Test #2a
Math 13
Summer 2008

Instructions: *Put your name on your paper before you begin. You may not use a calculator on this test, and all work must be shown in order to get all points for all questions. If you feel that you must use a piece of scratch paper, please tell me that you have used scratch paper each time that you use it and label your work clearly so that I may easily find it! Please box your final answer and don't forget that word problems require labels for their answers and setup. Staple your note card to the back of your test. Good luck!*

1. A mechanic charges \$50 an hour plus parts. If the bill, that included \$150 in parts, was \$450, how many hours did the job take? Set up as a linear equation.

+½ Let x = # hrs.

+3½ +1 $50x + 150 = 450$

$50x = 300$ } solve +1

$\boxed{x = 6 \text{ hr.}}$ +½ +½

2. From the following word problems **choose two**, showing setup, and an equation that could be used to solve the problem. **Do not solve.** Algebra must be used for full credit.

+7 or +6½

a) A lab has a 20% acid solution and a 50% acid solution. How many liters of each are required to obtain 600 liters of a 30% acid solution?

b) Train A and Train B leave the same station traveling in the same direction. Train A travels 20 mph and train B at 30 mph. If Train B leaves 2 hours after Train A, how long before Train B catches Train A?

c) Julie invested \$24,000 in two funds. The first, a bond, paid 5% simple annual interest and the 2nd, a money market, paid 3% simple annual interest. She earned a total of \$1120 in interest in one year. How much did she invest at each rate?

Decimals +½

	V	%	Pure
weak	x +½	20	$0.2x$ +½
strong	$600-x$ or y	50	$0.5(600-x)$ +½ or $0.5y$
mix	600L	30	$0.3(600) = 180$ +½

+1 $\boxed{0.2x + 0.5(600-x) = 180}$

or

+3½ $\boxed{\begin{cases} x + y = 600 \\ 0.2x + 0.5y = 180 \end{cases}}$

	D	R	T
Train A	$20x$ +½	20 mph	x +½ or y
Train B	$30(x-2)$ +½	30 mph	$x-2$ +½ or y

$\boxed{20x = 30(x-2)}$ +1 +3

or

$\boxed{20(x+2) = 30x}$

or

$\boxed{\begin{cases} 20x = 30y \text{ or } y = x-2 \\ 20y = 30x \text{ or } y = x+2 \end{cases}}$

Decimals +½

	P	R	T	I
bond	x +½	5%	1	$0.05x$ +½
money market	$24000-x$ or y	3%	1	$0.03(24000-x)$ or $0.03y$ +½
Total	24000	X	X	\$1120

correct places +½

+1 $\boxed{\begin{cases} x + y = 24000 \\ 0.05x + 0.03y = 1120 \end{cases}}$

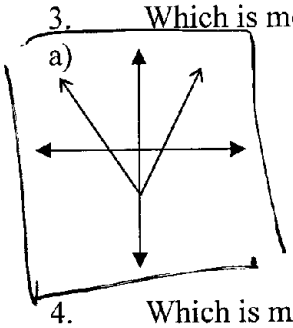
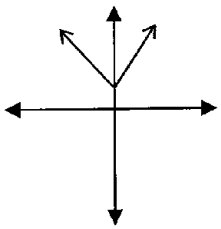
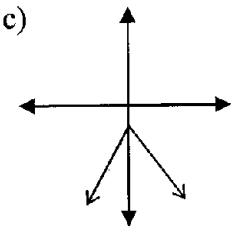
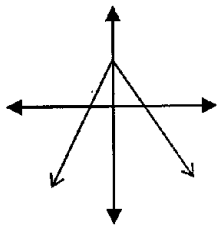
+3½

or

$\boxed{0.05x + 0.03(24000 - x) = 1120}$

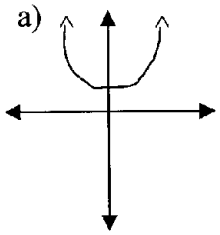
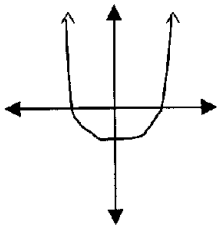
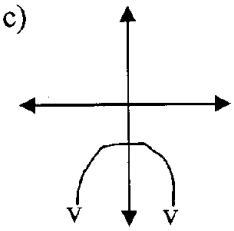
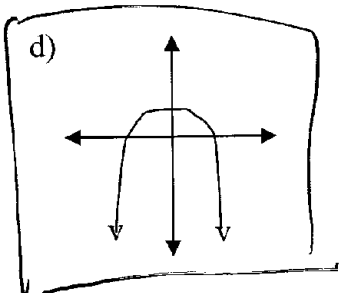
10.5/10

3. Which is most likely the graph of $y = |x| - 2$

a)  b)  c)  d) 

A +1

4. Which is most likely the graph of $y = -x^2 + 1$

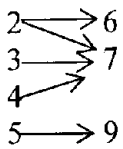
a)  b)  c)  d) 

D +1

5. State whether the following **is or is not** a function (state reasons). Give the **domain and range** of each.

a) +½ {(0,2),(5, 2),(3, 2)}
+½ D: {0,5,3}
+½ R: {2}
+½ Yes f(n)
-½ No x is repeated

b) +½ $f(x) = 3x^3 + 2$
+½ So f(n)
D: ℝ
R: ℝ

c) +½ 
Not a f(n) since 2 goes to 6 & 7
D: {2,3,4,5}
R: {6,7,9}

+6

6. Using $f(x) = x + 2$, $g(x) = 2x^2 - 7x - 4$

a) 12½ (f + g)(x)
$(x+2) + (2x^2-7x-4) = \boxed{2x^2 - 6x - 2}$ (+1; +½ +½ +½)

b) +2½ g(-1)
$2(-1)^2 - 7(-1) - 4 = 2 + 7 - 4 = 9 - 4 = \boxed{5}$ (+½ +½ +½ +½)
Subtract -2 it mult. by (-1)

c) +2½ (g • h)(0)
$g(0) \cdot h(0) = [2(0)^2 - 7(0) - 4][(0) + 2]$
$= -4(2) = \boxed{-8}$ (+1 +1 +½)

+7½

7. Give the equation for each line described by the scenario below. The line must be given in slope-intercept form where possible for full credit.

a) +3 Through the points (0, 5) and (-6, 3).
$m = \frac{3-5}{-6-0} = \frac{-2}{-6} = \frac{1}{3}$
$\boxed{y = \frac{1}{3}x + 5}$ +1

b) +1 Through the points (5, 7) and (-3, 7).
$\boxed{y = 7}$

+4

c) +3 Through the point (3, 5) and with slope of -2.

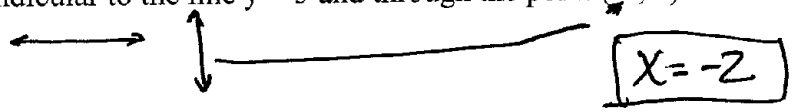
$y - 5 = -2(x - 3)$ (+½ each)

$y - 5 = -2x + 6$ (+½)

$+5 \quad +5$

$y = -2x + 11$ ← +½

d) +1 Perpendicular to the line y = 3 and through the point (-2, 3).



$x = -2$

8. Factor each of the following completely

a) +2 $3x^3y^2 - 21x^2y + 15xy^3$

$3x(x^2y^2 - 7xy + 5y^3)$ (+½ +½ +½)

$3xy(x^2y - 7x + 5y^2)$

b) +3 $10x^2 - 4x - 5xy + 2y$

$2x(5x - 2) - y(5x - 2)$ +1

$(5x - 2)(2x - y)$ (+1 +1)

c) +2 $x^2(x + y) - x(x + y) + 9(x + y)$

$(x + y)(x^2 - x + 9)$ (+½ +½ +1½)

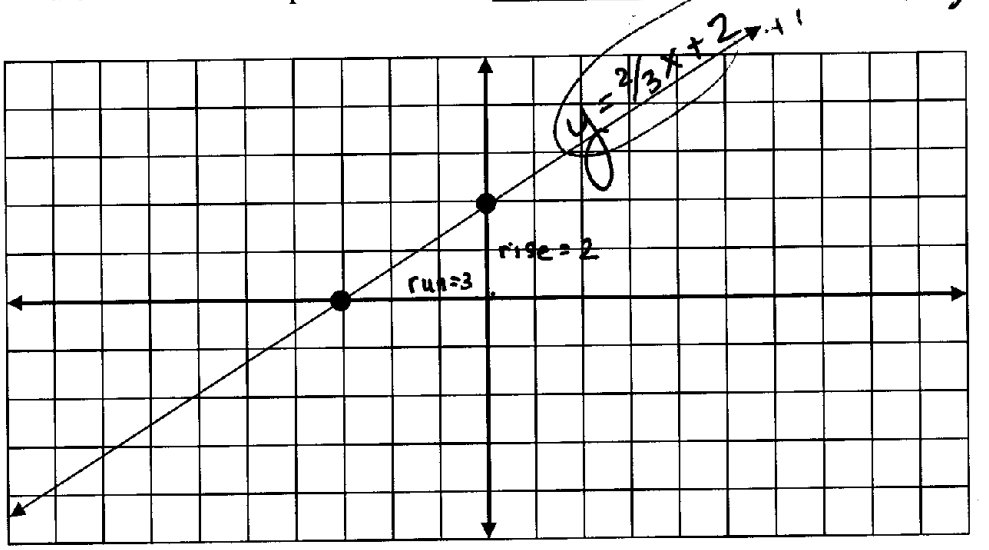
d) +2 $x^2 - 2xy + 48y^2$

$(x - 8y)(x + 6y)$ (+1 +1)

Prime

9. For the line below, give the slope, the y-intercept (as an ordered pair) and then label the line with it's equation. m = rise/run = 2/3 +1 ; y-intercept (0, 2) +1

+3



10. For the equation: $-12 + 2y = 3x$

a) Put the equation in slope-intercept form

$2y = 3x + 12 \Rightarrow y = \frac{3}{2}x + 6$ (+1, +1)

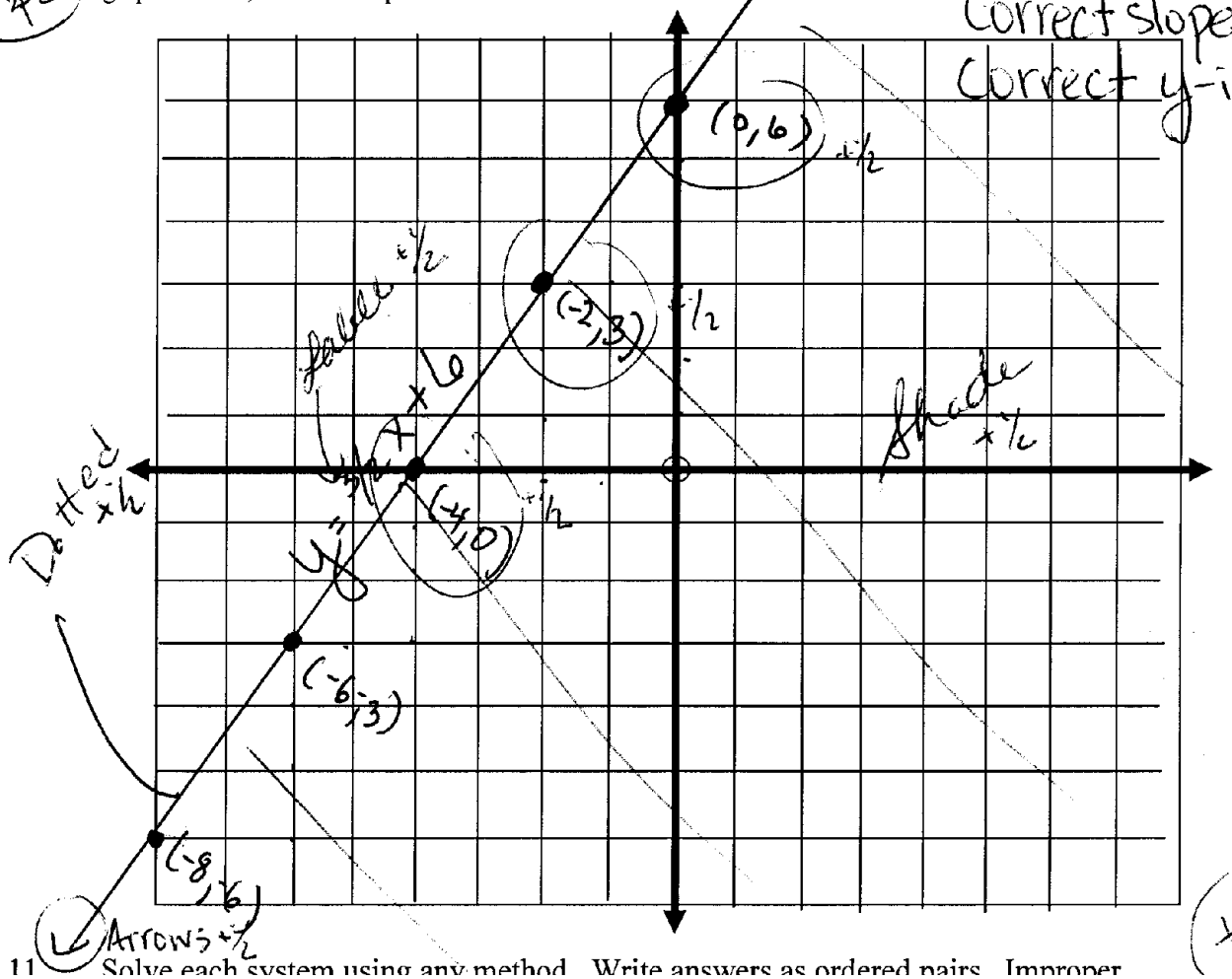
b) Give an equation of any line that is perpendicular to this line. $y = -\frac{2}{3}x + b$ ← any #

$m_2 = -\frac{2}{3}$

c) Give an equation of any line that is parallel to this line. $y = \frac{3}{2}x + b$ ← Any # but 6

$m_2 = \frac{3}{2}$

d) Graph the linear inequality $-12 + 2y < 3x$, using 3 points. Be sure to correctly label all points used to graph the line, label it and put arrows on the ends.



11 Solve each system using any method. Write answers as ordered pairs. Improper

+14½