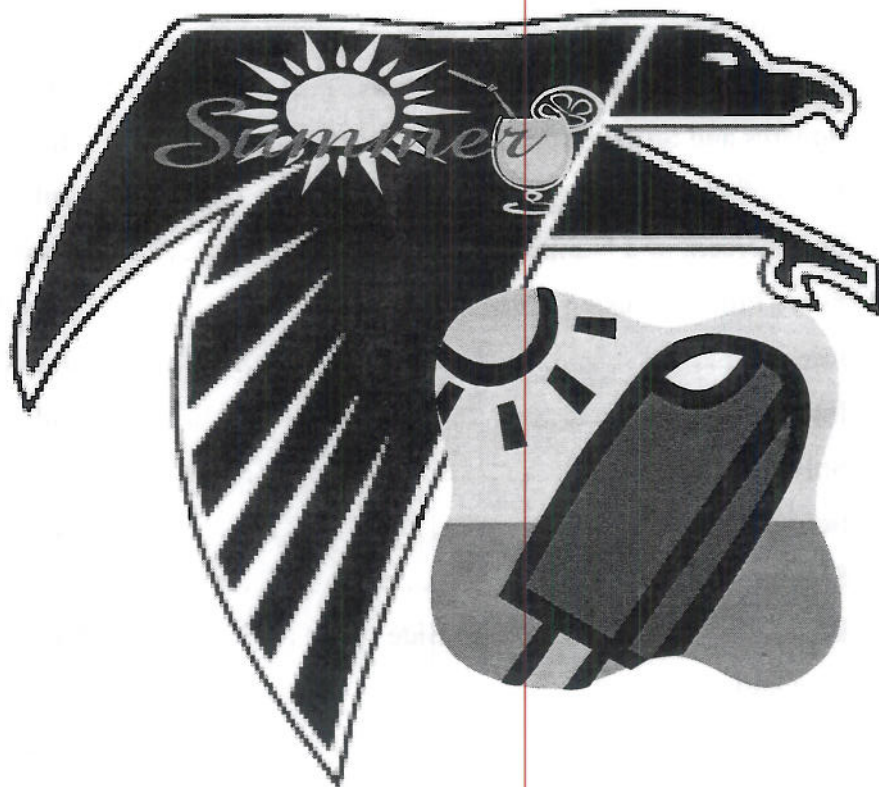Name: _____   Date: _____

Lakelands Park Middle School

Algebra 1
Summer Packet

Algebra 1 Summer Mathematics Packet

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Fraction Operations

Hints/Guide:

When adding and subtracting fractions, we need to be sure that each fraction has the same denominator, then add or subtract the numerators together. For example:

$$\frac{1}{8} + \frac{3}{4} = \frac{1}{8} + \frac{6}{8} = \frac{1+6}{8} = \frac{7}{8}$$

That was easy because it was easy to see what the new denominator should be, but what about if it was not so apparent? For example: $\frac{7}{12} + \frac{8}{15} =$

For this example, we must find the Lowest Common Denominator (LCM) for the two denominators 12 and 15.

Multiples of 12 are 12, 24, 36, 48, 60, 72, 84, . . .
Multiples of 15 are 15, 30, 45, 60, 75, 90, 105, . . .
The LCM of 12 and 15 is 60

So, $\frac{7}{12} + \frac{8}{15} = \frac{35}{60} + \frac{32}{60} = \frac{35+32}{60} = \frac{67}{60} = 1\frac{7}{60}$.   Note: Be sure that answers are always in lowest terms

To multiply fractions, we multiply the numerators together and denominators together, and then simplify the product. To divide fractions, we find the reciprocal of the second fraction (flip the numerator and the denominator) and then multiply the two together. For example:

$$\frac{2}{3} \bullet \frac{1}{4} = \frac{2}{12} = \frac{1}{6} \text{ and } \frac{2}{3} \div \frac{3}{4} = \frac{2}{3} \bullet \frac{4}{3} = \frac{8}{9}$$

Exercises: Perform the indicated operation   No Calculators!
      SHOW ALL WORK. Use a separate sheet of paper (if needed) and staple to this page.

1. $\frac{6}{7} + \frac{2}{3} =$ 2. $\frac{8}{9} + \frac{3}{4} =$ 3. $\frac{9}{11} - \frac{2}{5} =$

4. $\frac{5}{7} - \frac{5}{9} =$ 5. $\frac{6}{11} \bullet \frac{2}{3} =$ 6. $\frac{7}{9} \bullet \frac{3}{5} =$

7. $\frac{6}{7} \div \frac{1}{5} =$ 8. $\frac{7}{11} \div \frac{3}{5} =$ 9. $\left[\frac{2}{3} - \frac{5}{9}\right] \div \left[\frac{4}{7} + \frac{1}{6}\right] =$

10. $\frac{3}{4} + \frac{4}{5}\left[\frac{5}{9} + \frac{9}{11}\right] =$ 11. $\left[\frac{3}{4} + \frac{4}{5}\right]\left[\frac{5}{9} + \frac{9}{11}\right] =$

Decimal Operations

Hints/Guide:

When adding and subtracting decimals, the key is to line up the decimals above each other, add zeroes so all of the numbers have the same place value length, then use the same rules as adding and subtracting whole numbers. The answer will have a decimal point in line with the problem.

For example:

$$34.5 + 6.72 + 9.045 = \begin{array}{r} 34.5 \\ 6.72 \\ 9.045 \\ \hline 50.265 \end{array}$$

To multiply decimals, the rules are the same as with multiplying whole numbers, until the product is determined and the decimal point must be located. The decimal point is placed the same number of digits in from the right side of the product as the number of decimal place values in the numbers being multiplied. For example,

$8.54 \cdot 17.2$, since $854 \cdot 172$ is 146888, then we count the number of decimal places in the factors (3) and move in from the right three places, so the final product is 146.888

To divide decimals by a whole number, the division process is the same as for whole numbers, but the decimal points are lined up in the dividend and the quotient. For example, to divide 51.06 by 3, the process is the same as if the problem were 5,106 divided by 3, with the decimal point from the quotient moving up into the quotient to create the final answer of 17.02

$$\begin{array}{r} 17.02 \\ 3\overline{)51.06} \end{array}$$

Exercises: Perform the indicated operation   No Calculators!

SHOW ALL WORK. Use a separate sheet of paper (if needed) and staple to this page.

1. $15.709 + 2.34 + 105.06 =$

2. $64.308 + 164.18 + 1005.7 =$

3. $87.4 - 56.09 =$

4. $500.908 - 4.72 =$

5. $6108.09 - 2004.704 =$

6. $9055.3 - 242.007 =$

7. $\begin{array}{r} 63 \\ \times\ .04 \\ \hline \end{array}$

8. $\begin{array}{r} .87 \\ \times\ .23 \\ \hline \end{array}$

9. $\begin{array}{r} 8.904 \\ \times\ \ 2.1 \\ \hline \end{array}$

10. $\begin{array}{r} 4.2 \\ \times\ .602 \\ \hline \end{array}$

11. $35\overline{)70.35}$

12. $14\overline{)50.512}$

13. $23\overline{)74.888}$

Rename Fractions, Percents, and Decimals

Hints/Guide:

To convert fractions into decimals, we start with a fraction, such as $\frac{3}{5}$, and divide the numerator (the top number of the fraction) by the denominator (the bottom number of the fraction). So:

$$5\overline{)3.0}^{.6}$$ and the fraction $\frac{3}{5}$ is equivalent to the decimal 0.6

To convert a decimal to a percent, we multiply the decimal by 100 (percent means a ratio of a number compared to 100). A short-cut is sometimes used of moving the decimal point two places to the right (which is equivalent to multiplying a number by 100), so $0.6 \cdot 100 = 60$ and $\frac{3}{5} = 0.6 = 60\%$.

To convert a percent to a decimal, we divide the percent by 100,
60% is the same as $60 \div 100$, which is 0.6, so $60\% = 0.6$

To convert a fraction into a percent, we can use proportions to solve, so

$\frac{3}{5} = \frac{x}{100}$ and using cross products to solve, $5x = 300$ or $x = 60\%$

Exercises: Complete the chart

	Fraction	Decimal	Percent
1.		0.04	
2.			125%
3.	$\frac{2}{3}$		
4.		1.7	
5.			0.6%
6.	$3\frac{1}{2}$		
7.		0.9	
8.			70%
9.	$\frac{17}{25}$		
10.		0.007	

Add and Subtract Mixed Numbers

Hints/Guide:

When adding mixed numbers, we can add the whole numbers and the fractions separately, then simplify the answer. For example:

$$4\frac{1}{3}+2\frac{3}{4}=4\frac{8}{24}+2\frac{18}{24}=6\frac{26}{24}=6+1\frac{2}{24}=7\frac{2}{24}=7\frac{1}{12}$$

When subtracting mixed numbers, we subtract the whole numbers and the fractions separately, then simplify the answer. For example:

$$7\frac{3}{4}-2\frac{15}{24}=7\frac{18}{24}-2\frac{15}{24}=5\frac{3}{24}=5\frac{1}{8}$$

$$5\frac{1}{4}-3\frac{3}{8}=5\frac{2}{8}-3\frac{3}{8}=4\frac{10}{8}-3\frac{3}{8}=1\frac{5}{8}$$ Note: regrouping needed in order to subtract

Exercises: Solve in lowest terms.   No Calculators!
        SHOW ALL WORK. Use a separate sheet of paper (if needed) and staple to this page.

1. $3\frac{1}{2}+5\frac{3}{5}=$

2. $6\frac{17}{25}+8\frac{4}{7}=$

3. $6\frac{2}{3}+9\frac{7}{9}=$

4. $8\frac{3}{10}-6\frac{7}{9}=$

5. $9\frac{7}{15}-2\frac{7}{12}=$

6. $12\frac{8}{9}-7\frac{3}{4}=$

Multiply and Divide Mixed Numbers

Hints/Guide:

To multiply mixed numbers, we can first convert the mixed numbers into improper fractions. This is done my multiplying the denominator by the whole number part of the mixed number and them adding the numerator to this product. This sum is the numerator of the improper fraction. The denominator of the improper fraction is the same as the denominator of the mixed number.

For example: $3\frac{2}{5}$ leads to $3 \cdot 5 + 2 = 17$, so $3\frac{2}{5} = \frac{17}{5}$.

Once the mixed numbers are converted into improper fractions, we multiply and simplify just as with regular fractions. For example: $5\frac{1}{5} \bullet 3\frac{1}{2} = \frac{26}{2} \bullet \frac{7}{2} = \frac{182}{10} = 18\frac{2}{10} = 18\frac{1}{5}$

To divide mixed numbers, we must convert to improper fractions then multiply by the reciprocal of the second fraction and simplify. For example: $2\frac{1}{2} \div 3\frac{1}{3} = \frac{5}{2} \div \frac{10}{3} = \frac{5}{2} \bullet \frac{3}{10} = \frac{15}{20} = \frac{3}{4}$

Exercises: Solve in lowest terms. No Calculators!
SHOW ALL WORK. Use a separate sheet of paper (if needed) and staple to this page.

1. $6\frac{2}{3} \bullet 7\frac{3}{7} =$

2. $3\frac{1}{3} \bullet 6\frac{4}{5} =$

3. $7\frac{1}{8} \bullet 6 =$

4. $4\frac{1}{4} \div \frac{5}{7} =$

5. $3\frac{2}{3} \div 4\frac{3}{7} =$

6. $\frac{3}{4} \div 2\frac{3}{11} =$

7. $6\frac{1}{5} \div 8\frac{2}{5} =$

8. $8\frac{2}{7} \div 7\frac{8}{9} =$

9. $6\frac{4}{7} \div 3\frac{3}{5} =$

Squares and Square Roots

Hints/Guide:

Exponents are a way to represent repeated multiplication, so that 3^4 means 3 multiplied four times, or $3 \cdot 3 \cdot 3 \cdot 3$, which equals 81. In this example, 3 is the base and 4 is the power.

Roots are the base numbers that correspond to a given power, so the square (referring to the power of 2) root of 81 is 9 because $9 \cdot 9 = 81$ and the fourth root of 81 is 3 because $3 \cdot 3 \cdot 3 \cdot 3$ is 81.

$\sqrt[n]{x}$, where n is the root index and x is the radicand

Exercises: Evaluate.

1. $3^4 =$

2. $(-4)^3 =$

3. $-4^3 =$

4. $\sqrt{49} =$

5. $\sqrt{289} =$

6. $\sqrt[3]{64} =$

7. $(8-4)^2 =$

8. $(4-2)^2 (5-8)^3 =$

9. $5(8-3)^2 =$

10. $\sqrt{25-16} =$

11. $\sqrt{5(9 \bullet 125)} =$

12. $\sqrt{(8-4)(1+3)} =$

13. $\sqrt{45-4(3+6)} =$

14. $-\sqrt{14(16-2)} =$

Laws of Exponents

Hints/Guide:

There are certain rules when dealing with exponents that we can use to simplify problems. They are:

Adding powers	$a^m a^n = a^{m+n}$	
Multiplying powers	$(a^m)^n = a^{mn}$	
Subtracting powers	$\dfrac{a^m}{a^n} = a^{m-n}$	
Negative powers	$a^{-n} = \dfrac{1}{a^n}$	
To the zero power	$a^0 = 1$	

Here are some examples of problems simplified using the above powers:

$$4^3 \bullet 5^5 = 4^8 \qquad (4^3)^3 = 4^9 \qquad 4^5 \div 4^3 = 4^2 \qquad 4^{-4} = \frac{1}{4^4} = \frac{1}{256} \qquad 4^0 = 1$$

Exercises: Simplify the following problems using exponents (Do not multiply out).

1. $5^2 5^4 =$

2. $7^{-3} 7^5 =$

3. $(12^4)^3 =$

4. $(6^5)^2 =$

5. $5^9 \div 5^4 =$

6. $10^3 \div 10^{-5} =$

7. $7^{-3} =$

8. $3^{-4} =$

9. $124^0 =$

10. $-9^0 =$

11. $(3^5 \bullet 3^2)^3 =$

12. $5^3 \bullet 5^4 \div 5^7 =$

Find Percent of a Number

Hints/Guide:

To determine the percent of a number, we must first convert the percent into a decimal by dividing by 100 (which can be short-cut by moving the decimal point in the percentage two places to the left), then multiplying the decimal by the number. For example:

$$4.5\% \text{ of } 240 = 4.5\% \cdot 240 = 0.045 \cdot 240 = 10.8$$

Exercises: Solve for n.
  SHOW ALL WORK. Use a separate sheet of paper (if needed) and staple to this page.

1. 305% of 450 = n   2. 7.5% of 42 = n

3. 120% of 321 = n   4. 15% of 54 = n

5. 0.65% of 320 = n   6. 800% of 64 = n

7. 95% of 568 = n   8. 150% of 38 = n

9. 215% of 348 = n   10. 85% of 488 = n

11. 9.05% of 750 = n   12. 160% of 42 = n

13. 60% of 78 = n   14. 0.4% of 480 = n

15. 0.10% of 435 = n   16. 2.4% of 54 = n

Solve Problems Using Percents

Hints/Guide:

When solving percent problems, we apple the rules for finding percent of a number in realistic situations. For example, to ding the amount of sales tax on a $450.00 item if the tax rate is 5%, we find 5% of 450 (.05 · 450 = 22.5), and then label our answer in dollars, getting $22.50.

Exercises: Solve the following items.
      SHOW ALL WORK. Use a separate sheet of paper (if needed) and staple to this page.

1.   Susie has just bought a pair of jeans for $49.95, a sweater for $24.50, and a jacket for $85.95. The sales tax is 5%. What is her total bill?

2.   Jack bought a set of golf clubs for $254.00 and received a rebate of 24%. How much was the rebate?

3.   A construction manager calculates it will cost $2,894.50 for materials for her next project. She must add in 12.5% for scrap and extras. What will be the total cost?

4.   The regular price for a video game system is $164.50 but is on sale for 30% off. What is the amount of the discount?

    What is the sale price?

5.   Cindy earns a 15% commission on all sales. On Saturday, she sold $985.40 worth of merchandise. What was the amount of commission she earned on Saturday?

6.   The band had a fundraiser and sold $25,800 worth of candy. They received 38% of this amount for themselves. How much did they receive?

Integers I

Hints/Guide:

To add integers with the same sign (both positive or both negative), add their absolute values and use the same sign. To add integers of opposite signs, find the difference of their absolute values and then take the sign of the larger absolute value.

To subtract integers, add its additive inverse. For example, $6 - 11 = 6 + -11 = -5$

Exercises: Solve the following problems.

1. $(-4) + (-5) =$

2. $-9 - (-2) =$

3. $6 - (-9) =$

4. $(-6) - 7 =$

5. $7 - (-9) =$

6. $15 - 24 =$

7. $(-5) + (-8) =$

8. $-15 + 8 - 8 =$

9. $14 + (-4) - 8 =$

10. $14.5 - 29 =$

11. $-7 - 6.85 =$

12. $-8.4 - (-19.5) =$

13. $29 - 16 + (-5) =$

14. $-15 + 8 - (-19.7) =$

15. $45.6 - (-13.5) + (-14) =$

16. $-15.98 - 6.98 - 9 =$

17. $-7.24 + (-6.28) - 7.3 =$

18. $29.45 - 56.009 - 78.2 =$

19. $17.002 + (-7) - (-5.23) =$

20. $45.9 - (-9.2) + 5 =$

Integers II

Hints/Guide:

The rules for multiplying integers are:

Positive · Positive = Positive   Negative · Negative = Positive
Positive · Negative = Negative   Negative · Positive = Negative

The rules for dividing integers are the same as multiplying integers

Exercises: Solve the following problems.

1. $4 \cdot (-3) \cdot 6 =$

2. $5\,(-12) \cdot (-4) =$

3. $(4)(-2)(-3) =$

4. $\dfrac{(-5)(-6)}{-2} =$

5. $\dfrac{6(-4)}{8} =$

6. $\dfrac{-56}{2^3} =$

7. $6\,(-5 - (-6)) =$

8. $8\,(-4 - 6) =$

9. $-6\,(9 - 11) =$

10. $\dfrac{-14}{2} + 7 =$

11. $8 - \dfrac{-15}{-3} =$

12. $-3 + \dfrac{-12 \bullet (-5)}{4} =$

13. $\dfrac{-6 - (-8)}{-2} =$

14. $-7 + \dfrac{4 + (-6)}{-2} =$

15. $45 - 14\,(5 - (-3)) =$

16. $(-4 + 7)\,(-16 + 3) =$

17. $16 - (-13)\,(-7 + 5) =$

18. $\dfrac{4 + (-6) - 5 - 3}{-6 + 4} =$

19. $(-2)^3\,(-5 - (-6)) =$

20. $13\,(-9 + 17) + 24 =$

Solving Equations I

Hints/Guide:

The key in equation solving is to isolate the variable, to get the letter by itself. In one-step equations, we merely undo the operation - addition is the opposite of subtraction and multiplication is the opposite of division. Remember the golden rule of equation solving: If we do something to one side of the equation, we must do the exact same thing to the other side.

Examples:

1. $x + 5 = 6$
    $\underline{-5 \quad -5}$
    $x = 1$
    Check: $1 + 5 = 6$
    $\quad\quad\quad 6 = 6$

2. $t - 6 = 7$
    $\underline{+6 \quad +6}$
    $t = 13$
    Check: $13 - 6 = 7$
    $\quad\quad\quad 7 = 7$

3. $\dfrac{4x}{4} = \dfrac{16}{4}$
    $x = 4$
    Check: $4(4) = 16$
    $\quad\quad\quad 16 = 16$

4. $6 \cdot \dfrac{r}{6} = 12 \cdot 6$
    $r = 72$
    Check: $72 \div 6 = 12$
    $\quad\quad\quad 12 = 12$

Exercises: Solve the following problems: \quad\quad\quad\quad\quad\quad No Calculators!
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $x + 8 = -13$

2. $t - (-9) = 4$

3. $-4t = -12$

4. $\dfrac{r}{4} = 24$

5. $y - 4 = -3$

6. $h + 8 = -5$

7. $\dfrac{p}{8} = -16$

8. $-5k = 20$

9. $-9 - p = 17$

Solving Equations II

Hints/Guide:

The key in equation solving is to isolate the variable, to get the letter by itself. In two-step equations, we must undo addition and subtraction first, then multiplication and division. Remember the golden rule of equation solving: If we do something to one side of the equation, we must do the exact same thing to the other side. Examples:

1. $4x - 6 = -14$

    $+6 \quad +6$

    $\underline{4x \quad = -8}$

    $4 \qquad 4$

    $x = -2$

Solve: $4(-2) - 6 = -14$

        $-8 - 6 = -14$

         $-14 = -14$

2. $\dfrac{x}{-6} - 4 = -8$

    $+4 \quad +4$

    $-6 \cdot \dfrac{x}{-6} = -4 \cdot -6$

    $x = 24$

Solve: $(24/-6) - 4 = -8$

       $-4 - 4 = -8$

        $-8 = -8$

Exercises: Solve the following problems: No Calculators!
    SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $-4t - 6 = 22$

2. $\dfrac{m}{-5} + 6 = -4$

3. $-4r + 5 = -25$

4. $\dfrac{x}{-3} + (-7) = 6$

5. $5g + (-3) = -12$

6. $\dfrac{y}{-2} + (-4) = 8$

Solving Equations III

Hints/Guide:

When solving equations that include basic mathematical operations, we must simplify the mathematics first, then solve the equations. For example:

$$5 (4 - 3) + 7x = 4 (9 - 6)$$
$$5 (1) + 7x = 4 (3) \qquad \text{Check: } 5 (4 - 3) + 7 (1) = 4 (9 - 6)$$
$$5 + 7x = 12 \qquad\qquad\qquad 5 + 7 = 4 (3)$$
$$-5 \qquad -5 \qquad\qquad\qquad\qquad 12 = 12$$
$$\frac{7x}{7} = \frac{7}{7}$$
$$x = 1$$

Exercises: Solve the following equations using the rules listed on the previous pages:
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $4x + 8 - 6 = 2 (9 - 2)$

2. $\dfrac{t}{5} - 7 + 31 = 8(6 - 4)$

3. $5 (t - 4) = 9 (7 - 3)$

4. $9 - 5(4 - 3) = -16 + \dfrac{x}{3}$

5. $6t - 9 - 3t = 8 (7 - 4)$

6. $7(6 - (-8)) = \dfrac{t}{-4} + 2$

7. $7 (3 - 6) = 6 (4 + t)$

8. $4r + 5r - 6r = 15 + 6$

9. $3(5 + x) = 5(7 - (-2))$

Equations - Variables on Each Side

Hints/Guide:

As we know, the key in equation solving is to isolate the variable. In equations with variables on each side of the equation, we must combine the variables first by adding or subtracting the amount of one variable on each side of the equation to have a variable term on one side of the equation. Then, we must undo the addition and subtraction, then multiplication and division. Remember the golden rule of equation solving. Examples:

$$8x - 6 = 4x + 5$$
$$\underline{- 4x \qquad - 4x}$$
$$4x - 6 = \quad 5$$
$$\underline{+ 6 \quad + 6}$$
$$\frac{4x}{4} = \frac{11}{4}$$
$$x = 2\frac{3}{4}$$

$$5 - 6t = 24 + 4t$$
$$\underline{+ 6t \qquad + 6t}$$
$$5 = 24 + 10t$$
$$\underline{- 24 \quad - 24}$$
$$\frac{-19}{10} = \frac{10t}{10}$$
$$-1\frac{9}{10} = t$$

Exercises: Solve the following problems: No Calculators!
     SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $4r - 7 = 8r + 13$ 2. $14 + 3t = 5t - 12$ 3. $4x + 5 = 3x - 3$

4. $6y + 5 = 4y - 13$ 5. $5x - 8 = 6 - 2x$ 6. $7p - 8 = -4p + 6$

Inequalities

Hints/Guide:

In solving inequalities, the solution process is very similar to solving equalities. The goal is still to isolate the variable, to get the letter by itself. However, the one difference between equations and inequalities is that when solving inequalities, when we multiply or divide by a negative number, we must change the direction of the inequality. Also, since an inequality as many solutions, we can represent the solution of an inequality by a set of numbers or by the numbers on a number line.

Inequality - a statement containing one of the following symbols:

$<$ is less than $>$ is greater than $\leq$ is less than or equal to
$\geq$ is greater than or equal to $\_$ is not equal to

Examples:

1. Integers between -4 and 4.
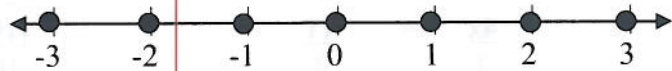
2. All numbers between -4 and 4.

3. The positive numbers.

So, to solve the inequality -4x < -8 becomes $\dfrac{-4x}{-4} < \dfrac{-8}{-4}$

and therefore x > 2 is the solution (this is because whenever we multiply or divide an inequality by a negative number, the direction of the inequality must change) and can be represented as:

Exercises: Solve the following problems: No Calculators!

1. $4x > 9$

2. $-5t \geq -15$

3. $\dfrac{x}{2} \geq 3$

4. $\dfrac{x}{-4} > 2$

Pythagorean Theorem

Hints/Guide:

The Pythagorean Theorem states that in a right triangle, and only in a right triangle, the length of the longest side (the side opposite the right angle and called the hypotenuse, or c in the formula) squared is equal to the sum of the squares of the other two sides (the sides that meet to form the right angle called legs, or a and b in the formula). The formula is $a^2 + b^2 = c^2$.
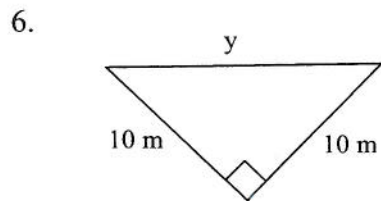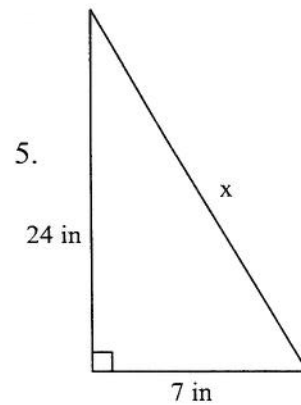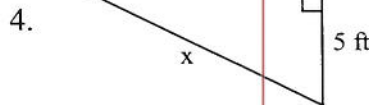
Find the missing side.
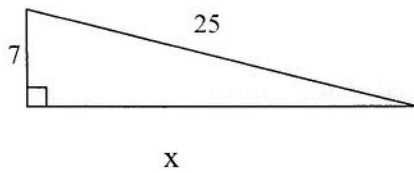
$$a^2 + b^2 = c^2$$
$$7^2 + x^2 = 25^2$$
$$49 + x^2 = 625$$
$$-49 \qquad -49$$
$$x^2 = 576$$
$$\sqrt{x^2} = \sqrt{576}$$
$$x = 24$$

Exercises: Solve for the variable:
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1.

2.

3.

4.

5.

6.

7.
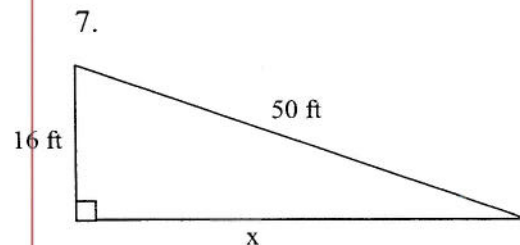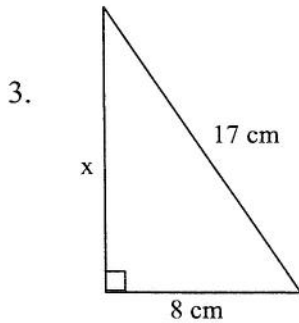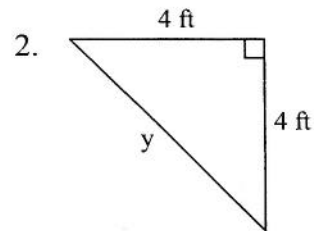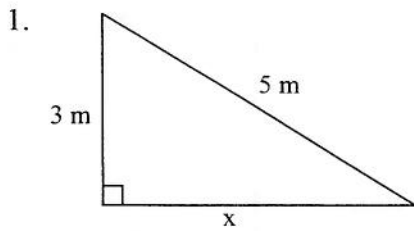
Volume

Hints/Guide:

To find the volume of prisms (a solid figure whose ends are parallel and the same size and shape and whose sides are parallelograms) and cylinders, we multiply the area of the base times the height of the figure. The formulas we need to know are:

The area of a circle is $A = \pi r^2$ The area of a rectangle is $A = bh$

The area of a triangle is $A = \dfrac{1}{2}bh$ The volume of a prism is
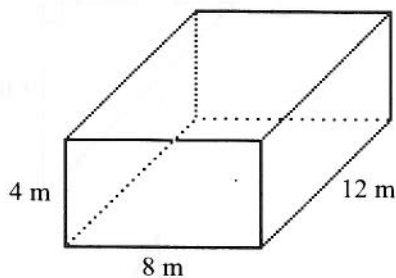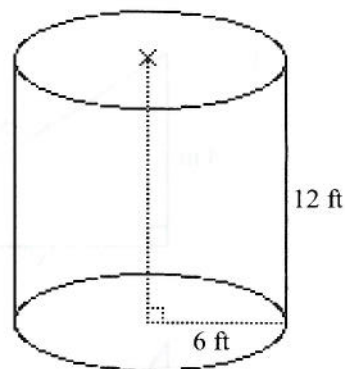
$$V = (\text{Area of Base}) \cdot (\text{Height})$$

So, the volume of a rectangular prism can be determined if we can find the area of the base and the perpendicular height of the figure.

Exercises: Find the volume of the following figures: Note: Use $\pi = 3.14$
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1.

4 m   12 m   8 m

2.

12 ft   6 ft

3.

20 in   10 in   10 in

4.

18 ft   9 ft   9 ft   8 ft   8 ft
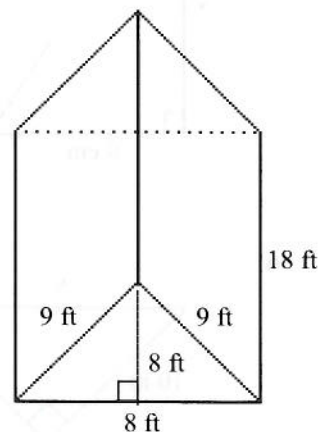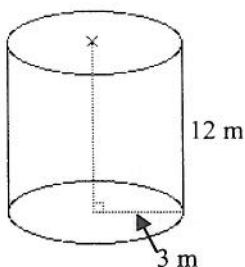
Surface Area

Hints/Guide:

To determine the surface area of an object, we must find the areas of each surface and add them together. For a rectangular prism, we find the area of each rectangle and then add them together. For a cylinder, we find the area of each base and then add the area of the rectangle (the circumference of the circular base times the height) which wraps around to create the sides of the cylinder. For example:

The area of each base is $A = \pi r^2 = 3.14 \cdot 3 \cdot 3 = 28.26$ m²
and the area of the cylinder "wrap" is
$A = 2\pi rh$ (which is the circumference of the circle
times the height of the cylinder)
$= 2 \cdot 3.14 \cdot 3 \cdot 12$
$= 226.08$
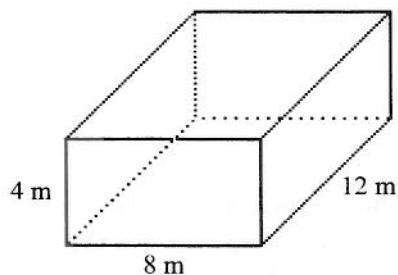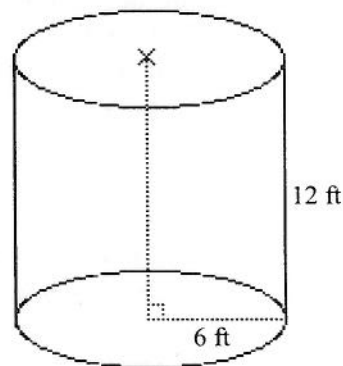So the surface area is $28.26 + 28.26 + 226.08 = 282.6$ m²

12 m

3 m

Exercises: Determine the surface area of the following figures:
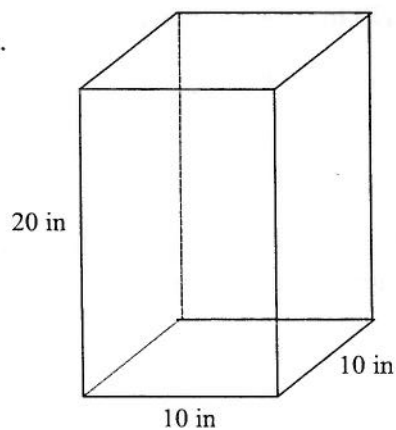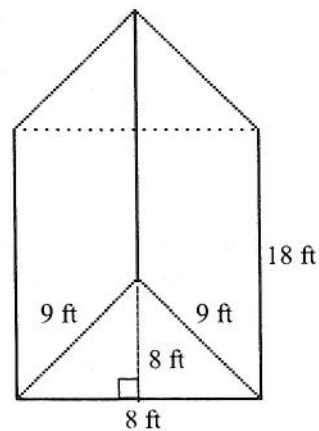SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1.

4 m   12 m

8 m

2.

12 ft

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3.

20 in

10 in

10 in

4.

18 ft

9 ft   9 ft

8 ft

8 ft

Problem Solving

Exercises: Solve each problem.

SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. The Acme Supply Store sells a security system for $2150.00 excluding tax. They sold 12 systems. If the total profit on these sales was $4824.36, how much did each system cost Acme Supply? Show your work.

2. Kristen is paid $5.60 per hour. She works 6 hours on Saturday, 3 hours on Sunday, and 5 hours on Monday. On Saturday her hourly rate in $1\frac{1}{2}$ times her regular rate and she is paid twice the regular rate on Sunday. How much did she earn in all? Show all work.

3. At the beginning of the week the value of a stock was 32½. On Monday it fell ½, on Tuesday it rose 1½, on Wednesday it rose 3, on Thursday it fell 2, and on Friday it rose 2½. What was the value of the stock at the end of the week? Show all work.

4. Norma is paid $4.80 per hour. She worked 3½ hours on Friday, 4 hours on Saturday, and 2½ hours on Sunday. On Saturday, her hourly rate was 1½ times her regular pay and on Sunday, it was twice the regular rate. How much did she earn in all? Show all work.

5. The formula which converts Fahrenheit degrees (F) to Celsius degrees (C) is:
$C = \frac{5}{9}$ (F - 32). How many degrees Celsius is 113 F?

6. The formula for the perimeter of a rectangle is P = 2(1 + w). If the length is 8 inches and the width is 7 inches, determine the perimeter of the rectangle.