

Name: _____

2108-2019 (entering) Grade 8 Algebra Summer Math Packet

Dear Students and Parents:

The purpose of this packet is to review 7th grade concepts as you look forward to 8th Grade. All concepts in this packet have been previously covered in 7th grade. Please use this summer to assure all prerequisite concepts have been understood. This packet will be collected and graded on completed and accuracy on Thursday, September 27th. Students will have an opportunity to come ask questions during the first three weeks of school. Show all your work for each problem.

Have a wonderful summer!

Simplify each expression. Be sure to show your work.

Use the order of operations to evaluate numerical expressions.

1. Do all operations within grouping symbols first.
2. Evaluate all powers before other operations.
3. Multiply and divide in order from left to right.
4. Add and subtract in order from left to right.

Example 1: Evaluate $14 + 3(7 - 2) - 2 \cdot 5$

$$\begin{aligned}
 &14 + 3(7 - 2) - 2 \cdot 5 \\
 &= 14 + 3(5) - 2 \cdot 5 && \text{Subtract first since } 7 - 2 \text{ is in parentheses} \\
 &= 14 + 15 - 2 \cdot 5 && \text{Multiply left to right, } 3 \cdot 5 = 15 \\
 &= 14 + 15 - 10 && \text{Multiply left to right, } 2 \cdot 5 = 10 \\
 &= 29 - 10 && \text{Add left to right, } 14 + 15 = 29 \\
 &= 19 && \text{Subtract 10 from 29}
 \end{aligned}$$

Example 2: $8 + (1 + 5)^2 \div 4$

$$\begin{aligned}
 &8 + (1 + 5)^2 \div 4 \\
 &= 8 + (6)^2 \div 4 && \text{Add first since } 1 + 5 \text{ is in parentheses} \\
 &= 8 + 36 \div 4 && \text{Find the value of } 6^2 \\
 &= 8 + 9 && \text{Divide 36 by 4} \\
 &= 17 && \text{Add 8 and 9}
 \end{aligned}$$

<p>1) $-8 - (-3) - (-2)$</p> $ \begin{aligned} &-8 + 3 + 2 \\ &= -5 + 2 \\ &= -3 \end{aligned} $	<p>2) $-5^2 - (12 + 2 \cdot 3)$</p> $ \begin{aligned} &-5^2 - (12 + 6) \\ &= -25 - 18 \\ &= -43 \end{aligned} $	<p>3) $7 - (-2)^3 \div 4$</p> $ \begin{aligned} &7 - (-8) \div 4 \\ &7 - (-2) = 9 \end{aligned} $
<p>4) $\frac{2}{5} \cdot 2\frac{4}{5} \div \frac{7}{8}$</p> $ \begin{aligned} &\frac{2}{5} \cdot \frac{14}{5} \cdot \frac{8}{7} \\ &= \frac{32}{25} \end{aligned} $	<p>5) $(5 - 5)^2 + 12 \div -3$</p> $ \begin{aligned} &0^2 + 12 \div -3 \\ &0 + 12 \div -3 \\ &0 + -4 = -4 \end{aligned} $	<p>6) $-4 \cdot 8\frac{2}{9} \div \frac{4}{3}$</p> $ \begin{aligned} &-4 \cdot \frac{74}{9} \cdot \frac{3}{4} \\ &= -74 \cdot \frac{1}{3} \\ &= -\frac{74}{3} \end{aligned} $

Solve each equation. Be sure to show your work. Leave all answers as simplified fractions.

<p>7) $\frac{1}{4}d + 2 = 3$ $\frac{1}{4}d - 2 = 3 - 2$ $\frac{1}{4}d = 1 \cdot \frac{4}{1}$ $d = 4$</p>	<p>8) $\frac{2a}{7} = \frac{2}{3}$ $\frac{14}{6} = \frac{6a}{6}$ $\frac{7}{3} = a$</p>	<p>9) $4(x - 15) + 2 = x + 13$ $4x - 60 + 2 = x + 13$ $4x - 58 = x + 13$ $-x -x$ $3x - 58 = 13$ $+58 +58$ $\frac{3x}{3} = \frac{71}{3} \quad \boxed{x = \frac{71}{3}}$</p>
<p>10) $\frac{y}{12} - 5 = 11$ $\frac{y}{12} + 5 = 11 + 5$ $12 \cdot \frac{y}{12} = 16 \cdot 12$ $y = 192$</p>	<p>11) $3.2x + 2.6 = -23$ $-2.6 - 2.6$ $3.2x = -25.6$ $x = -8$ $3.2 \overline{) 25.6}$ $\underline{-25.6}$ 0</p>	<p>12) $\frac{4x}{6} = \frac{5}{4}$ $-30 = 16x$ $-16 -16$ $\frac{-15}{8} = x$</p>
<p>13) $6(5x - \frac{2}{3}) = \frac{1}{2}$ $30x - 4 = 3$ $+4 +4$ $30x = 7$ $\frac{30x}{30} = \frac{7}{30}$ $x = \frac{7}{30}$</p>	<p>14) $-2(x - 3) = 8x + 48$ $-2x + 6 = 8x + 48$ $+2x +2x$ $6 = 10x + 48$ $-48 -48$ $-42 = 10x$ $\frac{-42}{10} = \frac{10x}{10} \quad \boxed{x = -\frac{21}{5}}$</p>	<p>15) $12 + 3(8 - 4x) = 14 + 2x$ $12 + 24 - 12x = 14 + 2x$ $36 - 12x = 14 + 2x$ $+12x +12x$ $36 = 14 + 14x$ $-14 -14$ $22 = 14x$ $\frac{22}{14} = \frac{14x}{14} \quad \boxed{x = \frac{11}{7}}$</p>

Evaluate the following expressions using the given values for a, b, and c. Show each step!

<p>16) Evaluate $6 + 3b$ if $b = 7$ $6 + 3(7)$ $6 + 21$ 27</p>	<p>17) Evaluate $6a^2$ if $a = 4$ $6(4)^2$ $6(16)$ 96</p>	<p>18) Evaluate $5(6) - c$ if $c = -7$ $5(6) - (-7)$ $30 + 7$ 37</p>
<p>19) Evaluate $\frac{b^4}{2}$ if $b = -2$ $\frac{(-2)^4}{2} = \frac{16}{2}$ $= 8$</p>	<p>20) Evaluate $3(a)^a$ if $a = 2$ $3(2)^2$ $3 \cdot 4$ 12</p>	<p>21) Evaluate $\frac{(-a)^3}{3}$ if $a = 3$ $\frac{(-3)^3}{3}$ $\frac{-27}{3} = -9$</p>

22) Below are two student's work when solving equations. Circle the error. Then describe the mistake and correctly solve each equation.

Original Problem (Circle Error)	Describe Error	Correct Work
$5x - 3(x - 6) = 2$ $5x - 3x - 18 = 2$ $2x - 18 = 2$ $2x = 20$ $x = 10$	<p>When distributing -3, the second term should be positive (neg + neg = pos.)</p>	$5x - 3(x - 6) = 2$ $5x - 3x + 18 = 2$ $2x + 18 = 2$ $\quad -18 \quad -18$ $2x = -16$ $\frac{2x}{2} = \frac{-16}{2}$ $x = -8$
$\frac{1}{2}(2x - 10) = 4$ $2x - 10 = 2$ $2x = 12$ $x = 6$	<p>When distributing $\frac{1}{2}$ to $2x$, the product is $1x$.</p>	$\frac{1}{2}(2x - 10) = 4$ $x - 5 = 4$ $\quad +5 \quad +5$ $x = 9$

Set up an inequality to model each relation. You do not need to solve.

An inequality is a mathematical sentence that contains the symbols $<$, $>$, \leq , or \geq .

Words	Symbols
m is greater than 7.	$m > 7$
r is less than -4.	$r < -4$
t is greater than or equal to 6.	$t \geq 6$
y is less than or equal to 1.	$y \leq 1$

<p>23) Five times a number is greater than 25.</p> $5x > 25$	<p>24) The sum of a number and 6 is at least 15.</p> $x + 6 \geq 15$	<p>25) In Ohio, you can get your license when you turn 16. Write an inequality to show the age of all drivers in Ohio.</p> $x \geq 16$
<p>26) Suppose a DVD costs \$19 and a CD costs \$14. Write an inequality to find how many CDs you can buy along with one DVD if you have \$65 to spend.</p> $19x + 14(1) \leq 65$ $19x + 14 \leq 65$	<p>27) Five dollars less than two times Chris' pay is at most \$124.</p> $2x - 5 = 124$ $2x - 5 \leq 124$	<p>28) 24 divided by some number is less than 7.</p> $\frac{24}{x} < 7$

Find the slope of each relation

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1} \text{ or } \frac{\text{change in } y}{\text{change in } x} \text{ or } \frac{\text{rise}}{\text{run}}$$

29) $(-1, 2)$ and $(-5, 10)$

$$\begin{array}{c|c} x & y \\ \hline -1 & 2 \\ -5 & 10 \end{array}$$

$$m = \frac{8}{-4}$$

$$m = -2$$

30)

x	y
-2	-8
-1	-5
0	-2

$$m = \frac{3}{1} \quad m = 3$$

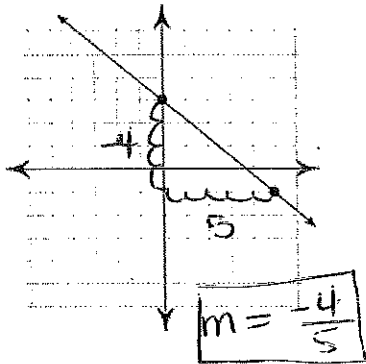
31) $(-7, 10)$ and $(1, 10)$

$$\begin{array}{c|c} x & y \\ \hline -7 & 10 \\ 1 & 10 \end{array}$$

$$m = \frac{0}{8}$$

$$m = 0$$

32)



33) $(3, 5)$ and $(-2, 6)$

$$\begin{array}{c|c} x & y \\ \hline 3 & 5 \\ -2 & 6 \end{array}$$

$$m = -\frac{1}{5}$$

34)

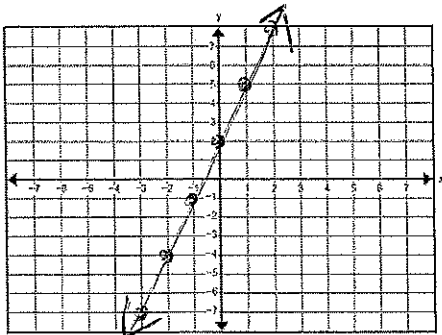
x	5	10	15
y	23	43	63

$$m = \frac{20}{5}$$

$$m = 4$$

Graph each line below on the provided coordinate plane

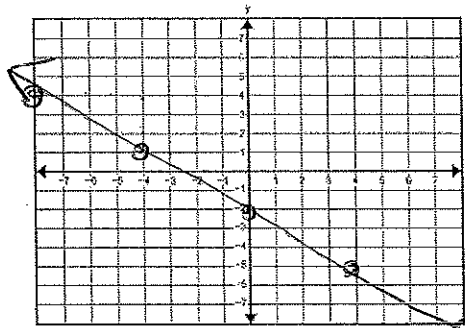
35) $y = 3x + 2$



$$m = 3$$

$$b = 2$$

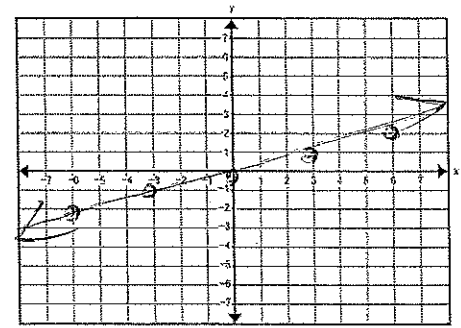
36) $y = -\frac{3}{4}x - 2$



$$m = -\frac{3}{4}$$

$$b = -2$$

37) $y = \frac{1}{3}x$



$$m = \frac{1}{3}$$

$$b = 0$$

Writing Linear Equations:

38) Write the equation of the line that has the same y-intercept as $y = \frac{1}{2}x - 2$, and has a slope of 5 .

$$y = 5x - 2$$

39) Write the equation of a line that goes through the points (4, 5) and (0, 8).

$$\begin{array}{c|c} x & y \\ \hline 4 & 5 \\ 0 & 8 \end{array} \quad m = \frac{-3}{4}$$

$$y = \frac{-3}{4}x + 8$$

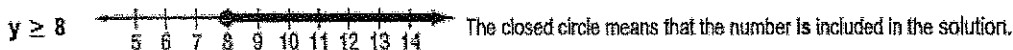
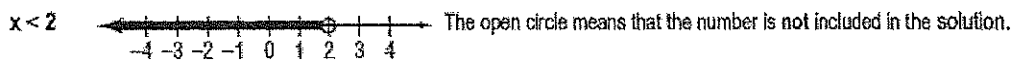
40) Write the equation of a line that goes through the points (0, 4) and (-2, -4)

$$\begin{array}{c|c} x & y \\ \hline 0 & 4 \\ -2 & -4 \end{array} \quad m = \frac{-8}{-2} = 4$$

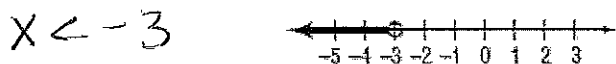
$$y = 4x + 4$$

Graphing Inequalities:

Examples: Graph each inequality on a number line.



41) Write an inequality for the given graph:



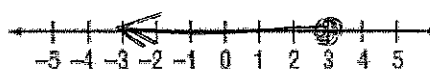
42) Write an inequality for the given graph:



43) Graph the inequality: $x > -1$

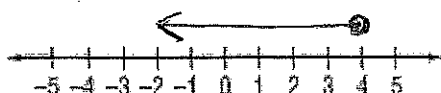


44) Graph the inequality: $x \leq 3$



45) Solve the inequality, then graph it on the number line.

$$\begin{aligned} y + 9 &\leq 13 \\ -9 &-9 \\ y &\leq 4 \end{aligned}$$



46) Solve the inequality, then graph it on the number line.

$$\begin{aligned} 4x - 6 &> -10 \\ +6 &+6 \\ 4x &> -4 \\ \frac{4x}{4} &> \frac{-4}{4} \\ x &> -1 \end{aligned}$$



47) Match a table (A–D) with a graph (E–H) and an equation (I–L). List your results below in four groups. For example, on the line for group 1 you should put 3 letters, one for a table, one for a graph and one for an equation which all represent the same linear pattern.

Group 1	Group 2	Group 3	Group 4
Table: <u>A</u>	Table: <u>B</u>	Table: <u>C</u>	Table: <u>D</u>
Graph: <u>F</u>	Graph: <u>H</u>	Graph: <u>G</u>	Graph: <u>E</u>
Equation: <u>K</u>	Equation: <u>M</u>	Equation: <u>J</u>	Equation: <u>L</u>

A.

x	y
-2	-5
-1	-3
0	-1
1	1
2	3

$m=2, b=-1$

B.

x	y
-2	3
-1	2
0	1
1	0
2	-1

$m=-1, b=1$

C.

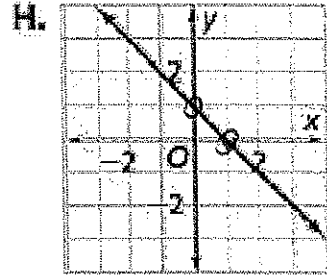
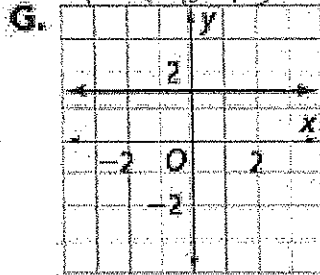
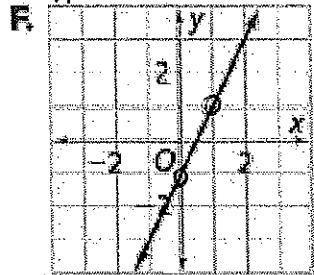
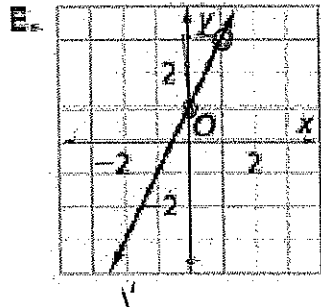
x	y
-2	1.5
-1	1.5
0	1.5
1	1.5
2	1.5

$m=0, b=1.5$

D.

x	y
-2	-3
-1	-1
0	1
1	3
2	5

$m=2, b=1$



J. $y = 1.5$

K. $y = 2x - 1$

L. $y = 2x + 1$

M. $y = -x + 1$

48) Complete the table below:

Expression	$x = 4$	$x = -3$
$3x + 1$	$3(4) + 1 \rightarrow 12 + 1 \rightarrow (13)$	$3(-3) + 1 \rightarrow -9 + 1 \rightarrow (-8)$
x^2	$(4)^2 \rightarrow (4)(4) \rightarrow (16)$	$(-3)^2 \rightarrow (-3)(-3) \rightarrow (9)$
$-x$	$-(4) \rightarrow (-4)$	$-(-3) \rightarrow (3)$
$2x + 6$	$2(4) + 6 \rightarrow 8 + 6 \rightarrow (14)$	$2(-3) + 6 \rightarrow -6 + 6 \rightarrow (0)$

Word Problems

49) A box of cereal has a volume of 384 cubic inches. If the width of the box is 4 inches and the length is 8 inches, what is the height of the box?

$$\begin{array}{l}
 V = Bh \\
 \downarrow \\
 V = lwh \\
 \\
 V = 384 \\
 W = 4 \\
 l = 8 \\
 h = ? \\
 \\
 384 = 8 \cdot 4 \cdot h \\
 \frac{384}{32} = \frac{32h}{32} \quad h = 12 \\
 \underline{12} \text{ inches}
 \end{array}$$

50) 2 more than 3 times a number x is equal to 17. Set up an equation to model this situation. Then solve for x .

$$\begin{array}{l}
 \downarrow \text{ addition} \quad \downarrow \text{ multiplication} \\
 2 + 3x = 17 \\
 \\
 2 + 3x = 17 \\
 -2 \quad -2 \\
 \hline
 3x = 15 \\
 \frac{3x}{3} = \frac{15}{3} \\
 x = 5 \\
 \\
 \text{Equation: } \underline{2 + 3x = 17} \\
 x = \underline{5}
 \end{array}$$

51) Tatenda has a chocolate chip cookie recipe that uses 2 cups of sugar for 6 dozen cookies. How much sugar will he need if he only wants to make 36 cookies?

$$\begin{array}{l}
 2 \text{ cups} : 6 \text{ doz} \rightarrow \boxed{1 \text{ cup} : 3 \text{ doz}} \text{ or } \frac{2}{6} = \frac{x}{3} \\
 ? \text{ cups} : 36 \text{ cookies} \rightarrow 3 \text{ dozen} \\
 \\
 \frac{2}{6} = \frac{x}{3} \\
 \frac{2}{6} = \frac{6x}{6} \quad x = 1 \\
 \underline{1} \text{ cup(s) of sugar}
 \end{array}$$

52) A building 50 ft high casts a 75 ft shadow. Sarah casts a 6-ft shadow. The triangle formed by the building and its shadow is similar to the triangle formed by Sarah and her shadow. How tall is Sarah? let x = Sarah's height

$$\begin{array}{l}
 \frac{x}{6} = \frac{50}{75} \\
 \frac{x}{6} = \frac{2}{3} \rightarrow \frac{3x}{3} = \frac{12}{3} \quad x = 4 \\
 \underline{4} \text{ feet}
 \end{array}$$

53) One can of Mountain Dew costs \$1.25 in a vending machine. A 12-pack of Mountain Dew costs \$10.99 at the grocery store. How much money would you save by purchasing a dozen cans of Mountain Dew at the grocery store instead of a dozen at the vending machine?

$$\begin{array}{l}
 1 \text{ MD} \rightarrow \$1.25 \\
 12 \text{ pk of MD} \rightarrow 10.99 \\
 \\
 \begin{array}{r}
 \$1.25 \\
 \times 12 \\
 \hline
 250 \\
 1250 \\
 \hline
 15.00 \\
 \text{(for 12 cans in vending machine)}
 \end{array} \\
 \\
 \begin{array}{r}
 49.10 \\
 15.00 \\
 - 10.99 \\
 \hline
 4.01
 \end{array} \\
 \\
 \$ \underline{4.01}
 \end{array}$$

54) Which size Dairy Queen Blizzard gives you the best price per ounce? Show your work and explain.

- Small 6 oz. cup for \$2.49
- Medium 10 oz. cup for \$3.49
- Large 16 oz. cup for \$4.99
- Super Size 24 oz. cup for \$7.69

$$\text{Sm: } \frac{\$2.49}{6 \text{ oz}} = 42¢/\text{oz}$$

$$\text{Med: } \frac{\$3.49}{10 \text{ oz}} = 35¢/\text{oz}$$

$$\text{Lg: } \frac{\$4.99}{16 \text{ oz}} = 31¢ \quad \text{SS: } \frac{\$7.69}{24} = 32¢/\text{oz}$$

The best price per ounce is the large blizzard.

55) Samantha and four friends are going to dinner. The bill is \$60. If they plan to leave a 15% tip on the bill, how much will each person have to pay?

Let $x = \text{tip}$

$$\frac{x}{60} = \frac{15}{100} \rightarrow \frac{20x}{20} = \frac{150}{20}$$

$$x = 9$$

(\$9 tip)

Total Bill: $60 + 9 = \$69$

5 people paying: $\frac{69}{5} = 13.80$

\$ 13.80 per person

56) A real estate agent receives a 3% commission for selling a house. Find the commission that the agent earned for selling 3 houses, each for \$131,000.

Let $x = \text{commission}$

$$\frac{x}{393,000} = \frac{3}{100}$$

$$100x = 1179000$$

$$x = 11,790$$

$$\begin{array}{r} 131,000 \\ \times 3 \\ \hline 393,000 \end{array} \text{ (Total for 3 sales)}$$

\$ 11,790

57) Sam has \$25 in his savings account. He needs \$200 to buy a new bicycle. He plans to deposit \$12.50 per week into the account until he has enough money to buy the bicycle. How many weeks will it take him to reach the necessary amount? Let $w = \# \text{ of weeks}$

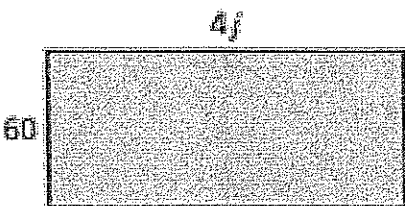
$$\begin{array}{r} 25 + 12.50w = 200 \\ -25 \quad \quad -25 \\ \hline 12.50w = 175 \end{array}$$

$$\frac{12.50w}{12.50} = \frac{175}{12.50}$$

$$w = 14$$

14 weeks

58) The perimeter of the rectangle is 400 inches. What is the value of j ? (Hint: $P = L + W + L + W$) Try solving by setting up an equation!



$$P = L + W + L + W$$

$$400 = 4j + 60 + 4j + 60$$

$$\begin{array}{r} 400 = 8j + 120 \\ -120 \quad -120 \\ \hline 280 = 8j \end{array}$$

$$\frac{280}{8} = \frac{70}{2} = 35$$

$$\frac{280}{8} = \frac{8j}{8}$$

$$35 = j$$

$j = 35$

59) Bob has sketched an equilateral triangle. The sum of the lengths of the sides is 10.5. What is the length of each side of Bob's triangle? Explain your reasoning. Try solving by setting up an equation!

let x = value of each side



$$\begin{aligned}
 P &= 10.5 \\
 10.5 &= x + x + x \\
 10.5 &= \frac{3x}{3} \quad x = 3.5
 \end{aligned}$$

Each side is 3.5 inches

60) You set up a lemonade stand. You are selling each cup for \$0.50. Your profit is equal to your revenue (money earned) from lemonade sales minus your cost to operate the stand. Your cost to operate is \$8. How many cups of lemonade must you sell to earn a profit of \$30? Try solving by setting up an equation!

Profit = Revenue - Costs let x = # of cups

$$\begin{array}{r}
 30 = 0.50x - 8 \\
 + 8 \qquad + 8
 \end{array}$$

$$\begin{array}{r}
 38 = 0.50x \\
 0.50 \quad 0.50 \qquad x = 76
 \end{array}$$

76 cups of lemonades

61) Rewrite these numbers in order from least to greatest.

$-\frac{5}{4}$	$-2\frac{1}{4}$	$-\frac{1}{3}$	$-\frac{13}{3}$	Least to Greatest:	<u>$-\frac{13}{3}$</u>	<u>$-2\frac{1}{4}$</u>	<u>$-\frac{5}{4}$</u>	<u>$-\frac{1}{3}$</u>
$-\frac{5}{4}$	$-\frac{9}{4}$	$-\frac{1}{3}$	$-\frac{13}{3}$					
$-\frac{15}{12}$	$-\frac{27}{12}$	$-\frac{4}{12}$	$-\frac{52}{12}$					

62) A quiche recipe calls for $2\frac{3}{4}$ cups of grated cheese. A recipe for quesadillas requires $1\frac{1}{3}$ cups of grated cheese. What is the total amount of grated cheese needed for both recipes?

sum

$$2\frac{3}{4} + 1\frac{1}{3}$$

$$\frac{11}{4} + \frac{4}{3} \rightarrow \frac{33}{12} + \frac{16}{12} = \frac{49}{12} = 4\frac{1}{12}$$

$4\frac{1}{12}$ cups of grated cheese

63) Lois has $3\frac{1}{3}$ pounds of butter. She uses $\frac{3}{4}$ pound in a recipe. How much does she have left?

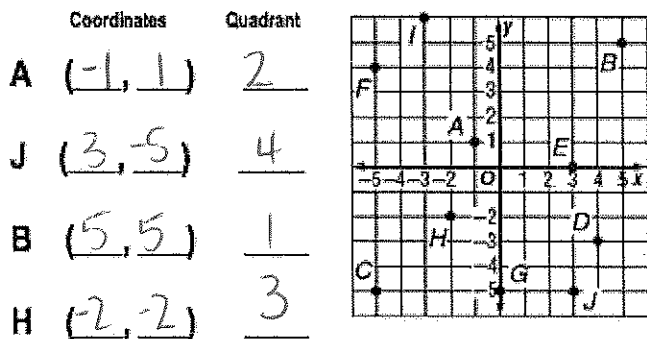
subtract

$$\begin{array}{r}
 3\frac{1}{3} - \frac{3}{4} \\
 \frac{10}{3} - \frac{3}{4} \\
 \frac{40}{12} - \frac{9}{12} = \frac{31}{12} = 2\frac{7}{12}
 \end{array}$$

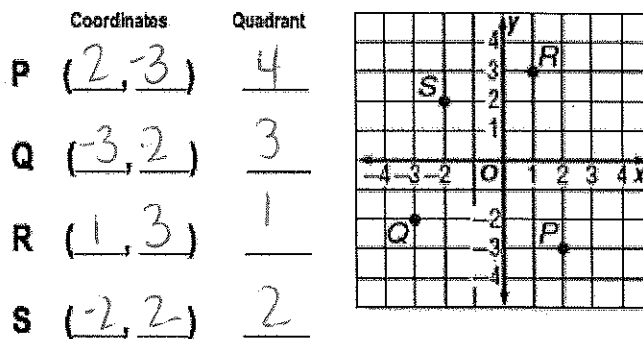
$2\frac{7}{12}$ pd of butter

Graphing Points on the Coordinate Plane:

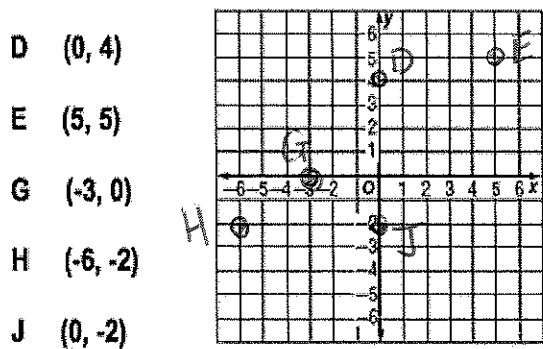
64) Name the ordered pair for each point graphed at the right. Then identify the quadrant in which each point lies.



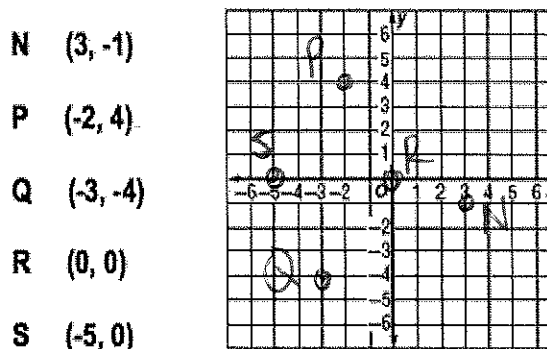
65) Name the ordered pair for each point graphed at the right. Then identify the quadrant in which each point lies.



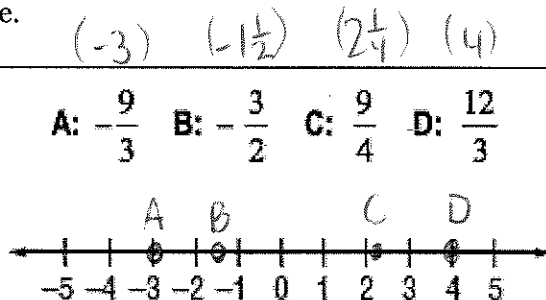
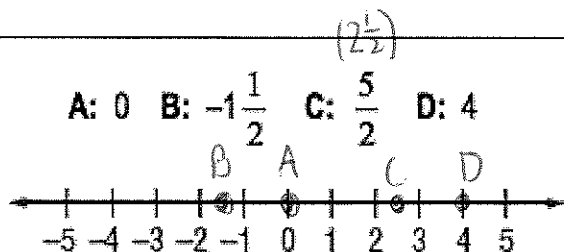
66) Graph and label each point on the coordinate plane.



67) Graph and label each point on the coordinate plane.

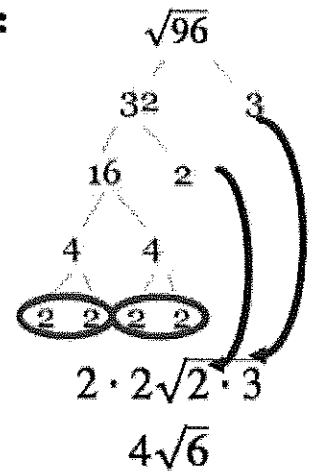


68) Graph and label the following numbers on the number line.



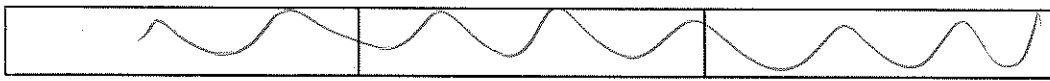
Simplifying Radicals:

Example:



Simplify each of the following radicals completely. Show all work!

<p>68) $\sqrt{60}$</p> <p>$\sqrt{60}$ OR 60 $\begin{matrix} \uparrow & \uparrow \\ 3 & 20 \\ \uparrow & \uparrow \\ 2 & 10 \\ \uparrow & \uparrow \\ 2 & 5 \end{matrix}$ $\sqrt{4 \cdot 15}$ $2\sqrt{15}$</p> <p>$2\sqrt{15}$</p>	<p>69) $2\sqrt{32}$</p> <p>$2\sqrt{32}$ OR $2\sqrt{32}$ $\begin{matrix} \uparrow & \uparrow \\ 16 & 2 \\ \uparrow & \uparrow \\ 4 & 4 \\ \uparrow & \uparrow \\ 2 & 2 \end{matrix}$ $2 \cdot 4 \cdot \sqrt{2}$ $8\sqrt{2}$</p> <p>$2 \cdot 2 \cdot 2 \cdot \sqrt{2}$ $8\sqrt{2}$</p>	<p>70) $\sqrt{81}$</p> <p>$9 \cdot 9$ Perfect Square 9</p>
<p>71) $\frac{\sqrt{144}}{\sqrt{64}}$</p> <p>$\sqrt{144} \rightarrow 12$ Perfect Squares $\sqrt{64} \rightarrow 8$ $\frac{12}{8} = \frac{3}{2}$</p>	<p>72) $\sqrt{\frac{100}{25}}$</p> <p>$\sqrt{\frac{100}{25}} = \sqrt{4} = 2$ or $\frac{\sqrt{100}}{\sqrt{25}} = \frac{10}{5} = 2$</p>	<p>73) $-2\sqrt{\frac{36}{4}}$</p> <p>$-2 \frac{\sqrt{36}}{\sqrt{4}}$ $-2 \frac{6}{2}$ $-2 \cdot 3 = -6$</p>
<p>74) $\sqrt{\frac{8}{9}}$</p> <p>$\frac{\sqrt{8}}{\sqrt{9}} = \frac{\sqrt{4 \cdot 2}}{3} = \frac{2\sqrt{2}}{3}$ $\frac{\sqrt{8}}{9} = \frac{\sqrt{4 \cdot 2}}{9} = \frac{2\sqrt{2}}{9}$ $\frac{2\sqrt{2}}{9}$</p>	<p>75) $-3\sqrt{120}$</p> <p>$-3\sqrt{120}$ OR $-3\sqrt{120}$ $\begin{matrix} \uparrow & \uparrow \\ 40 & 3 \\ \uparrow & \uparrow \\ 2 & 20 \\ \uparrow & \uparrow \\ 2 & 10 \end{matrix}$ $-3 \cdot 2 \cdot \sqrt{30}$ $-6\sqrt{30}$</p>	<p>76) $5\sqrt{90}$</p> <p>$5\sqrt{90}$ OR $5\sqrt{90}$ $\begin{matrix} \uparrow & \uparrow \\ 3 & 30 \\ \uparrow & \uparrow \\ 3 & 10 \\ \uparrow & \uparrow \\ 5 & 2 \end{matrix}$ $5 \cdot 3 \sqrt{10}$ $15\sqrt{10}$</p>



+ Alg

Pythagorean Theorem:

For each problem, show all work. Leave your answers as simplified radicals, if necessary.

77) Solve for x.

$$a^2 + b^2 = c^2$$

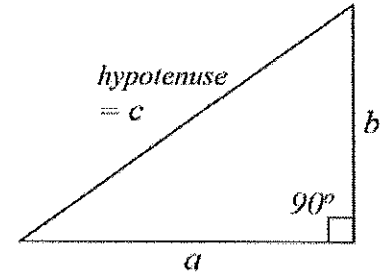
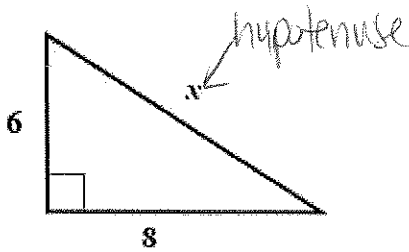
$$6^2 + 8^2 = x^2$$

$$36 + 64 = x^2$$

$$100 = x^2$$

$$\sqrt{100} = \sqrt{x^2}$$

$$\boxed{x=10}$$



$$c^2 = a^2 + b^2$$

78) Solve for y. Then find the area and perimeter of the right triangle.

$$a^2 + b^2 = c^2$$

$$y^2 + 12^2 = 13^2$$

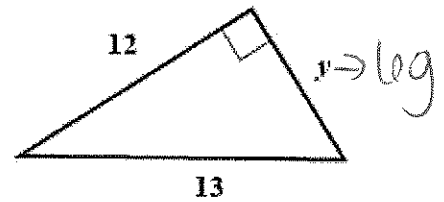
$$y^2 + 144 = 169$$

$$-144 \quad -144$$

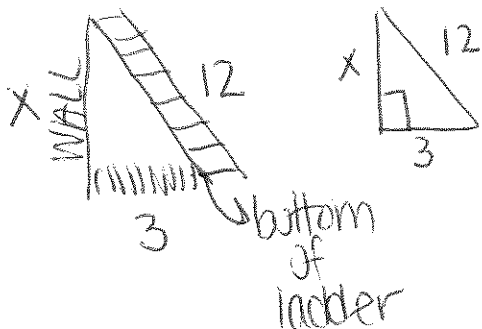
$$y^2 = 25$$

$$\sqrt{y^2} = \sqrt{25}$$

$$\boxed{y=5}$$



79) The bottom of a ladder must be placed 3 ft. from a wall. The ladder is 12 feet long. How far above the ground does the ladder touch the wall? (Hint: Draw the picture)



$$a^2 + b^2 = c^2$$

$$3^2 + x^2 = 12^2$$

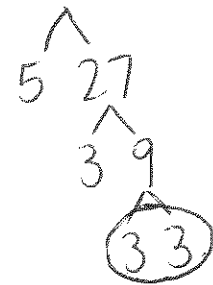
$$9 + x^2 = 144$$

$$-9 \quad -9$$

$$x^2 = 135$$

$$\sqrt{x^2} = \sqrt{135}$$

$$x = \sqrt{135} \text{ ft} = \boxed{3\sqrt{15} \text{ ft}}$$



80) The area of a square is 80 in². Find the perimeter of the square.

$$\boxed{A=80}$$

$$A = s^2$$

$$80 = s^2$$

$$\sqrt{80} = \sqrt{s^2}$$

$$s = \sqrt{80} = 4\sqrt{5} \text{ (or } \sqrt{80} = \sqrt{16 \cdot 5} = 4\sqrt{5})$$

$$P = 4s \text{ or } s+s+s+s$$

$$P = 4(4\sqrt{5}) \text{ or } 4\sqrt{5} + 4\sqrt{5} + 4\sqrt{5} + 4\sqrt{5}$$

$$= 16\sqrt{5} \text{ in} = \boxed{16\sqrt{5} \text{ in}}$$