Welcome to 8th grade mathematics! The class you are scheduled for next year will be the beginning of Algebra. To help prepare you for a great beginning to eighth grade, some review work over the summer is being required**.** Work on these activities and bring them to school with you in the fall.

The following skills should be **mastered** to be successful in 8th grade math:

1. Operations with rational numbers (add, subtract, multiply and divide whole numbers, fractions, decimals and integers) **WITHOUT a calculator.**

2. Order of operations – use inverted pyramid style to show work to solve.

3. Proportions – be able to set up a proportion, find the scale factor and solve.

4. Areas of circles, rectangles and triangles – know these formulas and be able to find the areas of these figures.

5. Plotting points on a coordinate graph

6. Plotting a linear table of points on a coordinate graph (make sure you can identify the independent (x) and dependent (y) variables.

7. Write a $y=mx+b$ equation from a table or word scenario.

The following worksheets will help review the above skills. Make sure you **READ and FOLLOW ALL DIRECTIONS and SHOW ALL YOUR WORK.** You may write and do everything on the packet. All of the above concepts have been taught in 6th and 7th grade math. Refer to your 7th grade math binder to help refresh your memory on these concepts. There are notes and examples (the first 5 pages) included in the packet to help you remember how to do some skills. Another resource you can use is Kahn Academy by using the website: www.kahnacademy.com. You can use your school email to register to use this site for free. Please make sure your work is organized so that you will be able to grade and correct it. Bring this binder of work with you on the **second week** of the school year. We will be going over this packet of work and **it will be taken as a grade**. You will be taking a **basic skills quiz** to make sure you have these concepts mastered. If you don't, you will have additional work and practice to do to get yourself prepared to do 8th grade work. There are **OPTIONAL Math iXL** lessons also included if you feel you need more practice on a skill.

If you have any questions contact Mrs. Brenner via email @ gbrenner@sylvaniaschools.org

8th grade math department

Notes for Adding and Subtracting Fractions

*** You MUST have common denominators

*** LEAVE mixed numbers as mixed numbers to add and subtract

ex. $\frac{2}{9} + \frac{1}{6}$

$$\frac{2}{9} \overset{*2}{=} \frac{4}{18}$$

$$+ \frac{1}{6} \overset{*3}{=} \frac{3}{18}$$

$$\frac{7}{18}$$

1) Make common denominator and scale up numerator by the same value.

2) Add/subtract numerator. Leave over common denominator

3) Simplify if possible

ex. $2\frac{4}{9} \overset{*4}{=} 2\frac{16}{36}$

$$+ 3\frac{5}{12} \overset{*3}{=} 3\frac{15}{36}$$

$$5\frac{31}{36}$$

ex. $\frac{8}{14} - \frac{3}{7} \Rightarrow \frac{8}{14} - \frac{8}{14}$

$$- \frac{3}{7} \overset{*2}{=} \frac{6}{14}$$

$$\frac{2}{14} = \frac{1}{7}$$

Borrow 1 ($1 = \frac{6}{6}$ and $\frac{6}{6} + \frac{3}{6} = \frac{9}{6}$)

ex. $8\frac{1}{2} \overset{*3}{=} 8\frac{3}{6} = 7\frac{9}{6}$

$$- 2\frac{2}{3} \overset{*2}{=} 2\frac{4}{6} = 2\frac{4}{6}$$

$$5\frac{5}{6}$$

To multiply fractions

**** Do NOT make common denominators

**** Change mixed numbers into improper fractions

****Simplify within the problem to make it easier, by dividing out common factors.

ex. $\frac{\cancel{3}^{1}}{7} * \frac{5}{\cancel{9}_{3}} = \frac{5}{21}$

1) Cross simplify
2) multiply across

ex. $\frac{\cancel{8}^{2}}{\cancel{21}_{3}} * \frac{\cancel{14}^{2}}{\cancel{20}_{5}} = \frac{4}{15}$

(8 & 20 divide by 4, 14 & 21 divide by 7)

ex. $2\frac{1}{2} * 3\frac{2}{5} = \frac{\cancel{5}^{1}}{2} * \frac{17}{\cancel{5}_{1}} = \frac{17}{2}$ or $8\frac{1}{2}$

To divide fractions

**** Do NOT make common denominators

**** Change mixed numbers into improper fractions

**** Multiply by the reciprocal

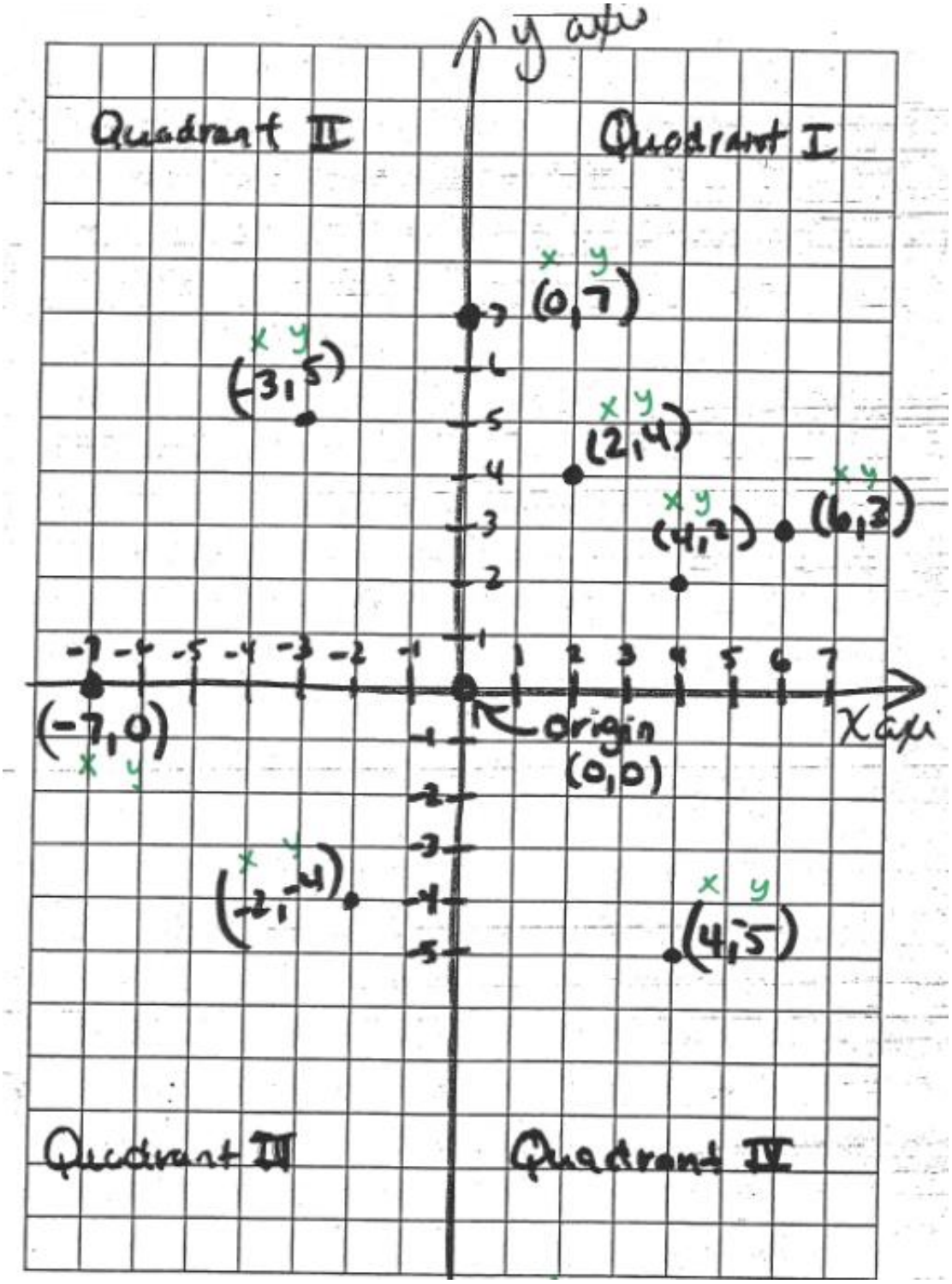
ex. $\frac{3}{8} \div \frac{5}{7} \rightarrow \frac{3}{8} * \frac{7}{5} = \frac{21}{40}$

ex. $4\frac{2}{3} \div 2\frac{1}{3} \rightarrow \frac{14}{3} \div \frac{7}{3} \rightarrow \frac{\cancel{14}^{2}}{\cancel{3}_{1}} * \frac{\cancel{3}^{1}}{\cancel{7}_{1}} = 2$

ex. $8\frac{1}{3} \div 2\frac{1}{2} \rightarrow \frac{25}{3} \div \frac{5}{2} \rightarrow \frac{\cancel{25}^{5}}{3} * \frac{2}{\cancel{5}_{1}} = \frac{10}{3}$

Coordinate Points – Graphing

Ordered pairs are ALWAYS in the form of (X , Y). The x-coordinate tells how far to the RIGHT (+) or LEFT (-) you go from the origin (0,0). You do the x-coordinate FIRST. The y-coordinate tells how far you go UP (+) or DOWN (-). You do the y-coordinate SECOND. Think of an airplane…you have to go down the runway before you can take off.



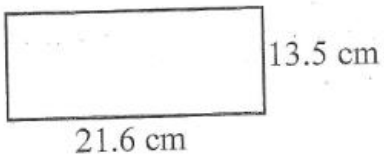
AREA – Formulas and examples

To find the area of a figure use the following formulas:

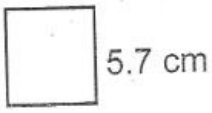
Rectangle = $l * w$ Square = S^2 Triangle = $\frac{1}{2}bh$ or $\frac{bh}{2}$

Parallelogram = $b * h$ Trapezoid = $\frac{1}{2}h(b_1 + b_2)$ Circle = πr^2 Circumference = πd

Use the following steps: Formula
Substitution
Answer with Label

1. 

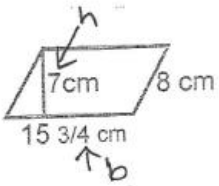
$A = LW$
$A = 21.6 * 13.5$
$A = 291.6\ cm^2$

2. 

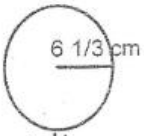
$A = S^2$
$A = 5.7^2$
$A = 32.49\ cm^2$

3. 

$A = \frac{1}{2}bh$ or $\frac{bh}{2}$
$A = \frac{1}{2} * 8.4 * 11$
$A = 46.2\ cm^2$

4. 

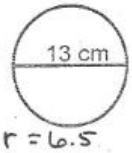
$A = bh$
$A = 15\frac{3}{4} * 7$
$A = 110\frac{1}{4}\ cm^2$

5. 

$r = 6\frac{1}{3}$
$d = 12\frac{2}{3}$

Area and Circumference
$A = \pi r^2$
$A = 3.14 * 6\frac{1}{3}^2$
$A = 125.9\ cm^2$

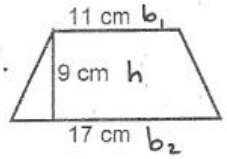
$C = \pi d$
$C = 3.14 * 12\frac{2}{3}$
$C = 39.8\ cm$

6. 

$r = 6.5$
$d = 13$

Area and Circumference
$A = \pi r^2$
$A = 3.14 * 6.5^2$
$A = 132.7\ cm^2$

$C = \pi d$
$C = 3.14 * 13$
$C = 40.82\ cm$

7. 

$A = \frac{1}{2}h(b_1 + b_2)$
$A = \frac{1}{2} * 9(11 + 17)$
$\frac{1}{2} * 9 * 28$
$A = 126\ cm^2$

Add and Subtract Integers –

Adding Integers – When the signs are the ***same***, ADD and KEEP the sign. When the signs are ***different***, SUBTRACT and keep the sign of the HIGHEST ABSOLUTE VALUE.

Subtracting Integers – Subtraction is the same as adding the opposite. To subtract, change the subtraction sign to an addition sign and then change the second number sign to its opposite. Then use the above adding integer rules.

Ex. – 4 + - 8 = -12

+11 + + 7 = +18

-11 + + 5 = -6 (subtract and keep negative)

+12 + -3 = +9 (subtract and keep positive)

-6 - + 8 becomes -6 + -8 = -14

14 - -5 becomes 14 + +5 = +19

-7 - -4 becomes -7 + +4 = -3

Multiply and Divide Integers –

Multiply and divide "like normal" then count the number of negative signs to determine the sign of the answer. If there are an **odd number** of **negative** signs, the answer is **negative**. If there is an **even number** of negative signs, the answer is **positive**. (Remember negative times negative = positive!)

-3 * -7 = +21 or 21 (2 negatives make a positive)

-24 ÷ 3 = -8 (1 negative makes a negative)

Order of Operations: Hint: Please Excuse My Dear Aunt Sally

Parenthesis and Exponents
Multiplication and Division – in order from left to right
Addition and Subtraction – in order from left to right
Use inverted pyramid style to solve

Ex. $(5 + 3)^2 + 3 * 7 – 18 ÷ 2$

$8^2 + 3 * 7 – 18 ÷ 2$

$64 + 3 * 7 – 18 ÷ 2$

$64 + 21 – 9$

$85 – 9$

76

Optional Math iXL Work: G.C.13; G.I.5; G.O.5

Basic Skills Worksheet: NO CALCULATORS! Show all work!!

1) 134 + 45 + 27 =

2) 453 – 169 =

3) 78 X 94 =

4) 391 ÷ 17 =

5) 24.7 + 1.52 + 36 =

6) 75.6 – 43.62 =

7) 26 X 3.7 =

8) 10.54 ÷ 2.5 =

9) -15 + 7 =

10) 8 - -21 =

11) 3 * -9 =

12) -24 ÷ 4 =

13) -9 + -13 =

14) -2 * -25 =

15) -50 – 30 =

16) -56 ÷ -8 =

Optional Math iXL Work: G.L.2; G.M.28; G.N.12

All fraction answers must be simplified to lowest terms.

17) $\frac{2}{7} + \frac{4}{9} =$

18) $7\frac{2}{3} + 8\frac{5}{6} =$

19) $\frac{7}{8} - \frac{1}{6} =$

20) $5\frac{1}{3} - 2\frac{3}{4} =$

21) $\frac{5}{8} \text{ X } \frac{4}{9} =$

22) $2\frac{1}{4} \text{ X } 4\frac{5}{6} =$

23) $\frac{12}{21} \div \frac{4}{15} =$

24) $4\frac{1}{5} \div 2\frac{7}{10} =$

Optional Math iXL Work: H.P.5; I.H.6; I.H.8

DO NOT USE A CALCUATOR FOR THIS! SHOW YOUR WORK NEXT TO EACH PROBLEM!!!

1. $-\frac{2}{3} + -\frac{4}{5} =$

2. $\frac{1}{2} - \frac{7}{10} =$

3. $1\frac{1}{4} + -3\frac{5}{6} =$

4. $-7\frac{3}{10} - -4\frac{4}{5} =$

5. $-3\frac{2}{5} - \frac{5}{6} =$

6. $\frac{-6}{7} * \frac{3}{8} =$

7. $-1\frac{5}{9} * -2\frac{1}{7} =$

8. $\frac{-9}{10} \div \frac{-6}{15} =$

9. $5\frac{2}{3} \div -1\frac{2}{15} =$

<u>Optional Math iXL work: I.C.9; I.G.18; I.I.8</u>

Skill: Order of Operations. Show ALL your steps using inverted pyramid style (see pg. 6 of instructions)

1. $(8 + 2) * 9$

2. $(6 + 3) \div 18$

3. $80 – 6 * 7$

4. $4 * (6 + 3)$

5. $(-4)^2 + 10 * 2$

6. $-4^2 + 10 * 2$

7. $9 + (7 – 4)^2$

8. $-9 + 7 – 4^2$

9. $23 + 4(8 - 5) – 5^2$

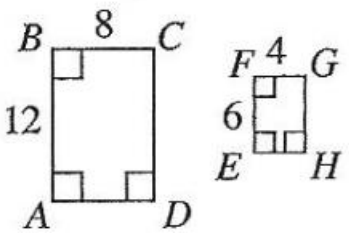
10. $(2^3 + 8) – 5*4 – 5^2$

Optional Math iXL Work: H.DD.7; I.X.9

Skill: Similarity and Ratios

Tell whether each pair of polygons is similar. **EXPLAIN why or why not.**

1.



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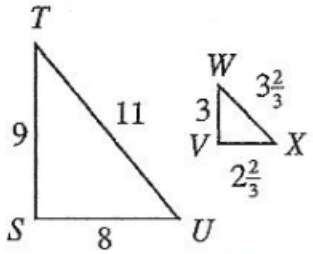
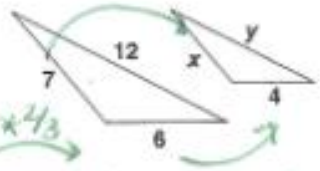


Find the missing side lengths. Use the following steps: 1. Create a proportion

2. Find the Scale Factor

3. Solve

Example:



$\times 2/3$

EX. $\frac{7}{6} = \frac{x}{4}$ $\quad 7 \times 2/3 = x$

$4\,2/3 = x$

$\times 2/3$

$4 \div 6 = 2/3$ for Scale factor

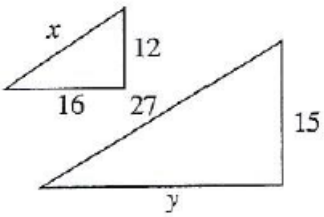
$\times 2/3$

$\frac{12}{6} = \frac{y}{4}$ $\quad 12 \times 2/3 = y$

$8 = y$

$\times 2/3$

3.



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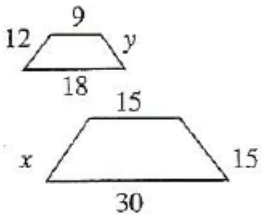

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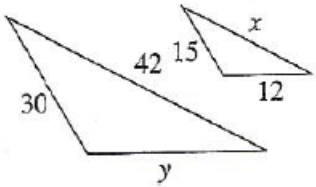


Optional Math iXL Work: F.I.2; H.X.2

name

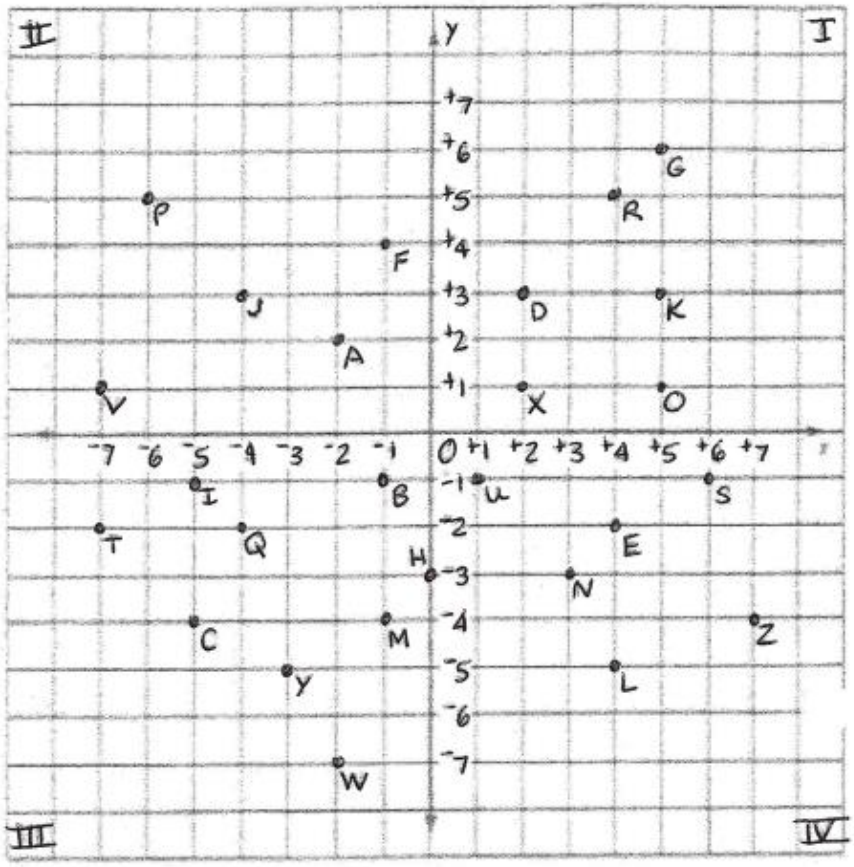
PRACTICE

WORKSHEET **137**

Locating Points for Ordered Pairs

Give the coordinates of points R, S, V, and Q. Always start at the origin.

point R (+4, +5)
point S (+6, −1)
point V (−7, +1)
point Q (−4, −2)



Practice • Give the coordinates of each point.

1. Z _____ 2. Y _____ 3. X _____ 4. W _____ 5. T _____

6. P _____ 7. O _____ 8. N _____ 9. M _____ 10. L _____

11. K _____ 12. J _____ 13. I _____ 14. H _____ 15. G _____

16. F _____ 17. E _____ 18. D _____ 19. C _____ 20. B _____

Give the point named by the coordinates.

21. (0, −3) ____ 22. (+4, −5) ____ 23. (−4, +3) ____ 24. (−3, −5) ____

25. (+3, −3) ____ 26. (−4, −2) ____ 27. (+4, +5) ____ 28. (−1, +4) ____

In which quadrant is each point located?

29. (−5, −4) ____ 30. (+2, +3) ____ 31. (+6, −1) ____ 32. (−2, +2) ____

Optional Math iXL Work: J.Z.7; J.Z.10

Writing Equations from Tables – Moving Straight Ahead Inv. 1

y = mx + b **m = constant rate of change (slope) b = y-intercept (start-up value)**

1. y = _____

X	Y
0	0
1	3
2	6
3	9
4	12

2. y = _____

X	Y
0	5
1	7
2	9
3	11
4	13

3. y = _____

X	Y
0	-2
1	1
2	4
3	7
4	10

4. Y = _____

X	Y
0	8
1	5
2	2
3	-1
4	-4

5. Y = _____

X	Y
1	6
2	10
3	14
4	18
5	22

Optional Math iXL Work: H.BB.10; I.U.10
More Moving Straight Ahead Inv. 1 & 2

1. a. Which of the following tables represent linear relationships? Circle your choice(s).

Table 1

Time (s)	Distance (m)
0	5
1	10
2	12
3	16
4	20

Table 2

Distance (km)	Money ($)
0	0
1	10
2	20
3	30
4	40

Table 3

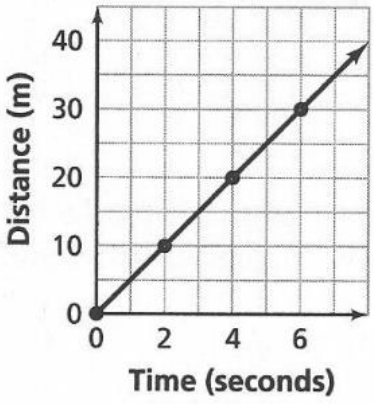
Days	Money ($)
0	10
1	8
2	6
3	4
4	2

b. Write an equation for one of the tables that represents a linear relationship.

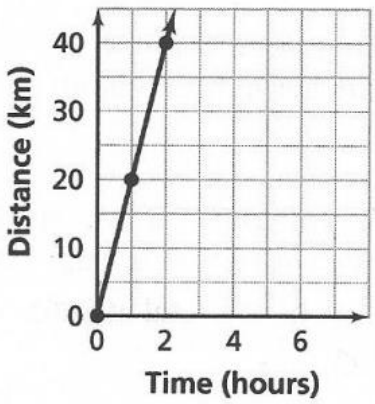
c. Which table(s), if any, represents a proportional relationship? Explain.

2. Each graph below represents a linear relationship between time and distance. For each graph, what is the rate of change?

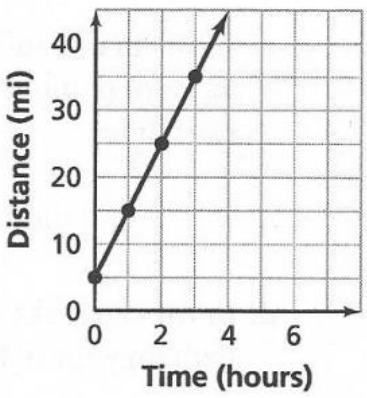
a.



b.



c.



Rate: _____ Rate: _____ Rate: _____

Optional Math iXL work: I.V.4; K.S.13

3. a. Jason is participating in a walkathon. He writes the equation $m = 2d + 50$ to represent the amount of money he collects from each sponsor for walking d kilometers. What number represents the rate of change?

b. Cierra is keeping track of the amount of money in her lunch account each week. She writes the equation $A = -6w + 40$. What number represents the rate of change?

4. Mark opens a bank account with \$20. He plans to put in \$5 each week.

a. Complete the table below to show the ***total*** amount of money Mark has in his bank account from 0 to 10 weeks.

Time (weeks)											
Money (\$)											

b. Use the grid to make a graph that matches the table.

c. Write an equation to represent the ***total*** amount of money Mark has in his account over time.

d. In which week will Mark have a total of \$60? Explain your reasoning.

Optional Math iXL: I.V.3; H.BB.3
Moving Straight Ahead Inv. 3

1. Find the value of the indicated variable.

a. Suppose $y = 2x + 10$. Find y if $x = -2$.

b. Suppose $y = 2x - 2.5$. Find x if $y = 10$.

2. Solve each equation to find the value of x. Use Algebraic format and check your equations.

a. $4x + 10 = 22$

b. $3x + 9 = 6x$

c. $2(x + 3) = 18$

d. $2x + 15 = 27 - 4x$

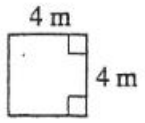
<u>Optional Math iXL: D.V.4; H.FF.1; E.FF.10; H.FF.3</u>

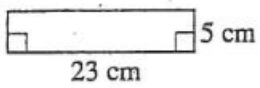
<u>Area</u> – Show your work (3 steps):

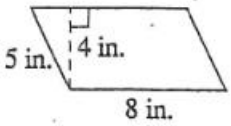
1) formula

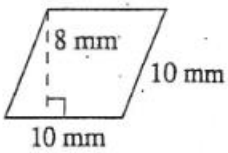
2) substitution

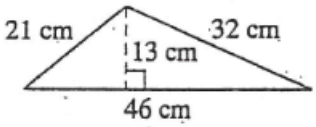
3) answer with label

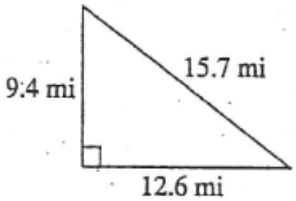
1. 

2. 

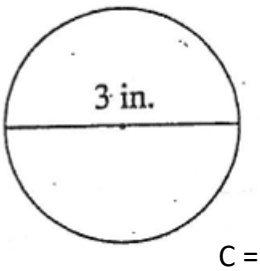
3. 

4. 

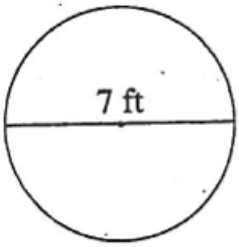
5. 

6. 

Find the circumference and area for each figure (that means 2 answers for each!!)

7. 

A = C =

8. 

A = C =