 DEG
ENTER	1.5/sin (12) → t 7. FIX DEG
FIX 2nd . .	1.5/sin (12) → t 7.214601517 DEG



Inverse Sine

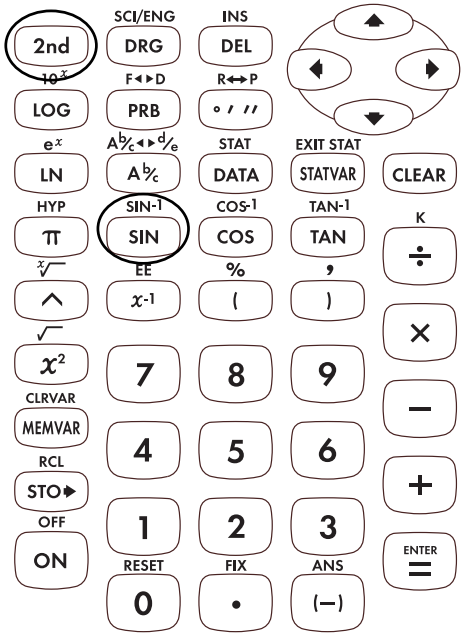
Use this formula to find the angle of the conveyor belt. Round your answer to the nearest tenth, and then return to floating decimal mode.

SIN x = 13/20



Press	Display
SIN^{-1} 2nd SIN 13 ÷ 20) ENTER	sin^{-1}(13/20) → ↑ 40.54160187 DEG
FIX 2nd · ▶ ▶	F0123456789 DEG
ENTER	sin^{-1}(13/20) → ↑ 40.5 FIX DEG
FIX 2nd · ·	sin^{-1}(13/20) → ↑ 40.54160187 DEG

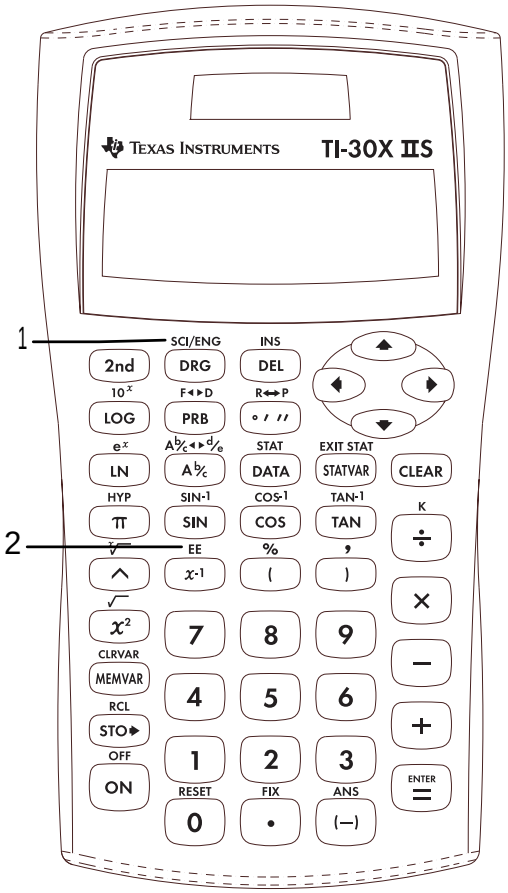
SIN^{-1} 2nd SIN



Keys

1. 2nd [SCI/ENG] displays the following numeric notation mode menu.

FLO	Restores standard mode (floating decimal).
SCI	Turns on scientific mode and displays results as a number from 1 to 10 ($1 \le n < 10$) times 10 to an integer power.
ENG	Turns on engineering mode and displays results as a number from 1 to 1000 ($1 \le n < 1000$) times 10 to an integer power. The integer power is always a multiple of 3.



2. 2nd [EE] lets you enter and calculate the exponent.

Notes

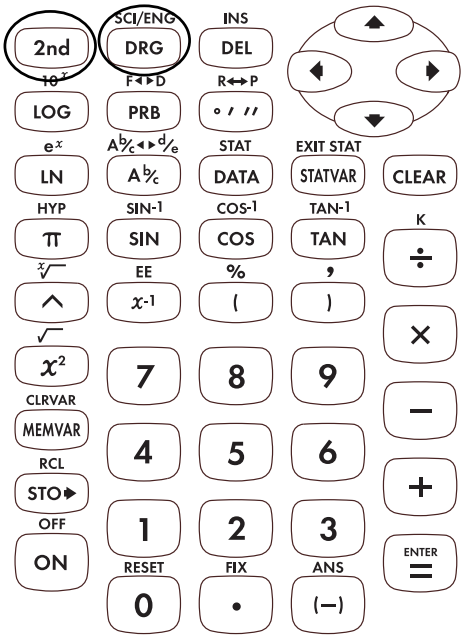
- The examples on the transparency masters assume all default settings.
- You can enter a value in scientific notation regardless of the numeric notation mode setting. For a negative exponent, press [(–)] before entering it.
- Results requiring more than 10 digits are automatically displayed in scientific notation.
- For the decimal notation mode, refer to 2nd [FIX] in Chapter 6, Decimals and Decimal Places.
- These modes (FLO, SCI, and ENG) affect *only* the display of results.

Engineering, Scientific, Floating Decimal

Enter 12543, which will be in floating decimal notation (default), and alternate between scientific and engineering notations.

Press	Display
12543	FLO SCI ENG DEG
SCI/ENG 2nd DRG ▶	
ENTER ENTER	12543 ↑ $1.2543_{x10}{}^{04}$ SCI DEG
SCI/ENG 2nd DRG ▶	FLO SCI ENG SCI DEG
ENTER	12543 ↑ $12.543_{x10}{}^{03}$ ENG DEG
SCI/ENG 2nd DRG ▶	FLO SCI ENG ENG DEG
ENTER	12543 ↑ 12543. DEG

SCI/ENG
2nd DRG

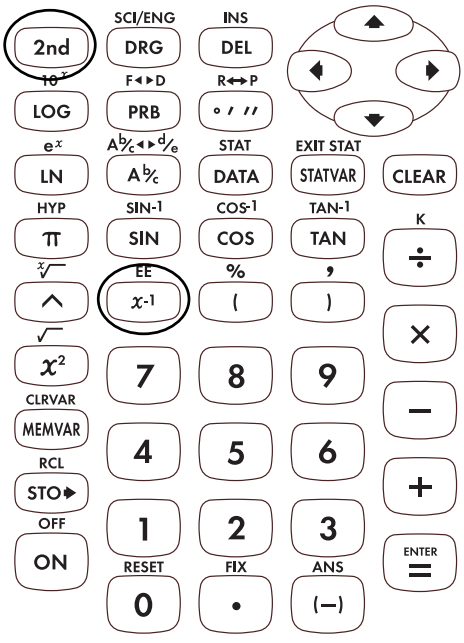


Exponent

The Earth is 1.496 x 108 kilometers from the Sun. Jupiter is 7.783 x 108 kilometers from the Sun. Enter the numbers in scientific notation and determine how far away the Earth is from Jupiter.

Press	Display
7 [.] 783	7.783E8-1.4 → t 628700000. DEG
[2nd] [EE] [x^{-1}] 8	
[−] 1 [.] 496	
[2nd] [EE] [x^{-1}] 8	
[ENTER]	

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



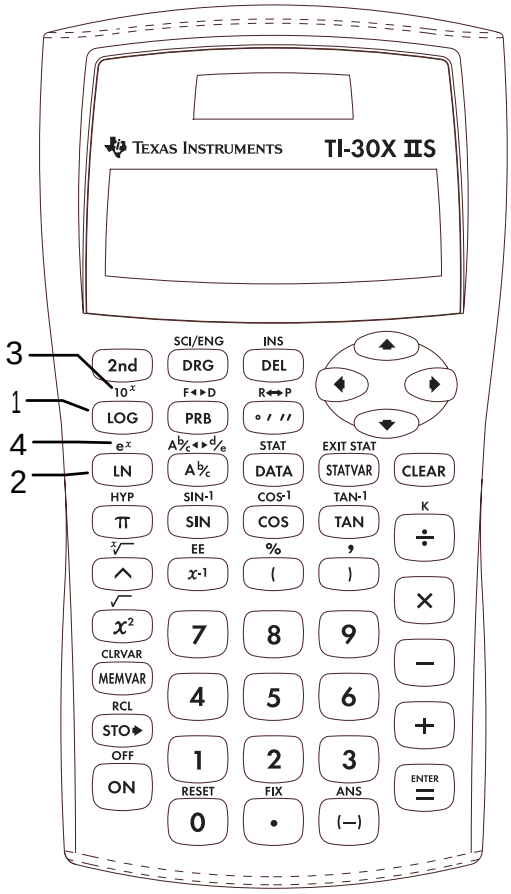
Logarithms and Antilogarithms 15

Keys

1. LOG calculates the common logarithm (base 10).
2. LN calculates the natural logarithm (base *e*, where *e* = 2.718281828459).
3. 2nd [10^x] calculates the common antilogarithm (10 raised to the power of the value).
4. 2nd [e^x] 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.

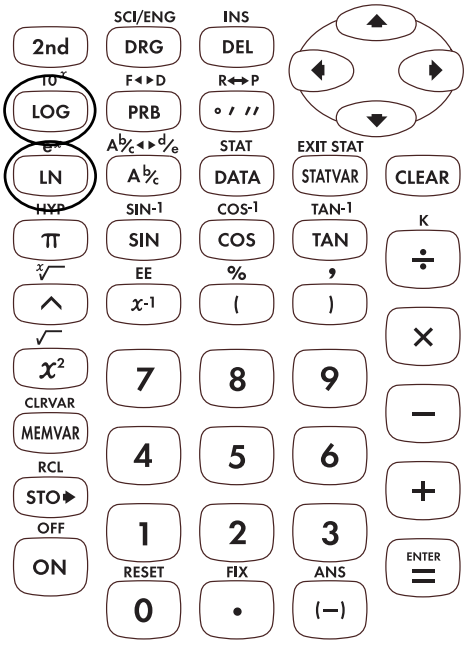


Common Logarithm, Natural Logarithm

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

LOG LN

Press	Display
LOG 23) ENTER	log (23) 1.361727836 DEG
2nd FIX •	F0123456789 DEG
4	log (23) 1.3617 FIX DEG
LN 23) ENTER	ln (23) 3.1355 FIX DEG
2nd FIX • •	ln (23) 3.135494216 DEG



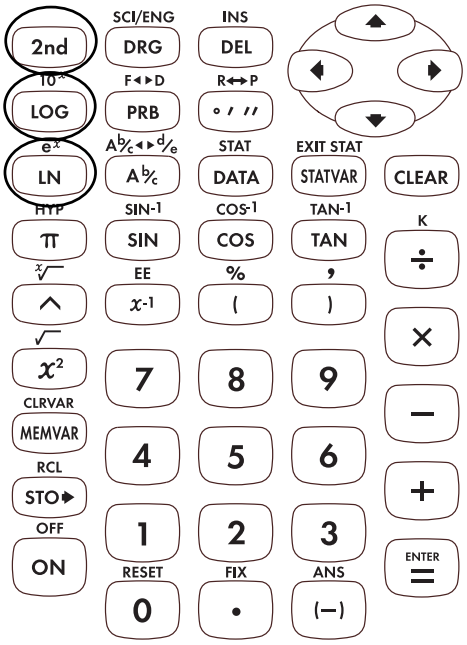
Common Antilogarithm, Natural Antilogarithm

Find antilog 3.9824 rounded to 4 decimal places. Then find antiln 3.9824 rounded to 4 decimal places. When finished, return to floating decimal notation.

Press	Display
2nd 10^x LOG 3 . 9824) ENTER	10^ (3.9824) 9602.846792 DEG
2nd FIX .	F0123456789 DEG
4	10^ (3.9824) 9602.8468 FIX DEG
2nd e^x LN 3 . 9824) ENTER	e^ (3.9824) 53.6456 FIX DEG
2nd FIX . .	e^ (3.9824) 53.64562936 DEG

2nd 10^x LOG

2nd e^x LN



Angle Settings and Conversions 16

Keys

1. [DRG] displays the following menu that lets you change the angle mode setting to DEG, RAD, and GRD without affecting the value in the display.

   DEG Sets degree mode.

   RAD Sets radian mode.

   GRD Sets gradient mode.

   The default setting is DEG.

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

   ° Specifies degrees.

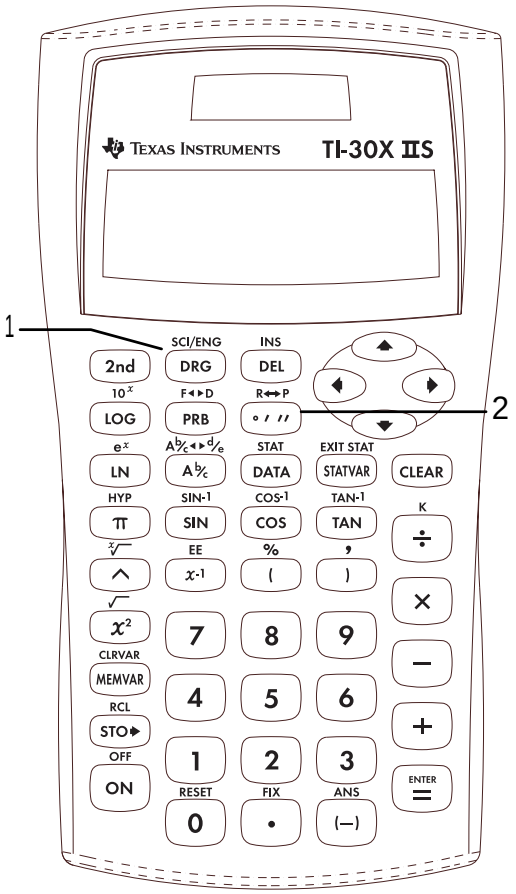
   ′ Specifies minutes.

   ″ Specifies seconds.

   r Specifies radians.

   g Specifies gradients.

   DMS Lets you convert an angle from decimal degrees to DMS notation.



Notes

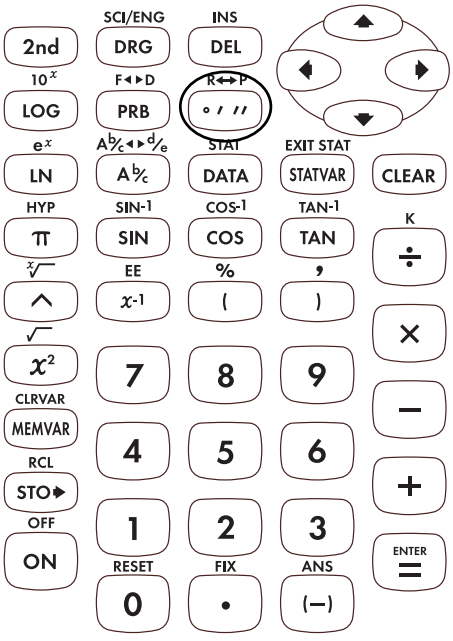
- The examples on the transparency masters assume all default settings.
- Angles with a trig function ignore the angle mode setting and display results in the original unit. Otherwise, angles (without a trig function) are converted and displayed according to the angle mode setting.
- You enter decimal-degree 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 [°′″]	DEG
[ENTER]	2° DEG
5 [°′″] [▶]	DEG
[ENTER] [+] 1 [°′″] [ENTER]	2° 5′ + 1° DEG
46 [°′″] [▶] [ENTER] [ENTER]	2° 5′ + 1° 46′ 3.85 DEG
[°′″] [◀]	← ▶DMS DEG
[ENTER] [ENTER]	Ans ▶DMS 3° 51′ 0″ DEG

[°′″]

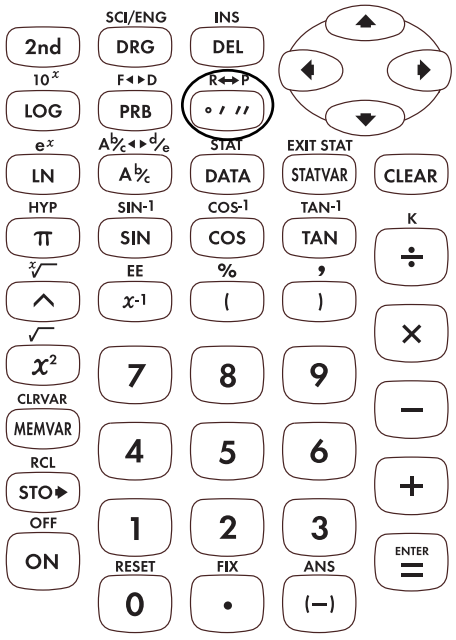


Fraction to Degrees, Minutes, and Seconds

How much is 2/3 of an hour in hours, minutes, and seconds?

Press	Display
2 [Ab/c] 3	2⌟3 DEG
[°′″] [◀]	← ▶DMS DEG
[ENTER] [ENTER]	2⌟3 ▶DMS 0° 40′ 0″ DEG

[°′″]

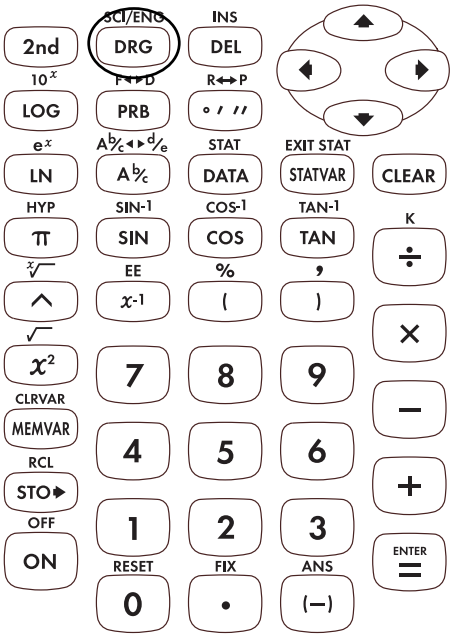


Degrees, Radians, Gradients

Calculate the sine of 30 in degrees, radians, and gradients.

Press	Display
SIN 30) ENTER	sin(30) 0.5 DEG
DRG ▶	DEG RAD GRD DEG
ENTER ENTER	sin(30) -0.988031624 RAD
DRG ▶	DEG RAD GRD RAD
ENTER ENTER	sin(30) 0.4539905 GRAD

DRG



Polar and Rectangular Conversions 17

Keys

1. 2nd [R⬌P] displays the following menu that lets you convert rectangular coordinates (χ,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.

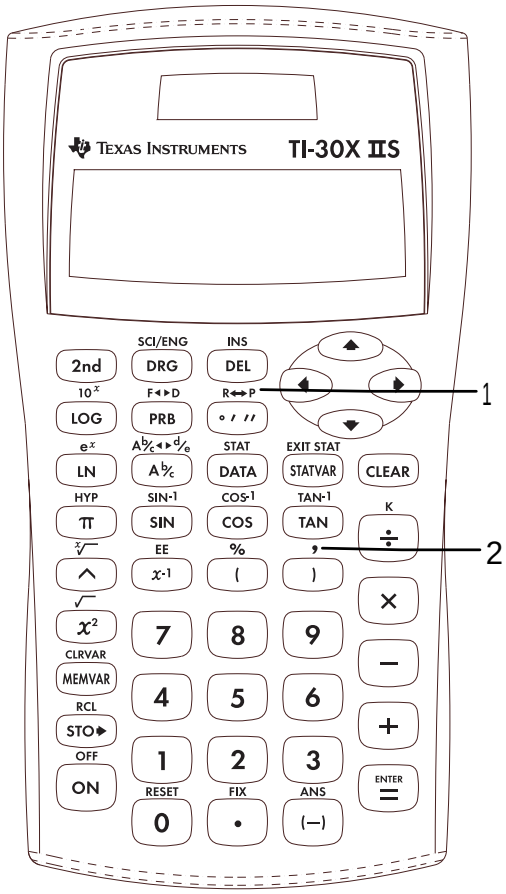
   P▶Rχ Converts polar coordinate to rectangular coordinate χ.

   P▶Ry Converts polar coordinate to rectangular coordinate y.

2. 2nd [,] enters a comma.

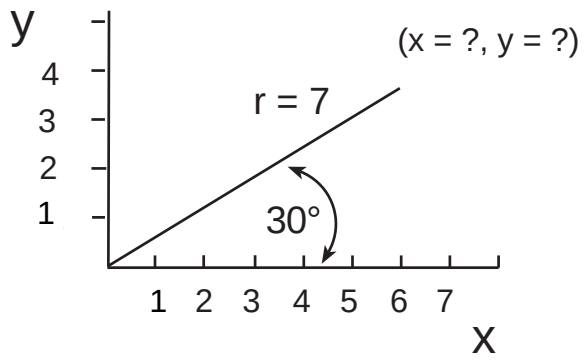
Notes

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



Polar to Rectangular

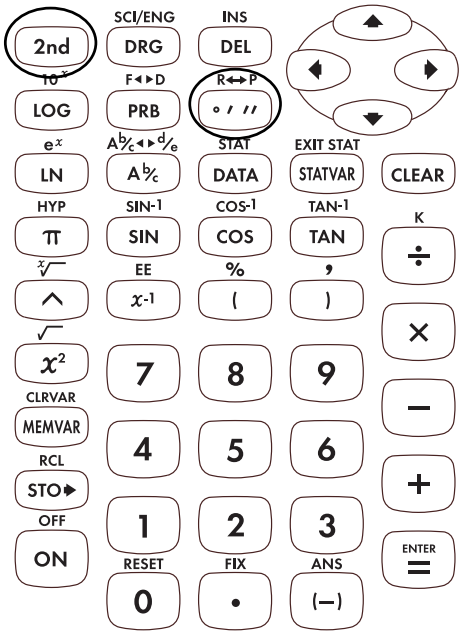
Convert the polar ordered pair (7,30) to rectangular using the DEG (°) angle unit.



Press	Display
2nd R↔P (o ′ ″) ▶ ▶	← PRx PRy DEG
ENTER 7 2nd , ( ) 30) ENTER	PRx(7,30) ↑ 6.062177826 DEG
2nd R↔P (o ′ ″) ◀	← PRx PRy DEG
ENTER 7 2nd , ( ) 30) ENTER	PRy(7,30) ↑ 3.5 DEG

The rectangular ordered pair is 6.062177826,3.5.

2nd R↔P (o ′ ″)

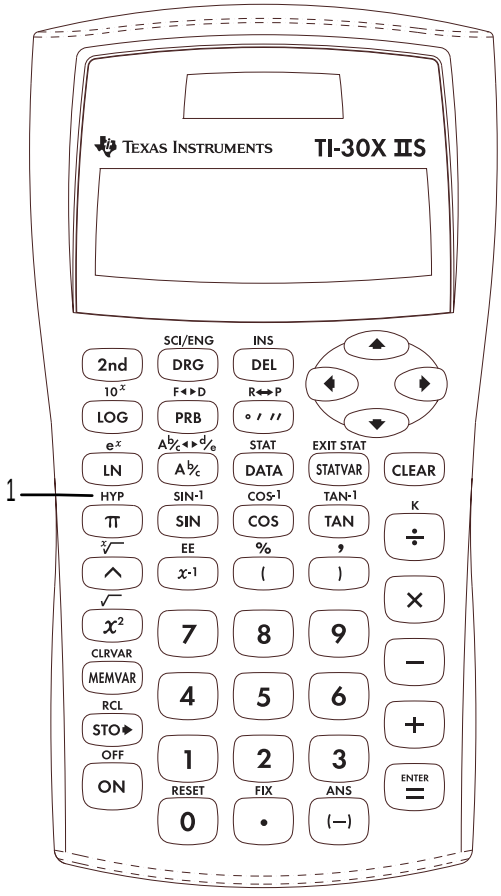


Keys

1. 2nd [HYP] accesses the hyperbolic (sinh, cosh, tanh) function of the next trig key that you press.

Notes

- The example on the transparency master assumes all default settings.
- Hyperbolic calculations are not affected by the angle mode setting—whether or not the calculator is in RAD (radian), GRD (gradient), or DEG (degree) modes.

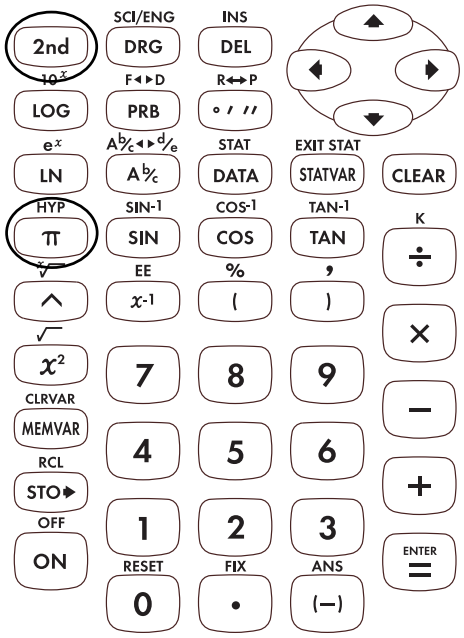


Sine, Cosine, Tangent

Find the hyperbolic sine (sinh), cosine (cosh), and tangent (tanh) of 5.

Press	Display
HYP 2nd π SIN 5) ENTER	sinh(5) 74.20321058 DEG
HYP 2nd π COS 5) ENTER	cosh(5) 74.20994852 DEG
HYP 2nd π TAN 5) ENTER	tanh(5) 0.999909204 DEG

HYP
2nd π



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^{-1}	Calculates the reciprocal.
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.
^	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. **g** Specifies gradients. **▶DMS** Lets you convert an angle from decimal degrees to **DMS** notation.
2nd	Turns on the **2nd** indicator and accesses the function shown above the next key that you press.
2nd [10^x]	Calculates the common antilogarithm (10 raised to the power of the value).
2nd [√‾]	Calculates the square root.

KEY	FUNCTION
2nd [%]	Changes a real number to percent. Results display according to the decimal notation mode setting.
2nd [,]	Enters a comma.
2nd [$\sqrt[x]{\ }$]	Calculates the specified root (x) of the value.
[A b/c]	Lets you enter mixed numbers and fractions.
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.
[COS]	Calculates the cosine.
2nd [COS^{-1}]	Calculates the inverse cosine.
[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 each time you press [DEL], it deletes 1 character to the left of the cursor.
[DRG]	Displays the following menu that lets you change the Angle mode to degrees (**°**), radians (**r**), or gradients (**g**), and then back to degrees without affecting the value in the display. **DEG** Sets degree mode. **RAD** Sets radian mode. **GRD** Sets gradient mode. When you turn on the TI30X IIS, it is always in the **DEG** mode.
2nd [e^x]	Calculates the natural antilogarithm (e raised to the power of the value).
2nd [EE]	Lets you enter and calculate the exponent.
[ENTER]	Completes the operation or executes the command.

KEY	FUNCTION
[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.
[2nd] [F◂▸D]	Converts a fraction to its decimal equivalent or converts a decimal to its fractional equivalent, if possible.
[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.
[2nd] [HYP]	Accesses the hyperbolic (**sinh**, ***cosh***, **tanh**) function of the next trig key that you press.
[2nd] [INS]	Lets you insert a character at the cursor.
[2nd] [K]	Turns on the constant mode and lets you define a constant.
[LN]	Calculates the natural logarithm (base *e*, where *e* = 2.718281828459).
[LOG]	Calculates the common logarithm (base 10).
[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.

KEY	FUNCTION
[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 (χ,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▶Rχ** Converts polar coordinate to rectangular coordinate χ. **P▶Ry** Converts polar coordinate to rectangular coordinate y.
[2nd] [SCI/ENG]	Displays the following numeric notation mode menu. **FLO** Restores standard mode (floating decimal). **SCI** Turns on scientific mode and displays results as a number from 1 to 10 ($1 \le n < 10$) times 10 to an integer power. **ENG** Turns on engineering mode and displays results as a number from 1 to 1000 ($1 \le n < 1000$) times 10 to an integer power. The integer power is always a multiple of 3.

KEY	FUNCTION
[SIN]	Calculates the sine.
[2nd] [SIN^{-1}]	Calculates the inverse sine.
[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 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 × y) for all xy pairs in 2 lists. **a** — Linear regression slope. **b** — Linear regression y-intercept. **r** — Correlation coefficient.
[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.
[TAN]	Calculates the tangent.
[2nd] [TAN^{-1}]	Calculates the inverse tangent.

Display Indicators

B

INDICATOR	MEANING
2nd	2nd function.
HYP	Hyperbolic function.
FIX	Fixed-decimal setting.
SCI, **ENG**	Scientific or engineering notation.
STAT	Statistical mode.
DEG, **RAD**, **GRAD**	Angle mode (degrees, radians, or gradients).
K	Constant mode.
x^{10}	Precedes the exponent in scientific or engineering 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 $\sqrt{}$ — $x < 0$. For LOG or LN — $x \leq 0$. For TAN — $x = 90°, -90°, 270°, -270°, 450°$, etc. For SIN^{-1} or COS^{-1} — $\|x\| > 1$. For nCr or nPr — n or r are not integers ≥ 0. For $x!$ — x is not an integer between 0 and 69.
EQUATION LENGTH ERROR	An entry exceeds the digit limits (88 for entry line and 47 for statistics or constant entry lines); for example, combining an entry with a constant that exceeds the limit.
FRQ DOMAIN	FRQ value (in 1-variable statistics) < 0 or >99, or not an integer.
OVERFLOW	$\|\theta\| \geq 1E10$, where θ is an angle in a trig, hyperbolic, or R▶Pr function.
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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E

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