MPM1D – Grade 9 Academic Math

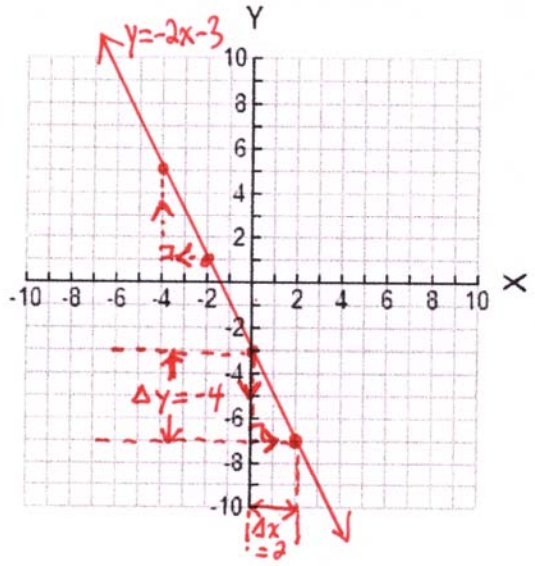
UNIT FOUR – LINEAR RELATIONS: REVIEW WORKSHEET # 1

Name: Mr. Solutions Date: _____

PART I

slope = m = -2, y-int = b = -3

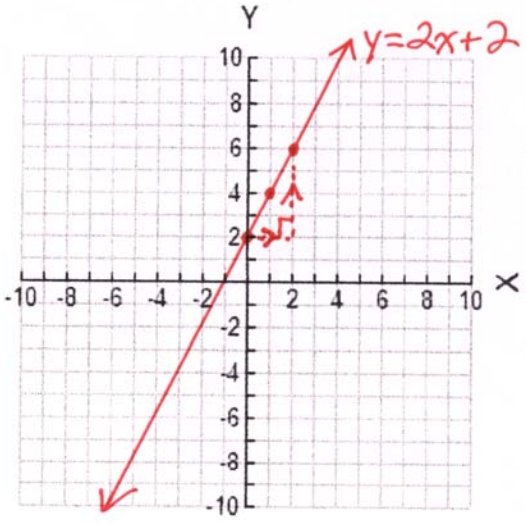
1. Graph the line $y = -2x - 3$ using the grid below.



rise/run = -2/1 = -4/2 = -6/3 = ...

m = slope = 2, y-int = b = 2

2. Graph the line $y = 2x + 2$ using the grid below.



3. Convert the following slopes into $\frac{rise}{run}$ form.

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

b) $m = 2\frac{1}{4}$ $\frac{9}{4}$

c) $m = 0.5$ $\frac{1}{2}$

d) $m = 1$ $\frac{1}{1}$

e) $m = -1\frac{2}{4}$ $\frac{-3}{2}$

4. Write the equation of the line with each of the following slopes and y-intercepts.

a) slope = -5

y-int = 2

$y = -5x + 2$

b) slope = $\frac{2}{3}$

y-int = -4

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

c) slope = 2

coordinate of y-int is $(0,-12)$

$y = 2x - 12$

d) slope = $\frac{-5}{4}$

y-int = 0

$y = -\frac{5}{4}x$

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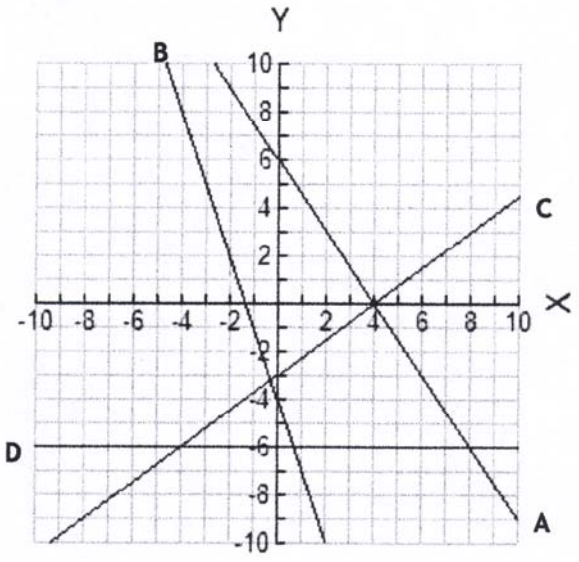
5. Match the lines on the graph below with their equation (fill in the box beside the equation with the "letter" used to label the line it represents)



$y = -6$	D
$y = -3x - 4$	B
$y = \frac{3}{4}x - 3$	C
$y = \frac{-3}{2}x + 6$	A

6. State the slope of a line segment that is _____ to a line with a _____. (See blanks below)

a) perpendicular, slope of -4 — $\frac{1}{4}$ negative reciprocal slopes

b) parallel, slope of $\frac{-6}{8} = \frac{-3}{4}$ — $-\frac{3}{4}$ same slopes

c) parallel, slope of $\frac{15}{1} = 15$ — 15 same slopes

d) perpendicular, slope of $\frac{-5}{2}$ — $-\frac{2}{5}$ negative reciprocal slopes

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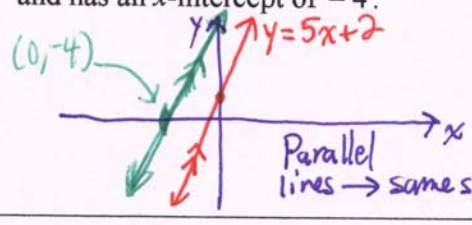
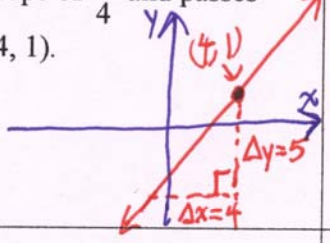
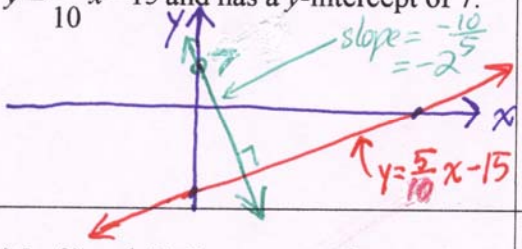
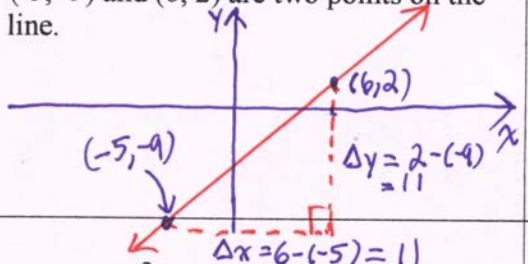
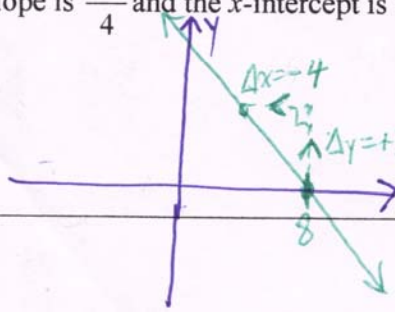
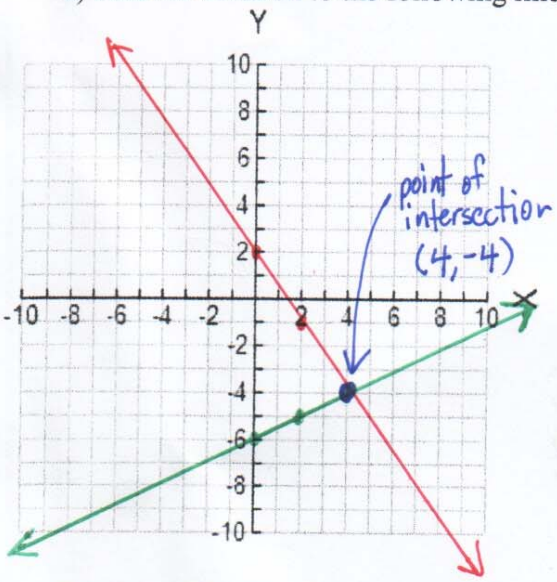
7. Write an equation of the line given the following information about the line.

Information	Equation of the Line
a) The line is parallel to the line $y = 5x + 2$ and has an x-intercept of -4. 	Since the lines are parallel, they have the same slopes. Therefore, for the required line, $m=5$ and b is unknown ($m=5$, $b=?$). ∴ equation is of the form $y=5x+b$ ∵ $(0,-4)$ lies on the line, it satisfies the equation ∴ $0 = 5(-4)+b$ ∴ $0 = -20+b$ → ∴ $b=20$ ∴ equation of the line is $y=2x+20$
b) The line has a slope of $\frac{5}{4}$ and passes through the point (4, 1). 	The equation must be of the form $y=\frac{5}{4}x+b$ $(m=\frac{5}{4}, b=?)$ Since (4,1) lies on the line, it satisfies the equation. ∴ $1 = \frac{5}{4}(\frac{4}{1})+b$ ∴ $1 = 5+b$ → ∴ $b=-4$ ∴ equation of the line is $y=\frac{5}{4}x-4$
c) The line is perpendicular to $y = \frac{5}{10}x - 15$ and has a y-intercept of 7. 	slope of given line $=\frac{5}{10}=\frac{1}{2}$ ∴ slope of perpendicular line $=-\frac{2}{1}=-2$ y-int of perpendicular line = 7 ∴ $m=-2$, $b=7$ ∴ equation of the perpendicular line is $y=-2x+7$
d) (-5, -9) and (6, 2) are two points on the line. 	slope $= m = \frac{\Delta y}{\Delta x} = \frac{2-(-9)}{6-(-5)} = \frac{11}{11} = 1$ ∴ equation is of the form $y = 1x+b = x+b$ ∵ (6,2) lies on the line, it satisfies equ'n ∴ $2 = 6+b$ ∴ $b=-4$ (agrees with graph) ∴ equation of the line is $y=x-4$
e) Slope is $\frac{-3}{4}$ and the x-intercept is 8. 	$m=-\frac{3}{4}$, $b=?$, $y=-\frac{3}{4}x+b$ ∵ the x-intercept is 8, (8,0) lies on the line ∴ (8,0) satisfies the equation ∴ $0 = -\frac{3}{4}(\frac{8}{1})+b$ ∴ $0 = -6+b$ ∴ $b=6$ (agrees with graph) → ∴ $y=-\frac{3}{4}x+6$ is the equation of the line.

8. a) Find the solution to the following linear system of equations by graphing.



$y = \frac{-3}{2}x + 2$ $\quad$ $y = \frac{1}{2}x - 6$

from graph, it appears that $x=4$, $y=-4$ is the solution

b) Check the solution. Show all work.

LS	RS
$y=-4$	$\frac{-3}{2}x+2$
	$=\frac{-3}{2}(\frac{4}{1})+2$
	$=-6+2$
	$=-4$

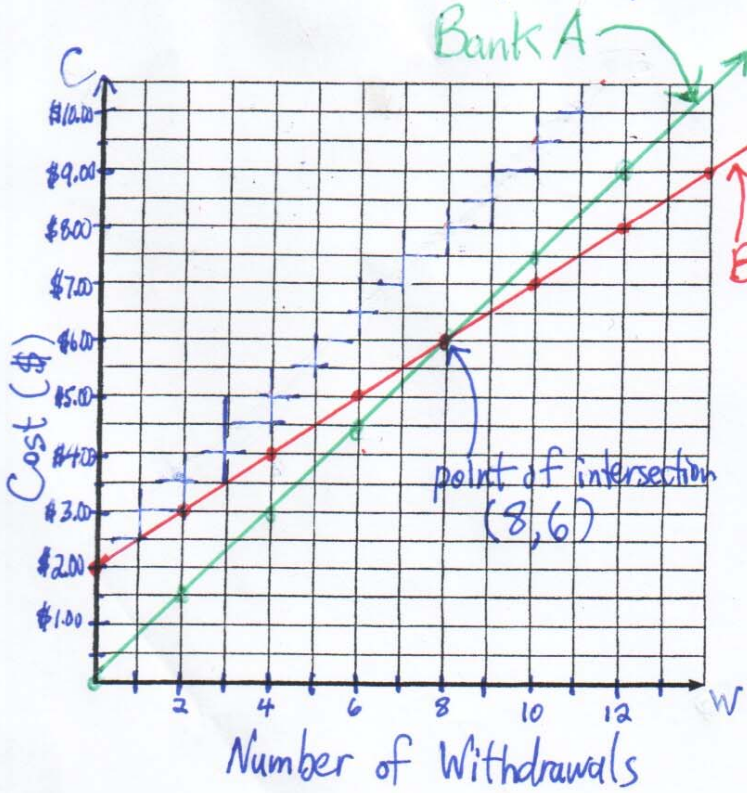
$\therefore$ L.S. = R.S.

LS	RS
$y=-4$	$\frac{1}{2}x-6$
	$=\frac{1}{2}(\frac{4}{1})-6$
	$=2-6$
	$=-4$

$\therefore$ L.S. = R.S.

9. **Bank A** offers a student banking package for \$0.75 per withdrawal. **Bank B** offers a student banking package for \$0.50 per withdrawal plus a monthly flat fee of \$2.00. How would you decide which bank to open a student account with? **(Note: Use a scale of 0.50 for the *y*-axis and a scale of 1 for the *x*-axis).** *Remember to label the axis and the lines with the equation of each line.*

Let C represent cost, w represent the number of withdrawals.



For fewer than 8 withdrawals, the cost of banking is lower for Bank A.

For more than 8 withdrawals, the cost of banking is lower for Bank B.