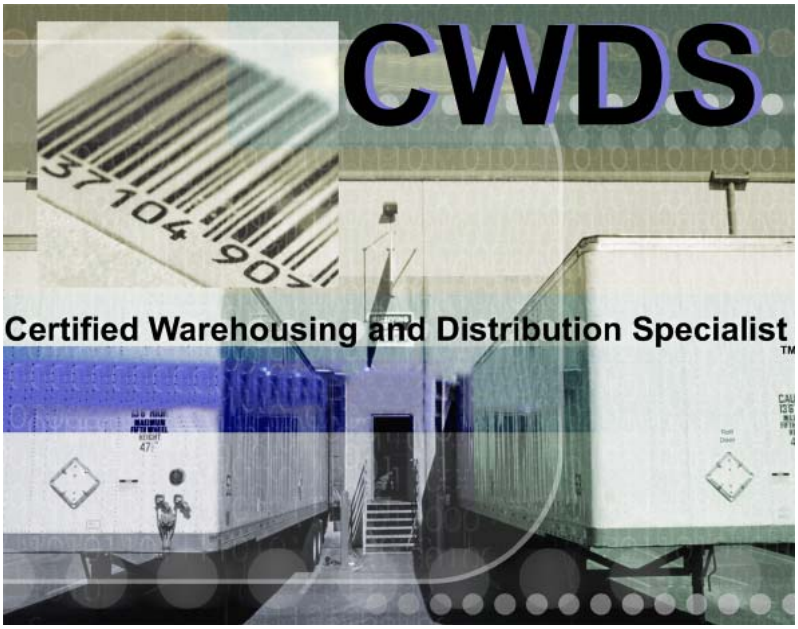

Instructor Guide

Calculators

QUICKSTART®
TECHNICAL COLLEGE SYSTEM OF GEORGIA

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Unit Description

Overview

Using the calculator, one can quickly compute correct answers to difficult or lengthy math problems. In this unit, participants will learn to use a basic hand-held calculator. They will work with whole numbers, fractions, mixed numbers and decimal numbers. Participants will learn the terms for the working parts of the calculator and the functions of many of the keys. They will also learn how to interpret answers shown on the calculator.

Objectives

The information, activities and practice provided during this course will enable participants to use a calculator to:

1. Add, subtract, multiply and divide whole numbers.
2. Add, subtract, multiply and divide decimal numbers.
3. Add, subtract, multiply and divide fractions.
4. Solve multistep computations.
5. Calculate percentages.
6. Use the calculator to square numbers.
7. Find the square root of a number.

Materials

1. Participant Guides
2. Projection System
3. Hand-held calculator for each participant and the instructor

PowerPoint Slides

1. Calculators
2. Objectives
3. Two Kinds of Basic Calculators
4. Fractions Less than One
5. Fractions Equal to One
6. Fractions Greater than One

Agenda

Introduction ..... 5 minutes
Getting to Know the Calculator ..... 10 minutes
Whole Numbers and the Calculator ..... 20 minutes
Decimal Numbers and the Calculator ..... 20 minutes
Fractions and the Calculator ..... 20 minutes
The Memory Function ..... 20 minutes
The Percent (%) Key ..... 20 minutes
Squaring a Number and Using the Square Root Key ..... 20 minutes
Summary ..... 5 minutes
Calculators Assessment ..... 30 minutes
Total ..... 3 hours

Introduction

Overview

DISPLAY the slide titled "Calculators."

WELCOME participants and introduce yourself.

DIRECT the class to "Introduction" in their Participant Guide.

STATE that using the calculator, one can quickly compute correct answers to difficult or lengthy math problems. In this unit, you will learn to use a basic hand-held calculator. You will work with whole numbers, fractions, mixed numbers and decimal numbers. You will also learn to interpret the results by the calculator.

Objectives

DISPLAY the slide titled "Objectives" and review the objectives.

STATE that the information, activities and practice provided during this unit will enable participants to use a calculator to:

1. Add, subtract, multiply and divide whole numbers.
2. Add, subtract, multiply and divide decimal numbers.
3. Add, subtract, multiply and divide fractions.
4. Solve multistep computations.
5. Calculate percentages.
6. Use the calculator to square numbers.
7. Find the square root of a number.

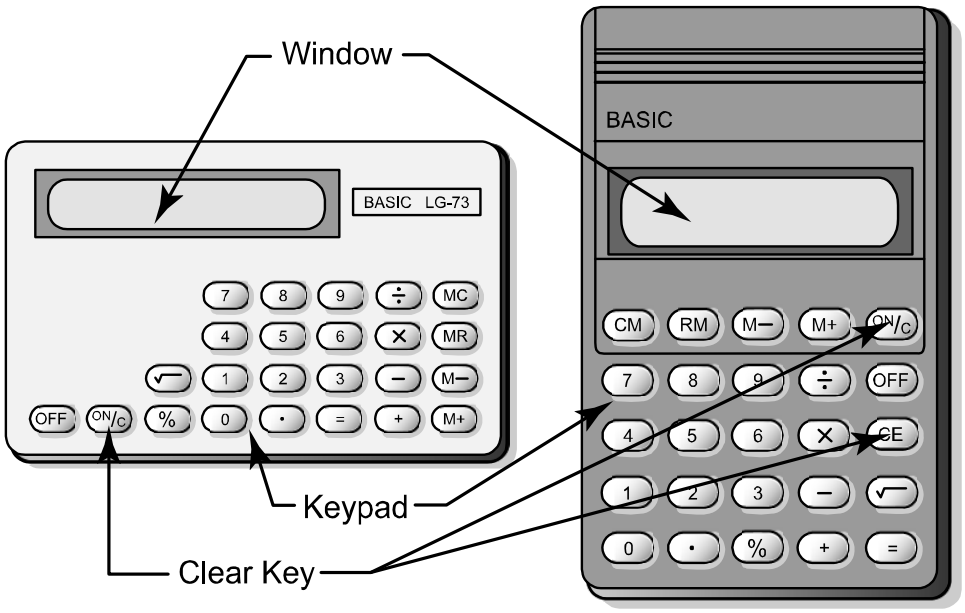
Getting to Know the Calculator

Introduction

DIRECT participants to the section titled "Getting to Know the Calculator" in their guide.

STATE that a basic calculator is used to add, subtract, multiply and divide.

DISPLAY the slide titled "Two Kinds of Basic Calculators."



Two Kinds of Basic Calculators

EXPLAIN that although there are many kinds of basic calculators, all of them have certain features in common. Though they may differ somewhat in appearance, they basically all work the same way. Each has a window that allows you to view data and a numeric key pad. There is a key for each basic mathematical procedure—addition (+), subtraction (–), multiplication (×) and division (÷). A basic calculator also has a key with an equal sign on it and a clear key.

REVIEW with participants as you describe and point out the following additional features.

EXPLAIN that the first step in using a calculator is to turn it ON. Some calculators have a key marked Power, some have a key marked ON and some have a key marked ON/C. When the calculator is ON and ready to use, you will see a zero (0) in the window. If there is no zero in the window, you must clear the window.

STATE that most calculators have more than one key for clearing the window. A common one is labeled CA (Clear All) or AC (All Clear). Others are labeled C, AC/ON, ON/C, or CE/C.

ASK: "What is the key that erases or clears everything?"

Anticipated response:

ON/C

STATE that the C Key will not erase what you have stored in memory, a storage place for a number you want to use later. Pressing the C key is like erasing the whole chalkboard except a small notice that is labeled "Do Not Erase." In the examples given, to clear the memory you must press the MC or the CM.

EXPLAIN that the illustration shows that there is a calculator with a key marked CE. Pressing the CE key is like erasing only the last number you wrote on the chalkboard. It is used to clear errors you make when you are keying in a calculation.

Progress Check #1

DIRECT the participants to "Progress Check #1" in their Participant Guide. Allow them enough time to complete then review the answers with the class.

1. The basic calculator is used to *add*, *subtract*, *multiply* and *divide*.

2. Place the letter of the correct calculator key in column one in the blank beside its definition in column two.

a.	C	*e*	clears everything in calculator
b.	–	*h*	divide
c.	ON, POWER, ON/C	*g*	clears only the last entry
d.	+	*f*	multiply
e.	CA or AC	*a*	clears everything, except memory
f.	×	*b*	subtract
g.	CE	*c*	turns calculator on
h.	÷	*d*	add

3. You view answers in the *window* of the calculator.

Whole Numbers and the Calculator

DIRECT participants to "Whole Numbers and the Calculator" in their guide.

EXPLAIN that working with whole numbers on a calculator is easy. There are several basic principles to remember. The principles are different depending on the operation you perform. Remember that a whole number is a digit from 0 to 9 or a combination of digits, like 1,091. Whole numbers are numbers with no fractional parts—7, 16, 143 and 1,972 for example.

Addition and Multiplication

STATE that adding or multiplying whole numbers is really just a matter of keying in the correct numbers and sign. Remember, the order in which you enter the numbers makes no difference when adding or multiplying.

DIRECT participants to follow the two Sample Problems in the sections titled "Whole Numbers and the Calculator," "Addition and Multiplication" in their Participant Guide.

Sample Problem

STATE that in this Sample Problem you will find the total length of steel necessary to fabricate a large frame for a production area. The lengths of all major pieces of 4 inch square steel tubing are given.

Procedure

EXPLAIN that the first step when using a calculator is to turn it ON then to clear the window by pressing the key that clears everything. How this key is labeled depends on your calculator, but some examples are AC (All Clear), CA (Clear All), or ON/C (ON/Clear).

INFORM participants that the next step is to key in each number. Since this is an addition problem, it makes no difference in what order you key in the numbers. Just be sure to press the addition key (+) between each entry.

Solution

STATE that after all of the numbers have been entered, press the equal key (=). The calculator adds the entries automatically, giving you a total after each entry. In this problem, the total length of steel needed is 304 feet.

SAY: "Next you will use your calculator to solve a multiplication problem."

Sample Problem

EXPLAIN that in this problem they will calculate the total amount of purchase of new welding machines priced at $1,300 for each of the nine plants of the division of a company.

Procedure

ASK: "What is the first step when using a calculator?"

Anticipated response:

Turn the calculator ON and/or clear the window

STATE that since this is a multiplication problem, the numbers can be keyed in any order. Be sure to touch the multiplication key (×) between touching the numbers being multiplied.

ASK: "What two numbers are being multiplied?"

Anticipated response:

1,300 (price of each welding machine), 9 (there are nine plants)

Solution

EXPLAIN that to find the solution, press the equal key (=) to get the product of the two numbers. The total amount of the purchase is $11,700.

Subtraction and Division

Note to Instructor: In this module calculations are shown as displayed on the calculator. A general discussion of rounding should be provided by the instructor.

DIRECT participants to follow the two Sample Problems in the section titled "Subtraction and Division" in their Participant Guide.

STATE that in subtraction and division, the order in which you key in the data is very important. For example, if you key in 45 divided by 5 (45 / 5) you will get the answer 9. If you key in 5 / 45, you will get the answer 0.11111111. As you can see, there is a big difference between the two answers.

Sample Problem

STATE that in this problem, Dave went to the hardware store to buy a space heater for his work area. He has $120 with him. He has to pay his $52 water bill. The heater he wants costs $78. Calculate whether he can buy the heater and pay his water bill.

Procedure

EXPLAIN that after turning ON the calculator and clearing the window, the total amount of money Dave has with him today, $120, is entered. Next, the minus sign (–) and the amount of the water bill ($52) are entered.

Solution

STATE that to reach the solution, the equal sign (=) must be pressed. Dave will not be able to buy the heater at $78 and pay his bill because $120 – $52 = $68.

INFORM participants that to use the calculator to solve a division problem, the numbers must be keyed in the proper order.

Sample Problem

EXPLAIN that this problem shows how to calculate the average weekly take-home pay for Chuck, an independent contractor, whose total weekly earnings for a six month period came to $12,650. During this time, Chuck worked 20 weeks.

Procedure

STATE that after turning ON the calculator and clearing the window, the total amount of earnings ($12,650) is keyed in. Next, the division key (÷) is pressed, followed by the number 20, the number of weeks he worked.

Solution

ASK: "What number will show in the window after the equal sign (=) is pressed?"

Anticipated response:

632.5

ASK: *"What is Chuck's average weekly take-home pay for the six month period?"*

Anticipated response:

$632.50

Progress Check #2

DIRECT the participants to "Progress Check #2" in their Participant Guide. Allow them enough time to complete then review the answers with the class.

INSTRUCT participants to use their calculators to work the following problems.

1. 894 – 684 = *210*
2. 5,475 ÷ 400 = *13.6875*
3. 798 – 499 = *299*
4. 953 ÷ 21 = *45.38095*
5. 23,541 – 14,699 = *8,842*
6. 423,657 ÷ 12,756 = *33.21237*
7. 324 × 109 = *35,316*
8. 283 + 89 = *372*
9. 34 × 684 = *23,256*
10. 16 × 45,739 = *731,824*
11. 1,035 + 2,509 = *3,544*
12. 56 + 56 = *112*

Decimal Numbers and the Calculator

DIRECT participants to the section titled "Decimal Numbers and the Calculator" in their guide.

EXPLAIN that there is not much difference between computing with whole numbers and with decimal numbers. The major difference is the decimal point. Remember that decimal numbers represent a mixed number, a combination of a whole number and a fraction, or a number less than one. For example, 4.53 and 0.1205 are decimal numbers.

Addition and Multiplication of Decimal Numbers

STATE that when you add or multiply decimal numbers with a calculator, the order of the numbers is not significant.

DIRECT participants to follow the two Sample Problems in the section titled "Addition and Multiplication of Decimal Numbers" in their Participant Guide.

		BUSINESS MILES TRAVELED
MONTH 6 DAY 22 YEAR		
ODOMETER READING		
END OF TRIP	26545.4	
LESS BEGINNING OF TRIP	26539.7	
TOTAL BUSINESS MILES		5.7
MONTH 6 DAY 22 YEAR		
ODOMETER READING		
END OF TRIP	26773.1	
LESS BEGINNING OF TRIP	26760.8	
TOTAL BUSINESS MILES		12.3
MONTH 6 DAY 24 YEAR		
ODOMETER READING		
END OF TRIP	26923.1	
LESS BEGINNING OF TRIP	26918.3	
TOTAL BUSINESS MILES		4.8
MONTH 6 DAY 27 YEAR		
ODOMETER READING		
END OF TRIP	27187.5	
LESS BEGINNING OF TRIP	27177.4	
TOTAL BUSINESS MILES		10.1
MONTH 6 DAY 27 YEAR		
ODOMETER READING		
END OF TRIP	27209.8	
LESS BEGINNING OF TRIP	27194.4	
TOTAL BUSINESS MILES		15.4
MONTH 6 DAY 28 YEAR		
ODOMETER READING		
END OF TRIP	27262.5	
LESS BEGINNING OF TRIP	27255.0	
TOTAL BUSINESS MILES		7.5
MONTH DAY YEAR		
ODOMETER READING		
END OF TRIP		
LESS BEGINNING OF TRIP		
TOTAL BUSINESS MILES		
TOTAL FOR WEEK		

Mileage Log

Sample Problem

STATE that the figure shows the log book entries of a delivery person who made six trips in the company car this week.

Procedure

EXPLAIN that to calculate the total mileage for the week, after turning ON the calculator and clearing the window, each mileage entry is keyed in. The addition sign (+) must be pressed between each entry: 5.7 + 12.3 + 4.8 + 10.1 + 15.4 + 7.5.

Solution

STATE that the equal sign (=) is pressed to give the total mileage of 55.8 miles.

Sample Problem

EXPLAIN that to work a decimal multiplication problem, the order in which the numbers are entered is not important. In the next Sample Problem, Bob is in charge of determining the total production cost for an order his company has sold. He knows that each bolt in the assembly costs $.33. Each completed unit has 57 bolts. You will calculate how much he should allow for the cost of the bolts for 200 units.

Procedure

STATE that to calculate the cost of the bolts for 200 units using the calculator, you must first turn it ON then clear the window. Next the cost ($.33) must be keyed in, followed by the multiplication sign (×). Then the number of bolts per unit (57) must be keyed in followed by the multiplication sign (×). Finally, key in the total number of units (200) followed by the equal sign (=).

Solution

STATE that the total cost for the bolts for 200 units is $3,762.

Subtraction and Division of Decimal Numbers

DIRECT participants to follow the two Sample Problems in the section titled "Subtraction and Division of Decimal Numbers" in their Participant Guide.

EXPLAIN that when you subtract or divide decimal numbers with a calculator, the order in which you enter the numbers is very important.

Sample Problem

STATE that Jake wants to check the exact distance he drives from his home to his workplace every day. His odometer reads 42,987.2 before he leaves his driveway and 43,022.7 when he gets to work.

Procedure

EXPLAIN that to calculate the distance he drives to work, after turning ON and clearing the calculator window, key in the figure that Jack records when he gets to work (43,022.7). Next, press the minus sign (–). The odometer reading Jake recorded before he began his drive to work (42,987.2) is then keyed in.

Solution

STATE that the solution is found by pressing the equal sign (=). Jake drives 35.5 miles to work.

Sample Problem

EXPLAIN that the calculator makes dividing large decimal numbers very easy. In this Sample Problem, Carl has to order industrial carpeting. He needs enough to cover at least part of the floor in each of seven offices. He found a sale on 1,555.75 square feet of a discontinued style. How will he calculate how many square feet of carpeting he can put into each office with the sale carpeting if he plans to put the same amount in each office?

Procedure

EXPLAIN that after turning ON the calculator and clearing the window, the total amount of carpet (1,555.75 square feet) must be keyed in, followed by the division sign (÷). Next, the number seven, the number of offices he has to buy for is keyed in followed by the equal sign (=).

Solution

STATE that he will be able to put 222.25 square feet of carpet in each office.

Progress Check #3

DIRECT the participants to "Progress Check #3" in their Participant Guide. Allow them enough time to complete then review the answers with the class.

Use your calculator to solve the following problems.

1. 39.23 × .065 = *2.54995*
2. 22.2 ÷ 5 = *4.44*
3. 58 + 58 + 398 + .076 = *514.076*
4. 5,000 – 529.78 = *4,470.22*
5. 65.7 × 90 × 8 = *47,304*
6. 2 – .087 = *1.913*
7. 6,478 – 24.578 = *6,453.422*
8. 748.50 × .05 = *37.425*
9. 35 + .35 + 3.5 = *38.85*
10. 8 + .8 + 19.8 + 345 = *373.6*
11. 6,000 ÷ .87 = *6,896.55172*
12. 41 ÷ 1.8 = *22.77777*

Fractions and the Calculator

DIRECT participants to the section titled "Fractions and the Calculator" in their Participant Guide.

EXPLAIN that they have learned to use a calculator to perform addition, subtraction, multiplication and division with whole numbers and decimal numbers. Next, they will perform the same operations with fractions. Fractions are numbers like 1/3, 3/8 and 17/9. They are written with a numerator (top number) divided by a denominator (bottom number).

REVIEW with participants that the horizontal line in a fraction, sometimes shown as a slash (/), means division. There are two types of fractions—proper and improper. In a proper fraction, the numerator is always smaller in value than the denominator, such as in 3/8, 1/5 and 8/9. In an improper fraction, the numerator is always equal to or greater in value than the denominator. For example, 8/3. 9/8 and 10/10 are improper fractions.

EXPLAIN that a calculator represents fractions as a decimal number. A proper fraction entered into the calculator will have numbers to the right of the decimal point. An improper fraction entered into the calculator will have numbers to the left and right of the decimal point.

STATE that since a fraction represents a division problem, enter it into your calculator as a division problem. To find the decimal equivalent of a fraction with your calculator, press the key for the top number. Then press the divide key (÷), then the key for the bottom number. Finally, press the equal key (=).

Sample Problem

DIRECT participants to follow the Sample Problem in the section titled "Fractions and the Calculator" in their Participant Guide.

STATE that in this Sample Problem, they will find the decimal equivalent of 1/3 using a calculator.

Procedure

EXPLAIN that after pressing ON and clearing the calculator, the numerator (top number) of the fraction is entered. First the number 1, then the divide key (÷) is pressed. The denominator (3) is entered, followed by the equal key (=).

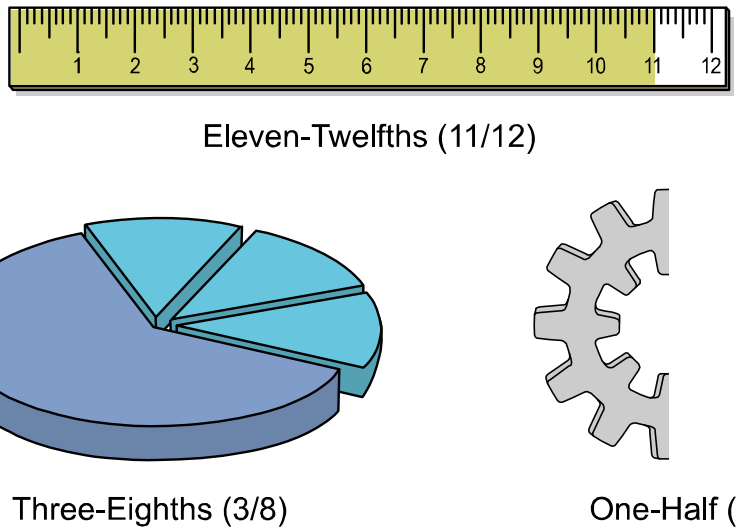
Solution

STATE that the decimal equivalent of the fraction 1/3 is 0.33333.

Fractions Equal to Less than One

EXPLAIN that since proper fractions all have a numerator that is smaller in value than the denominator, proper fractions have values less than one.

DISPLAY the slide titled "Fractions Less than One."

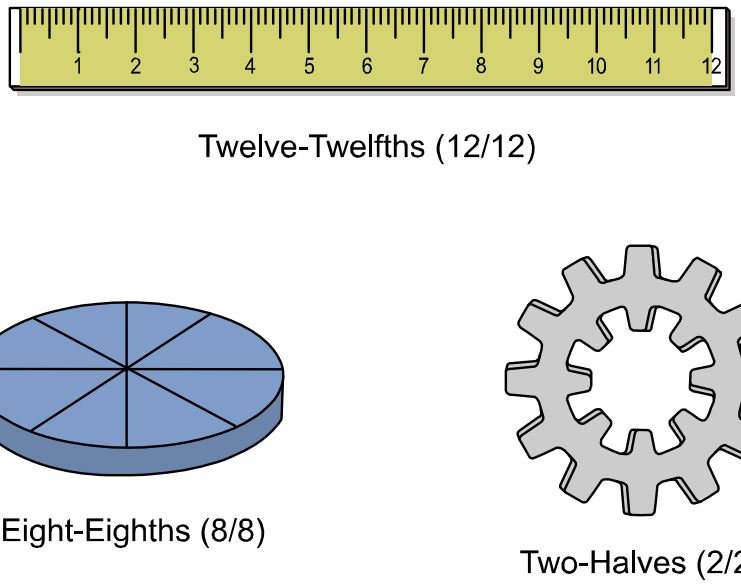


Fractions Less than One

STATE that some examples of proper fractions are illustrated. When you enter a proper fraction into a calculator, the number in the window has a decimal point on its left.

Fractions Equal to One

DISPLAY the slide titled "Fractions Equal to One."

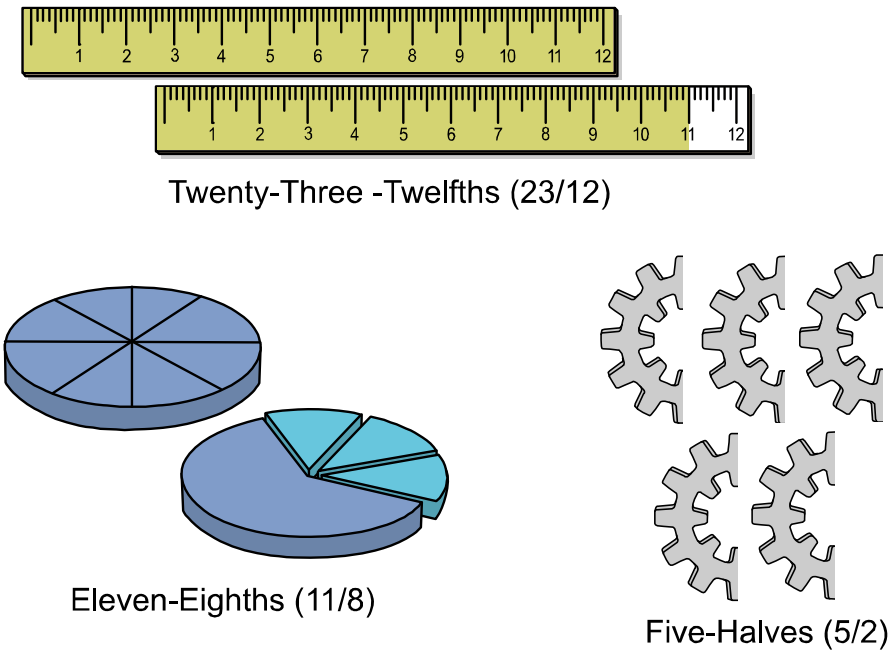


Fractions Equal to One

STATE that a fraction that has the same number for both the numerator and denominator equals one. Any number divided by itself will equal one.

Fractions Greater than One

DISPLAY the slide titled "Fractions Greater than One."



Fractions Greater than One

EXPLAIN that an improper fraction has a numerator that is equal to or greater in value than its denominator. For instance, $13/12$ is an improper fraction. The top number, 13, is larger in value than the bottom number, 12. An improper fraction always has a value equal to or more than one.

STATE that if you know how to enter fractions into the calculator, you can add, subtract, multiply and divide fractions quickly. However, you may need to write decimal equivalents when you work with fractions on the calculator.

Adding Fractions

DIRECT participants to follow the Sample Problem in the section titled "Adding Fractions" in their Participant Guide.

EXPLAIN that when you add fractions with a calculator, you must first change the fraction to a decimal number. Remember that the basic calculator can only perform one operation at a time. First change all the fractions to decimals. Record each answer. Then use the calculator to add the answers.

Sample Problem

A 6,000 pound casting of manganese bronze alloy is being made. The composition for manganese bronze is $^{11}/_{20}$ copper, $^{2}/_{5}$ zinc, $^{3}/_{100}$ manganese, $^{1}/_{125}$ tin, $^{1}/_{250}$ lead and $^{1}/_{125}$ other impurities. Find out whether the fractions account for the entire chemical makeup of the casting.

Procedure

Step 1: Turn the calculator ON and clear the window.

Step 2: Key in 11 ÷ 20 and write down the answer, .55.
Clear for the next entry.

Step 3: Key in 2 ÷ 5 and write down the answer, .4. Clear.

Step 4: Key in 3 ÷ 100 and write down the answer, .03. Clear.

Step 5: Key in 1 ÷ 125 and write down the answer, .008. Clear.

Step 6: Key in 1 ÷ 250 and write down the answer, .004. Clear.

Step 7: Key in 1 ÷ 125 and write down the answer, .008. Clear.

Step 8: Now that you have converted all the fractions to decimal numbers, add the decimal fractions.

.55 + .4 + .03 + .008 + .004 +.008 = 1

STATE that Steps 2 through 7 show that you must divide each of the fractions that represent the elements that make up manganese bronze. After each division, the decimal equivalent must be written down. These decimals are added together in Step 8.

Solution

The fractions account for the entire chemical makeup of the casting.

EXPLAIN that in this Sample Problem, we will find out whether the given fractions account for the entire chemical makeup of a 6,000 pound casting of manganese bronze alloy.

STATE that since the sum of the decimals in Step 8 equal 1, the fractions account for the entire chemical makeup of the casting.

Multiplying Fractions

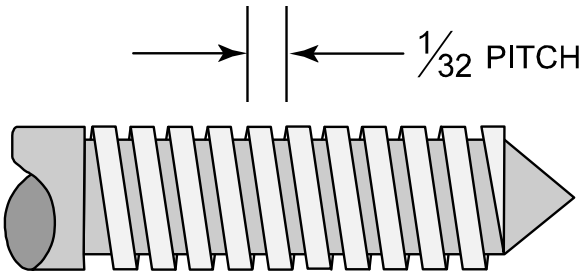
DIRECT participants to the section titled "Multiplying Fractions" in their guide.

EXPLAIN that in multiplication, as with addition, the order in which you key in numbers does not matter. However, to multiply fractions, you must first convert the fractions to decimal numbers, then multiply.

Sample Problem

DIRECT participants to follow the Sample Problem in the section titled "Multiplying Fractions" in their Participant Guide.

With a complete turn, a screw advances a distance equal to the "pitch." The pitch of a #8 screw is $1/32$ inch. Determine how far the screw will advance if it is tightened $1/2$ turn. Express your answer in decimal inches. Round your answer three decimal places.



A #8 Screw

Procedure

Step 1: Turn the calculator ON and clear the window.

Step 2: Find the decimal equivalent for the fraction $1/32$. (Remember, to find a fraction's decimal equivalent, divide the numerator by the denominator.) Write the answer, .03125, on a piece of paper. Clear the window.

Step 3: Find the decimal equivalent for the fraction 1/2. Write down the answer, .5. Clear the window.

Step 4: Now that you have converted the fractions to decimals, you can multiply. .03125 × .5 = 0.015625

Step 5: Round off to three decimal places. 0.016

STATE that Steps 2 and 3 show that you must divide the numerator (top number) by the denominator (bottom number) to determine the fraction's decimal equivalent.

ASK: "What is the decimal equivalent of 1/32?"

Anticipated response:

.03125

ASK: "What is the decimal equivalent of 1/2?"

Anticipated response:

.5

STATE that these two decimals need to be written down so that they can be multiplied as shown in Step 4.

Solution

The screw will advance approximately 0.016 inch if it is tightened one-half turn.

STATE that the product of multiplying .03125 by .5 is 0.015625. This answer, rounded off to three decimal places is 0.016. The screw will advance approximately 0.016 inch if it is tightened one-half turn.

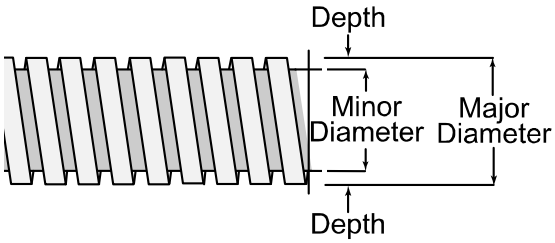
Subtracting Fractions

DIRECT participants to follow the Sample Problem in the section titled "Subtracting Fractions" in their participant Guide.

EXPLAIN that when you use a calculator to solve subtraction or division problems, the order in which you enter numbers is important. This is true whether you are working with whole numbers, decimals, or fractions. Since operations with fractions often require several steps, be sure to keep a pencil and paper handy. The procedure for subtraction of fractions is basically the same as it is for addition or multiplication. Be careful to key in the numbers in the correct order.

Sample Problem

The major (or outside) diameter of a certain screw is $5/8$ inch. The minor (or inside) diameter is $7/16$ inch.



Depth of Screw Threads

Find the depth of the screw thread.

Procedure

Step 1: Turn the calculator ON and clear the window.

Step 2: Key in 5 ÷ 8 = and write down the answer, 0.625. Clear the window.

Step 3: Key in 7 ÷ 16 = and write down that answer, 0.4375. Clear the window.

Step 4: Now you can key in the subtraction problem: 0.625 - 0.4375 = 0.1875. Do not clear the window.

Step 5: Depth appears on each side, so 0.1875 must be divided by 2. Key in 0.1875 ÷ 2, then press the = key. 0.1875 ÷ 2 = 0.09375

EXPLAIN that Steps 2 and 3 show that you must key in each fraction and record its decimal equivalent. Step 4 shows that the two resulting decimals may then be subtracted to arrive at an answer of 0.1875. Since this number will be divided by 2 (depth appears on each side), do not clear the window after performing the subtraction in Step 4. Simply press the division sign (÷) and the number 2, then press the equal sign (=).

Solution

ASK: "What is the depth of the screw head?"

Anticipated response:

0.09375

The depth of the screw thread is 0.09375 inch.

STATE that this Sample Problem illustrates how to find the depth of the screws thread when given the major (or outside) diameter ($5/8$ inch) and the minor (or inside) diameter ($7/16$ inch).

Division of Fractions

DIRECT participants to follow the two Sample Problems in the section titled "Division of Fractions" in their Participant Guide.

REMIND participants that in division, the order in which the numbers are entered is important.

Sample Problem

Divide $2/5$ by $1/2$.

Procedure

EXPLAIN that to divide $2/5$ by $1/2$, these two fractions must first be converted to decimals. To do this, key in $2 \div 5 =$ and record the answer (0.4) on a sheet of paper. Next, clear the window and key in $1 \div 2 =$ to find the decimal equivalent of the fraction $1/2$. Write the answer (0.5) on the sheet of paper. Clear the window again, then key in the division problem: $0.4 \div 0.5 = 0.8$.

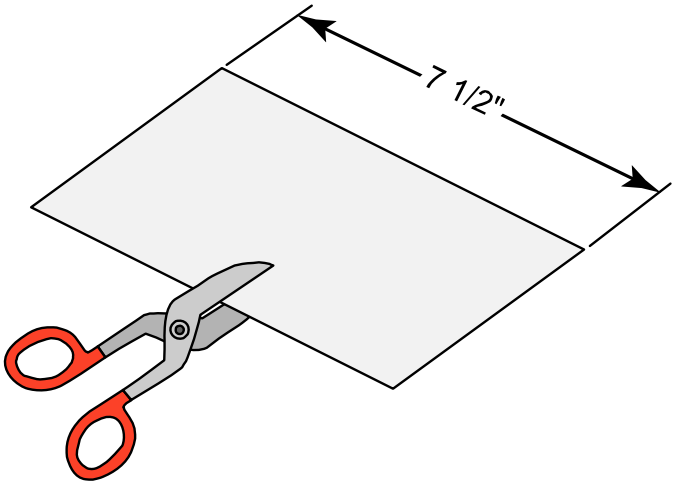
Solution

STATE that the solution to $2/5$ divided by $1/2$ equals 0.8.

STATE that this Sample Problem involves solving a division problem with fractions when mixed numbers are involved. Remember that a mixed number is a combination of a whole number and a fraction such as $9\ 7/8$ or $2\ 3/4$.
To read a mixed number, you say, "nine and seven-eighths" or "two and three-fourths."

Sample Problem

In this Sample Problem, you will determine how many 3/4 inch strips of stock can be cut from a strip that is 7 1/2 inches long. Cutting Shim Stock Strips.



Cutting Shim Stock Strips

Procedure

EXPLAIN that to solve this problem, each of the given fractions (3/4 ÷ 7 1/2) need to be converted to decimals. Step 2 shows that since 7 is a whole number and will remain a whole number, you have to find the decimal equivalent of 1/2. Key in the division problem 1 ÷ 2 to get the decimal .5. Now you can write 7 1/2 as 7.5. Clear the window and key in the problem 3 ÷ 4 to find the decimal equivalent of 3/4. The answer is 0.75. Clear the window one last time and perform the division 7.5 ÷ 0.75.

Solution

The quotient of the division problem, 7.5 ÷ 0.75 is 10. Thus ten 3/4 inch strips of stock can be cut from the 7 1/2 inch strip.

Progress Check #4

DIRECT the participants to "Progress Check #4" in their Participant Guide. Allow them enough time to complete then review the answers with the class.

1. Key in the following fractions, then write the decimal equivalent.

   a. $3/7 = \underline{0.42857}$

   b. $3/25 = \underline{.12}$

   c. $6/7 = \underline{0.85714}$

Solve the following problems:

2. $9/10 + 3\ 5/9 = \underline{4.45555}$

3. $7/8 + 3/4 + 2\ 5/7 = \underline{4.33928}$

4. $3\ 3/4 - 2\ 2/3 = \underline{1.08333}$

5. $5/8 \div 2 = \underline{0.3125}$

6. $1/7 \div 7/10 = \underline{.20408}$

7. $17\ 1/10 - 5\ 2/25 = \underline{12.02}$

8. $9/25 - 3/20 = \underline{0.21}$

9. $4/5 \times 5/2 = \underline{2}$

10. $2\ 1/5 \times 6\ 3/5 = \underline{14.52}$

11. $5/8 \times 2/5 \times 1/3 = \underline{.08333}$

12. $7\ 1/4 \div 1\ 1/8 = \underline{6.44444}$

The Memory Function

DIRECT participants to "The Memory Function" section of their guide.

EXPLAIN that your calculator probably has a memory, a storage place for a number you want to use later. It is useful for working problems that involve more than one operation. Putting a number in memory is similar to recording it on a piece of paper. Later, when you need it, you can bring the number out of memory. This is similar to looking at the number you recorded on the piece of paper.

STATE that not all calculators mark the memory key in the same way. You may need to consult the directions that came with your calculator. Usually there is a key that you press to add a number to the memory. Find the key on your calculator that adds a number into the memory. Pressing it adds the number in the display window to the number in the memory The number in the display window does not change.

DIRECT participants to practice using the memory with the following example. If you key in the number 10 and then press the M+ key, you will still see 10 in the window, but now it is in the memory, too. Some calculators indicate a number is in the memory by showing an "M" somewhere in the display window. When the memory is empty, or has a zero (0) in it, the M does not show in the display.

STATE that many calculators have a key labeled RM or MR for Recall Memory. The RM key makes a copy of the number in memory and displays it in the window This erases the previous number in the display window, but the number in memory stays the same.

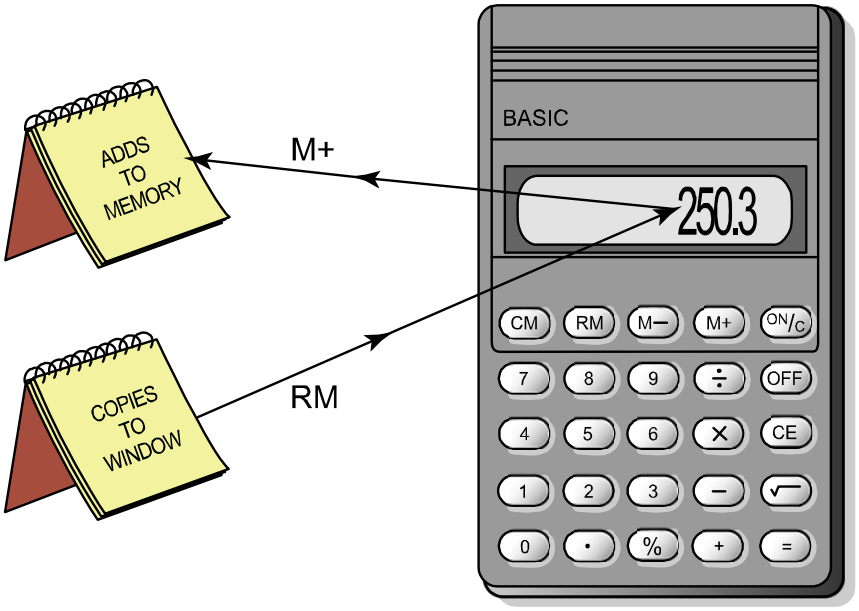
DIRECT participants to key in the problem 6 + 9 = 15. Note that before keying in this problem, the number 10 should still appear in the calculator window and in the memory.

ASK the class if they noticed that the number 10 in the window disappeared and the number 15 appears in the window.

DIRECT participants to press the RM key.

STATE that the number 10 that is in the memory is brought into the window. That 10 will stay in memory for you to use as long as you do not erase it from the memory bank.

DIRECT participants to the illustration "Using the Memory Function of a Calculator" in their Participant Guide.



Using the Memory Function of a Calculator

STATE that calculators that allow you to save a memory also have a key for clearing the memory. Often this key is marked CM. Always clear the memory before you start any problem.

Addition and Subtraction Problems and the Memory Key

DIRECT participants to follow the two Sample Problems in the section titled "Addition and Subtraction Problems and the Memory Key."

STATE that they may be able to work the following Sample Problems faster with pencil and paper than with their calculators. However, they should use the calculator so that they can learn how the memory of the calculator works.

Sample Problem

STATE that in this Sample Problem, a company has batteries stored in five different warehouse locations. At the beginning of the month, the different warehouses report inventories of 123, 80, 45, 231 and 189 batteries. During the month, two outgoing shipments are made, one of 100 and one of 200 batteries. Also, during the month there are incoming shipments of 120, 48 and 72 batteries.

Procedure

EXPLAIN that they will find out what the total inventory is at the beginning of the month.

DIRECT participants to clear the display window and the memory, then add the five beginning inventories to find the total for the beginning of the month (123 + 80 + 45 + 231 + 189).

Solution

STATE that by adding the five beginning inventories, the result is an inventory of 668 batteries. This information can now be used to provide more information.

Sample Problem

DIRECT participants to find the inventory at the end of the month by pressing the memory key while the total (668) is still in the display window. The memory now has the beginning total in it. Point out the M appears in the display window. Now, new numbers may be keyed in and the calculator will start a new problem.

Procedure

DIRECT participants to follow Step 3 which states that you must clear the window (the M will remain), then add together the outgoing shipments by pressing the keys for 100 + 200. 100 + 200 = 300. This total must then be subtracted from the inventory at the beginning of the month that is in the memory. With some calculators, you can do this by pressing a key labeled M–. This subtracts the number in the display window (300) from the number in memory (668). With other calculators you press the ± key to change the number in the window to –300 and then press the M+ key to combine the –300 and the total that is stored in memory (–668). This is the same as subtracting the 300 outgoing shipments from the beginning total of 668. The calculator works 668 – 300 as 668 + (300). Now the memory holds the beginning total minus the transfers.

DIRECT participants to clear the display window and the memory, then add the incoming shipments by pressing the keys 120 + 48 + 72. The total of the incoming shipments (240) is now in the display window. Add this incoming amount to the total in memory by pressing the M+ key. Now the memory holds the total inventory for the end of the month.

STATE that to see the contents of the memory, press the RM (Recall Memory) key. The number in the display window is the inventory at the end of the month.

Solution

STATE that at the end of the month, the inventory was 608 batteries.

Multiplication Problems and the Memory Key

DIRECT participants to follow the two Sample Problems in the section titled "Multiplication Problems and the Memory Key."

EXPLAIN that the memory feature of the calculator can help you work multiplication problems too.

Sample Problem

STATE that in this Sample Problem, you have $50 to spend. You buy 6 items at $1.29 each, 17 items at $0.79 each and 9 items at $2.56 each. You will find the amount of money you have left.

DIRECT participants to clear the display window and the memory, then key in 6 × $1.29 to get the total for the first item. Press the add-to-memory key (M+) to put this partial answer into the calculator memory. Continue to solve the problem by clearing the display window and finding the totals for the second and third items (17 × $0.79, 9 × $2.56). After each calculation, put the answer into the memory using the add-to-memory key (M+). The memory will then hold the total for all of the purchased items.

EXPLAIN that to find the amount of money left, the total of all items must be subtracted from $50.

DIRECT participants to key in 50 then the M– key, then the RM (Recall Memory) key. The display window should show how much money you have left.

Solution

ASK: "How much money do you have left?"

Anticipated response:

5.79

Sample Problem

EXPLAIN that in this Sample Problem, you will determine whether or not you have enough money to pay for your purchases and the tax (7 1/4%) that will be added at the checkout counter.

DIRECT participants to press the RM (Recall Memory) key. The window will show 44.21 which is the total amount of your purchases before tax. To figure the sales tax, you need to find 7 1/4 percent of $44.21. Since "of" signals multiplication, the problem now is to multiply $44.21 (already in the display window) by 7 1/4 percent. Enter 7 1/4 into the calculator by converting this fraction to a decimal. Remember that 1/4 is 1 divided by 4 on your calculator.

ASK: "What is the answer to 1 divided by 4?"

Anticipated response:

0.25

STATE that ¼ percent is 0.25 percent or 0.0025. You also know that 7 percent means 7 per 100 or 7/100 and you can write that as 0.07. So, 7 percent is 0.07 and ¼ percent is 0.0025. Therefore, 7 1/4% is equal to 0.0725. Now you are ready to multiply.

DIRECT participants to press the multiplication key (×) with 44.21 still in the display window. Next key in 0.0725 then the equal key (=) to find the amount of the tax. Notice that the calculator displays this to more than two decimal places:

44.21 × 0.0725 = 3.205225.

STATE that they should leave the amount in the long form until they get to the end of the problem.

DIRECT participants to press the add-to-memory key (M+) to add the number in the display window to memory.

EXPLAIN that since you have to pay the tax plus the cost of your purchases, the memory now holds the total you will have to pay, including tax.

DIRECT participants to press the RM key to see this final total.

ASK: "What is the final total showing in the display window?"

Anticipated response:

47.415225

DIRECT participants to find out exactly how much change they should get by keying in 50 and pressing the M– key. Depending on the calculator, this may also be done by pressing the ± key followed the M+ key. When the RM key is pressed, the amount of change due will appear.

ASK: "What is the number that represents the amount of change due?"

Anticipated response:

2.584775

Solution

STATE that when this answer is rounded off to two decimal places, your change is $2.58. You have more than enough for your purchases plus the tax.

Progress Check #5

DIRECT the participants to "Progress Check #5" in their Participant Guide. Allow them enough time to complete then review the answers with the class.

Use the memory key, where applicable, to solve the following problems:

1. Suppose you start out with a savings account balance of $358.68. Then you make deposits of $87.15, $126.43 and $125.00. The final deposit slip indicated a balance of $711.21.

   a. The total of your deposits is *$338.58*.

   b. The sum of the initial balance and the three deposits is *$697.26*.

   c. The difference between Part b and the balance on the final deposit slip is interest the bank credited to your account. The amount of interest credited to your account is *$13.95*.

2. Eight individually powered machines are used in a small production shop.

   Machine A uses 420 watts. Machine E uses 310 watts.

   Machine B uses 255 watts. Machine F uses 515 watts.

   Machine C uses 550 watts. Machine G uses 730 watts.

   Machine D uses 480 watts. Machine H uses 470 watts.

   a. The total wattage used when all the machines are running at the same time is *3,730*.

   b. The total wattage used must be limited to 3,000 watts. Machines C, F and G must be kept running. The fewest number of the other machines that can be turned off to keep the total power usage limited to 3,000 watts is *two*.

   c. Name the machines you would turn off.

      Machine A and Machine E

3. On a vacation trip, you plan to travel at an average speed of 60 miles per hour. The total distance you will travel is 1,170 miles.

   a. It will take *19.5* hours of driving to travel the total distance.

   b. You expect one overnight stay of 10 hours, 2 meal stops of 3/4 hour each and 3 fuel stops of 1/4 hour each. The total time needed for your vacation travel is *31.75* hours.

4. Pat begins the month with $178 in a checking account. During the month, she deposits (puts into her account) checks for $13.76, $5.86 and $10.18. She writes checks for $23.67, $14.53, $9.08 and $4.20. Her deposits total *$29.80*. Her checks total *$51.48*. She has *$156.32* in her account at the end of the month.

The Percent (%) Key

DIRECT participants to follow the Sample Problems in the section titled "The Percent (%) Key" in their Participant Guide.

EXPLAIN that one way to find percent is to first change the percent to a decimal and then multiply. Many calculators have a percent key (%). The percent key (%) on your calculator allows you to calculate percentage without performing multiplication. The calculator will do it for you.

Sample Problem

EXPLAIN that this Sample Problem has two parts. In the first, your plant manager has told you to plan on a 13 percent layoff at the beginning of the year. You have 800 workers on the floor. Current weekly production of particle board is 556 units. You estimate that production will probably drop by 28 percent. First, determine how many people will be laid off. Also calculate how many particle board units will be produced on a weekly basis with the reduced work force.

Procedure

EXPLAIN that to find out how many people will be laid off, begin by turning the calculator ON and clearing the window and the memory.

DIRECT participants to key in the total number of employees working (800). Key in the multiplication sign (×), then key in the amount of the percent and the percent sign (13%).

ASK: "What is 800 × 13%?"

Anticipated response:

104

Solution

STATE that 104 people will be laid off.

Sample Problem

EXPLAIN that the second part of the question is a little trickier. Note that it does not ask how many particle board units will be dropped from production. Instead, it asks how many will be produced. First, you will have to figure the number of units that will be lost when production is reduced. Then, subtract that number from the current total.

Procedure

DIRECT participants to clear the calculator window. Key in the total number of particle board units produced in a week (556) and the multiplication sign (×). Then key in the amount of the reduction percentage (28) and press the percent key (%).

ASK: "What is the product of multiplying 556 × 28%?"

Anticipated response:

155.68

STATE that you will be producing 155.68 fewer units after the layoff. However, you need to know how many particle board units will be produced. To find the new number of units, you must subtract the number you just calculated from the current production total. You may already have the number 155.68 in the window of your calculator.

DIRECT participants to save the number 155.68 by pressing the M+ key. Now 155.68 is in the calculator's memory. Next, press the clear key. Key in the total number of units currently in production (556) and the minus sign (–). Then, press the RM key to recall 155.68. Next, press the equal sign (=).

ASK: "What is the result of this subtraction?"

Anticipated response(s):

400.32

STATE that when you pressed the RM key, the calculator recalled the number it had stored in memory, 155.68. When you pressed the equal sign (=), it subtracted that number from 556 to give the number of units per week that will be produced after the layoff.

Progress Check #6

DIRECT the participants to "Progress Check #6" in their Participant Guide. Allow them enough time to complete then review the answers with the participants.

1. Rena wants to buy a typewriter that costs $750. If the sales tax is 4%, Rena will have to pay *$30* for sales tax. The total amount she will pay for the typewriter is *$780*.

2. Jim is planning a reception for the company's new boss. He estimates that 75% of the employees will come to the reception. There are 520 employees. He should plan for *390* employees to attend.

3. David collects debts for the Lawrence Collection Agency. He gets 20% of all debts collected. If he collects $1,750, he will receive *$350*.

4. Sarah is to pay 60% of a $975.00 bill she received from Harris products. She will pay *$585*.

5. Jim's Men's Wear is having a going-out-of-business sale. All merchandise is 65% off. The sale price of a coat originally marked $165.00 is *$57.75*.

6. The original price of a certain microcomputer system is $1,700. John's Computer Store is advertising it at 25% off. The price of the system at John's Computer Store is *$1,275*.

7. Fred's business borrowed $7,500 for one year at 13 1/2% simple interest. *$8,512.50* is due to the bank in one year.

8. Mark traded his old car to a dealer for a new model. The dealer gave him a trade-in value equal to 20% of the new car's price. The new car's list price was $14,885. Find the amount of Mark's trade-in. *$2,977*

9. 550 × 80% = *440*

10. 600 × 48% = *288*

11. 350 × 22% = *77*

12. 2,500 × 95% = *2,375*

13. 400 × 125% = *500*

14. 2,450 × 40% = *980*

15. 36 × 100% = *36*

Squaring a Number and Using the Square Root Key

DIRECT participants to the section titled "Squaring a Number and Using the Square Root Key " in their guide.

EXPLAIN that sometimes you have to multiply a number by itself. For example, you may have to multiply 25 by 25. This operation is called squaring a number. Using a calculator simplifies the process. To square a number with a calculator, first key in the number to be squared and a multiplication sign (×). Then key in the same number again.

Using the Square Root Key (√)

DIRECT participants to the section titled "Using The Square Root Key" in their Participant Guide.

EXPLAIN that to find the square root of a number you must determine what number, when multiplied by itself, produces the original quantity.

ASK: "For example, what number, when multiplied by itself, produces 100?"

Anticipated response(s):

10

STATE that the square root of 100 is 10. Finding the square root with a pencil and paper can be a very long process. But the square root key (√) makes it easy to find square roots.

Sample Problem

DIRECT participants to the Sample Problem in the section titled "Using the Square Root Key (√)" in their Participant Guide.

Procedure

DIRECT participants to find the square root of 25. Begin by clearing the window then key in the number whose square root you want to find, in this case, 25. Then press the square root (√) key.

Solution

ASK: "What number appears in the window?"

Anticipated response:

5

STATE that the square root of 25 is 5 because 5 times itself equals 25.

EXPLAIN that for our purposes here, it is only important that they know how to find the square root of a number. When they progress to more advanced levels of training, they will learn when to use the square root (√) key. Squaring and finding the square root of a number are useful when working on mechanical layouts or using electrical quantities.

Progress Check #7

DIRECT the participants to "Progress Check #7" in their Participant Guide. Allow them enough time to complete then review the answers with the class.

1. Square the numbers in the problems that follow:

   a. 15 = *225*
   b. 20 = *400*
   c. 100 = *10,000*
   d. 42.5 = *1,806.25*
   e. 0.05 = *0.0025*
   f. 5.5 = *30.25*
   g. 13 = *169*
   h. 1 = *1*
   i. 11.11 = *123.4321*

2. Find the square root of the numbers in the problems that follow:

   a. 100 = *10*
   b. 64 = *8*
   c. 1.21 = *1.1*
   d. 3,969 = *63*
   e. 14,400 = *120*
   f. 0.3364 = *.58*
   g. 4,225 = *65*
   h. 1,697.44 = *41.2*
   i. 182.25 = *13.5*

Summary

DIRECT participants to the section titled "Summary" in their Participant Guide.

EXPLAIN that a basic calculator is a useful tool for addition, subtraction, multiplication, division, finding percentages and finding square roots. Data is viewed through the window of a calculator. Data is keyed into the calculator on the numeric key pad.

STATE that the CA key on a calculator clears everything. The C key clears everything except that which is stored in the memory. The CE key clears only the last entry.

REVIEW that whole numbers are the digits from zero to nine and any combination of those digits. Fractions express a divided quantity. A fraction has two parts.

ASK: "What is the number on the top called?"

Anticipated response:

The numerator

ASK: "What is the number on the bottom called?"

Anticipated response:

The denominator

STATE that a proper fraction has a value equal to less than one.

ASK: "In a proper fraction, is the numerator smaller or larger than its denominator?"

Anticipated response:

In a proper fraction, the numerator is smaller

EXPLAIN that an improper fraction has a value equal to or greater than one. It has a numerator that is equal to or greater than its denominator.

STATE that decimal numbers are numbers that have a decimal point in them. Decimal numbers may represent fractions or mixed numbers (a mixed number is a combination of a whole number and a fraction).

ASK: "When adding or multiplying, does the order in which the numbers are entered into the calculator matter?"

Anticipated response:

No

STATE that when subtracting or dividing, the order in which they are entered into the calculator does matter.

EXPLAIN that the memory on a calculator stores numbers for later use. The M+ key adds the number showing in the window to the memory of the calculator. The RM (Recall Memory) key makes a copy of the number in memory and displays it in the window. The CA (Clear All) key clears the memory and the display in the calculator window.

ASK: "What does the CM key do?"

Anticipated response:

It clears the memory

STATE that the percent key (%) calculates percentage.

ASK: "What does it mean to square a number?"

Anticipated response:

It means to multiply a number by itself

ASK: "What does it mean to find the square root of a number?"

Anticipated response:

Finding the square root of a number means finding what number multiplied by itself gives the number whose square root you are seeking

ASK: "How do you find the square root with a calculator?"

Anticipated response:

Key in the number then press the square root key (√)

CONCLUDE by thanking participants.

HAND OUT the Calculators Assessment to participants. Allow enough time for them to complete the test. Collect the assessments when they finish and go over the answers with the class.

Glossary

Calculator — A machine used for performing mathematical operations.

Clear Key — Erases data from the window and/or the memory of a calculator.

Decimal Number — Fraction of a number or a mixed number, written with a decimal point that designates tenths, hundredths, thousandths. An example of a decimal number is 3.24.

Fraction — A portion of a whole amount. Expressed as a division problem, with a numerator and a denominator. For example, 5/6 is a fraction.

Improper Fraction — A fraction with the numerator larger than, or equal to, the denominator. For example, 5/4 is an improper fraction.

Memory Function — A storage function in the calculator where numbers are stored, then recalled to use again.

Mixed Number — A combination of a whole number and a fraction. For example, 6 3/4 is a mixed number.

Numeric Key Pad — On a calculator, the group of keys with numerals on them.

Proper Fraction — A fraction with the numerator smaller than the denominator. For example, 5/6 is a proper fraction.

Square Root	The square root of a number is the number that, when multiplied by itself, gives the number whose square root you are seeking. For example, the square root of 4 is 2.
Squaring a Number	Multiplying a number by itself. To square the number 5, multiply 5 × 5.
Whole Number	Numbers without fractional parts, like 7, 16, 143 and 1,972. A digit from 0 to 9 or a combination of those digits, like 1,091.
Window	The portion of the calculator that allows you to view data.