Name _____ Date _____ Period _____

Algebra I Skills Review

These are extra practice problems that correspond to the 10 sections from the summer packet. You will be assessed on all 10 sections.

A. Order of Operations

Evaluate each expression. Write your answers on the lines provided. Show all work neatly.

a. $3 + 8|2 - 6|$

$3 + 8|-4|$
$3 + 8(4)$
$3 + 32$

35

b. $(-6)^3 \div 3 \cdot 2$

$-216 \div 3 \cdot 2$
$-72 \cdot 2$

-144

c. $2|-8 + 5|^2 + 3q^2 \text{ if } q = -9$

$2|-3|^2 + 3(-9)^2$
$2(9) + 3(81)$
$18 + 243$

261

d. $6 \div 3(2 + 1)$

$6 \div 3(3)$
$6 \div 9$

$2/3$

e. $5x^3 \text{ if } x = -2$

$5(-2)^3$
$5(-8)$

-40

f. $-[2 \cdot 5^2 \div (-3 + 8)] - 9$

$-[2 \cdot 25 \div (5)] - 9$
$-(50 \div 5) - 9$
$-(10) - 9$
$-10 - 9$

-19

g. $2p^2 + (2q)^2 \text{ if } p = 4 \text{ and } q = 3$

$2(4)^2 + (2(3))^2$
$2(16) + (6)^2$
$32 + 36$

68

h. $\dfrac{6+9 \div 3+15}{8-2}$

$\dfrac{6+3+15}{6}$
$\dfrac{9+15}{6}$
$\dfrac{24}{6}$
4

B. Real Number System

1. Classify each real number as an *integer, whole number, natural number, rational number, and/or irrational number.* State all that apply.

a. -10

Real, rational integer

b. -2.3

Real, rational

c. 0

Real, rational integer, whole

d. 18

Real, rational integer, whole natural

e. $\sqrt{5}$

Real, irrational

f. $\sqrt{9} = 3$

Real, rational integer, whole natural

2. Decide whether each statement is *sometimes, always, or never true.* Write your answers on the lines provided.

a. A natural number is rational. Always

b. An integer is natural. Sometimes

c. A number is both natural and whole. sometimes

d. An irrational number is an integer. never

e. A never-ending decimal number is rational. sometimes

C. Simplifying Algebraic Expressions

1. Simplify each expression. Multiply when indicated then combine all like terms. There should not be parenthesis in a simplified expression.

a. $8p - 13(2p - m)$

$8p - 26p + 13m$

$13m - 18p$

b. $(8r + 7)(4r - 12)$

$32r^2 - 96r + 28r - 84$

$32r^2 - 68r - 84$

c. $13s - 28t + 4t(3 - s) - st$

$13s - 28t + 12t - 4st - st$

$13s - 16t - 5st$

d. $8x^2 - 12x^2$

$-4x^2$

e. $9v^3(v^2 + vg - 2g + 8) - 3vg(4v^3g - 4vg + 1)$ (hint: remember rules of exponents here...)

$9v^5 + 9v^4g - 18v^3g + 72v^3 - 12v^4g^2 + 12v^2g^2 - 3vg$

f. $8x^4(3x^2 - xy + 3y + 7) - 6y(2x - 1)$ (hint: remember rules of exponents here...)

$24x^6 - 8x^5y + 24x^4y + 56x^4 - 12xy + 6y$

2. Write an algebraic expression for each situation. Expression, not equation. There should not be any equal signs.

a. two less than the product of a number and five

$5x - 2$

b. the product of seven and a number, totaled with nine

$7x + 9$

c. twenty more than the quotient of a number and three

$\frac{x}{3} + 20$ or $x \div 3 + 20$

d. the difference of a number and triple the number

$x - 3x$ or $-2x$

e. twice the sum of a number and four

$2(x + 4)$

Name _____ **Date** _____ **Period** _____

Algebra I Skills Review

These are extra practice problems that correspond to the 10 sections from the summer packet. You will be assessed on all 10 sections.

D. Solving Basic Equations

Solve each equation. Circle the final answer.

1. $8m - 7 = 41$

$+7 \quad +7$

$\frac{8m}{8} = \frac{48}{8}$

$m = 6$

2. $9x + 20 = -16x - 5$

$+16x \quad +16x$

$25x + 20 = -5$

$-20 \quad -20$

$\frac{25x}{25} = \frac{-25}{25}$

$x = -1$

3. $-4(x + 9) = -8x - 4$

$-4x - 36 = -8x - 4$

$+8x \quad +8x$

$4x - 36 = -4$

$+36 \quad +36$

$\frac{4x}{4} = \frac{32}{4}$

$x = 8$

4. $-2 + 5(2y - 8) = 8(-2 + 3y) - 4y$

$-2 + 10y - 40 = -16 + 24y - 4y$

$10y - 42 = 20y - 16$

$-10y \quad -10y$

$-42 = 10y - 16$

$+16 \quad +16$

$\frac{-26}{10} = \frac{10y}{10}$

$-2.6 = y$

5. $4(x - 3) = -2(3x + 1)$

$4x - 12 = -6x - 2$

$+6x \quad +6x$

$10x - 12 = -2$

$+12 \quad +12$

$\frac{10x}{10} = \frac{10}{10}$

$x = 1$

6. $\frac{3x-1}{2} = \frac{x+9}{3}$

$3(3x - 1) = 2(x + 9)$

$9x - 3 = 2x + 18$

$-2x \quad -2x$

$7x - 3 = 18$

$+3 \quad +3$

$\frac{7x}{7} = \frac{21}{7}$

$x = 3$

E. Solving & Graphing Solutions to Basic Inequalities

Solve each inequality, then illustrate the set of solutions by graphing the solution on a number line.

7. $2(q - 1) + 10 < 30$

$2q - 2 + 10 < 30$

$2q + 8 < 30$

$-8 \quad -8$

$\frac{2q}{2} < \frac{22}{2}$

$q < 11$

8. $-7k \geq -343$ *and* $-5k + 5 < 80$

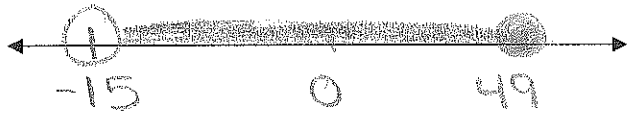
$\frac{-7k}{-7} \geq \frac{-343}{-7}$

$k \leq 49$

$-5 \quad -5$

$\frac{-5k}{-5} < \frac{75}{-5}$

$k > -15$ AND



9. $4 + 5x < x + 8 < 9x + 24$

$4 + 5x < x + 8$ AND $x + 8 < 9x + 24$

$-x \quad -x$ $\qquad$ $-x \quad -x$

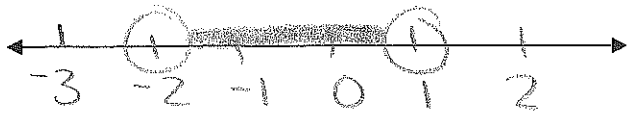
$4 + 4x < 8$ $\qquad$ $8 < 8x + 24$

$-4 \quad -4$ $\qquad$ $-24 \quad -24$

$\frac{4x}{4} < \frac{4}{4}$ $\qquad$ $\frac{-16}{8} < \frac{8x}{8}$

$x < 1$ $\qquad$ $-2 < x$

AND $\quad x > -2$



10. $12 \geq x - 3 \leq 4x$

$12 \geq x - 3$ AND $x - 3 \leq 4x$

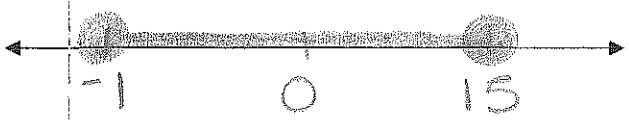
$+3 \quad +3$ $\qquad$ $-x \quad -x$

$15 \geq x$ $\qquad$ $-3 \leq 3x$

$\frac{-3}{3} \leq \frac{3x}{3}$

$-1 \leq x$

$x \leq 15$ AND $x \geq -1$



11. $-6(3x + 1) < 30$ *or* $-8(2x + 10) \geq 4x$

$-18x - 6 < 30$ $\quad +6 \quad +6$

$\frac{-18x}{-18} < \frac{36}{-18}$

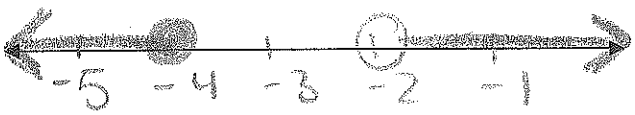
$x > -2$

$-16x - 80 \geq 4x$ $\quad +16x \quad +16x$

$\frac{-80}{20} \geq \frac{20x}{20}$

$-4 \geq x$

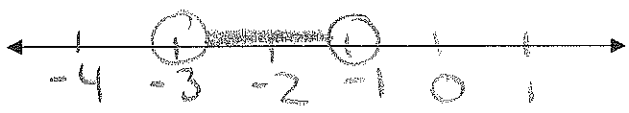
OR $\quad x \leq -4$



12. $18 < -8p - 10p < 54$

$\frac{18}{-18} < \frac{-18p}{-18} < \frac{54}{-18}$

$-1 > p > -3$



13. $-7(5g - 2) + 2 > -5g - 7(g + 1)$

$-35g + 14 + 2 > -5g - 7g - 7$

$-35g + 16 > -12g - 7$ $\quad +12g$

$+12g$

$-23g + 16 > -7$ $\quad -16 \quad -16$

$\frac{-23g}{-23} > \frac{-23}{-23}$

$g < 1$

14. $6 + 2w \leq -2(w + 5)$ *or* $-3(w - 2) < 12$

$6 + 2w \leq -2w - 10$ OR $-3w + 6 < 12$

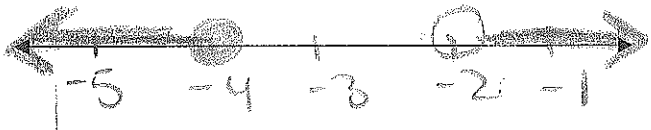
$+2w \quad +2w$ $\quad -6 \quad -6$

$6 + 4w \leq -10$ $\quad \frac{-3w}{-3} < \frac{6}{-3}$

$-6 \quad -6$

$\frac{4w}{4} \leq \frac{-16}{4}$ $\quad w > -2$

$w \leq -4$ OR



15. Rewrite the inequality so that the variable y is isolated: $\frac{1}{2}x - 4y > -128$.

$-\frac{1}{2}x \quad -\frac{1}{2}x$

$-4y > -\frac{1}{2}x - 128$

$\frac{-4y}{-4} > \frac{-\frac{1}{2}x}{-4} - \frac{128}{-4}$

$y < \frac{1}{8}x + 32$

F. Solving Basic Word Problems

16. In an animal shelter, there are 10 more dogs than cats and half as many birds as there are cats. The animal shelter has a total of 25 animals (only dogs, cats and birds). Determine how many of each animal are at the shelter. Circle the final answer.

Birds	$\frac{1}{2}x$
Cats	x
Dogs	$x+10$

$\frac{1}{2}x + x + x + 10 = 25$

$2.5x + 10 = 25$

$-10 \quad -10$

$\frac{2.5x}{2.5} = \frac{15}{2.5}$

$x = 6$

Birds = 3
Cats = 6
Dogs = 16
Answer

17. A rectangular pool is going to be built in such a way that the width is twelve feet less than double the length, and the length is no less than five feet. The pool will must have a perimeter less than 96 feet. Determine the range of possible lengths for the pool. Express your answer as a compound inequality, and explain the inequality via a short sentence.

length	x
width	$2x-12$

$2(x) + 2(2x-12) < 96$

$2x + 4x - 24 < 96$

$6x - 24 < 96$

$+24 \quad +24$

$\frac{6x}{6} < \frac{120}{6}$

$x < 20$ ft

Compound inequality for length:

$5 < x < 20$

Ans:

18. You are planning on making a donation to your favorite charity. Your friend tells you that he/she will add an additional 40% to your donation! How much should you donate in order that the charity will receive at least $100? Circle the final answer.

You	x
Your friend	$.4x$

$x + .4x \geq 100$

$\frac{1.4x}{1.4} \geq \frac{100}{1.4}$

$x \geq \$71.43$

19. Adam is two years younger than Joanna. Joanna is three years older than double Katie's age. The sum of Adam, Joanna, and Katie's ages is 59. How old is Adam? Circle the final answer.

Adam	$2x+3-2$
Joanna	$2x+3$
Katie	x

$x + 2x + 3 + 2x + 3 - 2 = 59$

$5x + 4 = 59$

$-4 \quad -4$

$\frac{5x}{5} = \frac{55}{5}$

$x = 11$

Adam is 23

G. Fraction Operations

1. Complete the operations indicated.

a. $\frac{5}{8}+\frac{2}{5}-\frac{1}{2}$

$\frac{25}{40}+\frac{16}{40}-\frac{20}{40}$

$\boxed{\frac{21}{40}}$

b. $2\frac{2}{3}-\frac{1}{4}$

$\frac{8}{3}-\frac{1}{4}$

$\frac{32}{12}-\frac{3}{12}$

$\boxed{\frac{29}{12}}$

c. $\frac{1}{8}\cdot\frac{7}{9}\cdot\frac{1}{2}=\frac{21}{144}=\boxed{\frac{7}{48}}$

d. $8\frac{1}{3}\cdot\frac{2}{3}$

$\frac{25}{3}\cdot\frac{2}{3}=\boxed{\frac{50}{9}}$

e. $\dfrac{\frac{1}{8}\div 4}{\frac{3}{2}}$

$\frac{1}{8}\cdot\frac{1}{4}=\dfrac{\frac{1}{32}}{\frac{3}{2}}$

$\frac{1}{32}\cdot\frac{2}{3}=\frac{2}{96}$

$=\boxed{\frac{1}{48}}$

f. $\frac{7}{3}\div 2\frac{1}{4}$

$\frac{7}{3}\div\frac{9}{4}$

$\frac{7}{3}\cdot\frac{4}{9}=\boxed{\frac{28}{27}}$

2. Solve each problem. Show all work.

a. Your goal is to complete 5½ miles of cardio at the gym today. If you ran for 1¾ of a mile, cycled for two-thirds of a mile, and used the elliptical for seven-tenths of a mile, how many more miles of cardio should you complete to reach your goal?

make easier

$1\frac{3}{4} + \frac{2}{3} + \frac{7}{10} + x = 5\frac{1}{2}$

$\frac{7}{4} + \frac{2}{3} + \frac{7}{10} + x = \frac{11}{2}$

$\frac{105}{60} + \frac{40}{60} + \frac{42}{60} + x = \frac{330}{60}$

$\frac{187}{60} + x = \frac{330}{60}$

$-\frac{187}{60} \quad -\frac{187}{60}$

$\frac{143}{60}$

Ans: $2\frac{23}{60}$ miles

b. Joe runs four-fifths of a mile every 10 minutes! How far can Joe run in an hour, assuming he maintains a steady pace? Round to the nearest tenth.

$\frac{4}{5}(6) = \frac{24}{5}$

4.8 miles

c. You are baking rice crispy treats for your friend's birthday. The recipe calls for 3¼ cups of marshmallows. If you need to make two and a half batches, how many cups of marshmallows will you need?

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

$\frac{13}{4} \cdot \frac{5}{2} = \frac{65}{8}$ $\quad 8\frac{1}{8}$ cups

d. Considering the situation from part c, each bag of marshmallows contains 5 cups. If each bag costs $1.49 and there is no tax, *how much money should you expect to spend on marshmallows*? *What amount of marshmallows will be left over* for you to enjoy while you are watching tonight's episode of America's Got Talent?

* You will need 2 bags.

* 1.49

× 2

$2.98

* $10 - 8\frac{1}{8}$

$10 - \frac{65}{8}$

$\frac{80}{8} - \frac{65}{8} = \frac{15}{8} = 1\frac{7}{8}$ cups

e. A recipe for 32 pancakes calls for 3½ cups of flour. You only want to make 24 pancakes. How much flour should you use? Give your answer as a fraction.

$\frac{3.5}{32} = \frac{x}{24}$ $\quad \frac{32x}{32} = \frac{84}{32}$ $\quad x = 2\frac{20}{32}$

$= 2\frac{5}{8}$ cups

H. Graphing Linear Functions

Use the given information to solve the problems.

Slope Formula: $\frac{y_2 - y_1}{x_2 - x_1}$

1. What is the slope between the points (-2, 7) and (-3, -8)?

x_1, y_1 x_2, y_2

$\frac{-8-7}{-3-(-2)} = \frac{-15}{-1} = 15$

2. What is the slope between the points (-4,-6) and (1,-4)?

x_1, y_1 x_2, y_2

$\frac{-4-(-6)}{1-(-4)} = \frac{2}{5}$

What is the slope of each line?

3. $y = 3x + 12$ Slope: 3

4. $\frac{7y}{7} = \frac{9}{7} - \frac{3x}{7}$ Slope: $-\frac{3}{7}$

$y = -\frac{3x}{7} + \frac{9}{7}$

5. $-3x = y + 2$

$-2 \quad -2$

$-3x - 2 = y$

Slope: -3

6. $x = 9$ Slope: Undefined

7. $y = -14$ Slope: Zero

H.O.Y → y =

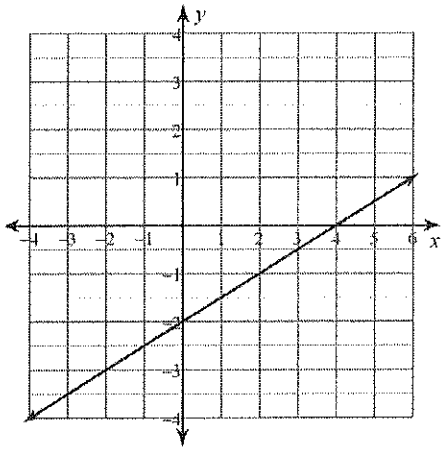
zero Slope → horizontal Line

V.U.X → x =

undefined Slope → vertical line

Name the x-intercept and y-intercept of each line. You should write as an ordered pair.

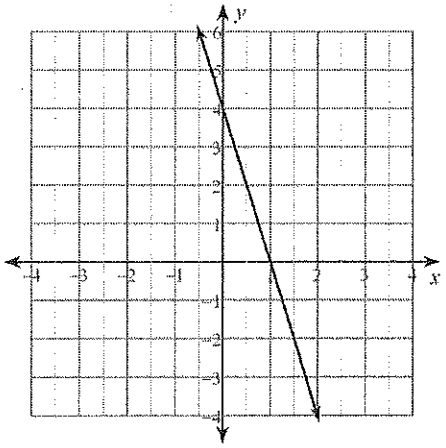
8.



x-intercept: (4,0)

y-intercept: (0,-2)

9.



x-intercept: (1,0)

y-intercept: (0,4)

10. A line is given by the equation y = -½x - 5. What is the slope of the ***perpendicular*** line?

opposite, reciprocal slope

2

11. A line is given by the equation y = -9x -3. What is the slope of the ***parallel*** line?

-9

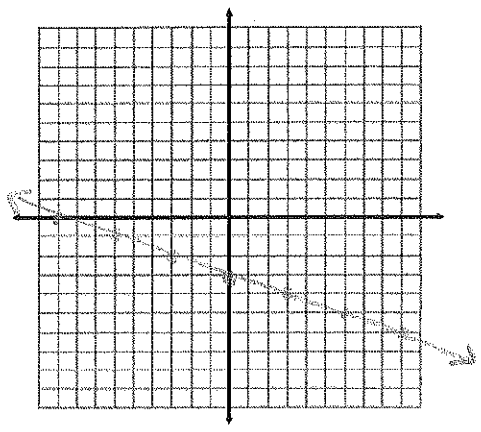
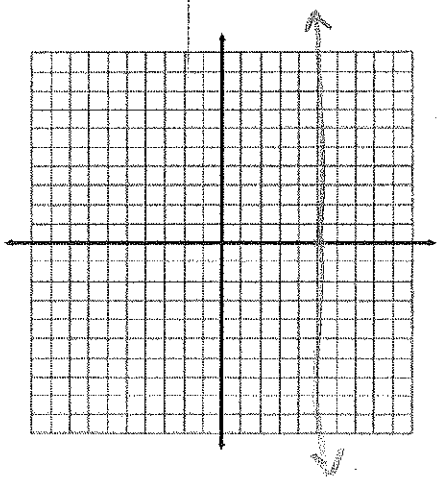
Same slope

Graph each line.

12. $3y = -x - 9$

$\frac{3y}{3} = \frac{-x}{3} - \frac{9}{3}$

$y = -\frac{1}{3}x - 3$



13. x = 5