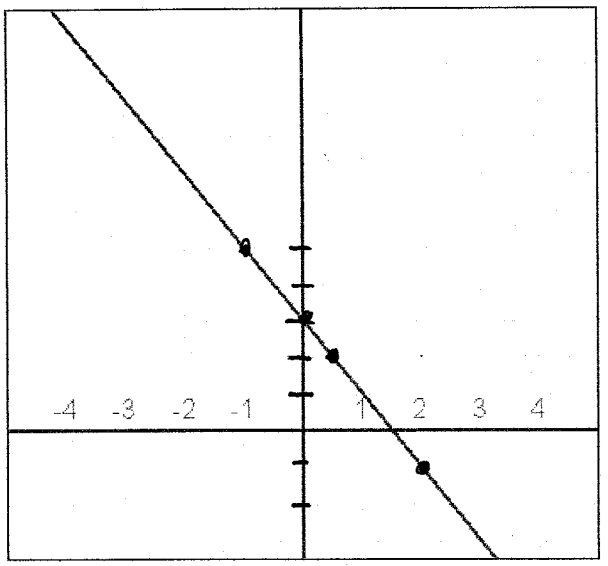
Math 1301 - Test 2 - Spring 2008 ...

Name: Solutions **Student ID:** _____

You may use your calculator. No notes, books nor scratch paper is allowed.

1. (11 Pts) Use the graph of the shown here to answer the following questions.



1a. Find the y-coordinate $(2, \underline{-1})$

1b. Find the y-coordinate $(-1, \underline{5})$

1c. Find the x-coordinate $(\underline{\frac{1}{2}}, 2)$

1d. Find the x-coordinate $(\underline{2}, -1)$

1e. Find the coordinates of the y-intercept

$(\underline{0}, \underline{3})$

1f. Find the coordinates of the x-intercept

$(\underline{1.5}, \underline{0})$

1g Find the slope of the line in the graph. $\underline{-2}$

1h Find the equation of the line in the graph.

$y = \underline{-2x+3}$

2. (8 pts) Find an equation of the line for each of the following..

i. A line that has slope -3.2 and y-intercept 8.

$y = -3.2x + 8$

ii. A line that has slope 9 and passing through $(-1, -3)$.

$y = 9(x+1) - 3$ or $y = 9x + 6$

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

$y = 9x + 6$

iii. A line passing through $(1, -3)$ and parallel to $y = \frac{1}{2}x - 5$.

$y = \frac{1}{2}(x+1) - 3$ or $y = \frac{1}{2}x - \frac{5}{2}$

$y = \frac{1}{2}(x+1) - 3$

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

iv. A line passing through $(1, -3)$ and perpendicular to $y = \frac{1}{2}x - 5$.

$y = -2(x-1) - 3$ or $y = -2x - 1$

$y = -2(x-1) - 3$

$y = -2x + 2 - 3$

3. (9 Pts) For each given equation: (i) solve the equation symbolically (write the values of x that are solutions); (ii) classify the equation as a *conditional equation*, a *contradiction* or an *identity*.

3a. (i) $6x - 2 = 6x + 5$

$-2 = 5$

(ii) This equation is a(n) contradiction

3b. (i) $2(7 - 4x) - x = 14 - 9x$

$14 - 8x - x = 14 - 9x$

(ii) This equation is a(n) Identity (infinitely many sols)

3c. (i) $7 = 5(x - 1)$

$7 = 5x - 5$

$12 = 5x$

$x = 12/5$

(ii) This equation is a(n) Conditional $x = 12/5$

4. (9 Pts) The table lists data that is exactly linear. Find the equation of the corresponding line and use it to predict other values.

x	-3	-2	-1	0	1
y	-7.5	-6.0	-4.5	-3.0	-1.5

4a. Write a linear equation in slope-intercept form for the line that passes through the data points in the table.

$m = \frac{-3-(-6)}{0-(-2)} = \frac{-3+6}{2} = \frac{3}{2}$

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

4b. Use your linear equation from part a to predict y when $x = -2.4$. $y =$ -6.6

Predicting y for this value of x is an example of which of the following? check one of the following.

☑ interpolation ☐ extrapolation

$y = \frac{3}{2}(-2.4) - 3$

4c. Use your linear equation from part a to predict y when $x = 5.5$. $y =$ 5.25

Predicting y for this value of x is an example of which of the following? check one of the following.

☐ interpolation ☑ extrapolation

$y = \frac{3}{2}(5.5) - 3$

5. (8 Pts) A 500-gallon tank initially contains 90 gallons of fuel oil. A pump is filling the tank at a rate of 4 gallons per minute.

y-int

m

5a. Write a formula for a linear function f that models the number of gallons of fuel oil in the tank after x minutes.

$y = 4x + 90$

$f(x) = 4x + 90$

5b. Use the linear function f that you found in part a. to **evaluate** $f(20)$.

$f(20) = 4 \cdot 20 + 90 = 80 + 90 = 170$

5c. Interpret $f(20)$ in the context of this problem.

After 20 mins the tank contains 170 gallons

5d. After how many minutes will the tank contain 188 gallons of fuel oil?

$4x + 90 = 188$

$4x = 188 - 90$

$4x = 98$

$x = \frac{98}{4} = \frac{49}{2} = 24.5$

6. (8 Pts) The weight of an object on Earth (y) is directly proportional to the weight of an object on Mars (x). Suppose a 25-pound object on Earth weighs 10 pounds on Mars.

6a. Find the constant of proportionality and then write the formula relating y and x. Show your work.

earth mars

$y = kx$

$25 = k \cdot 10$

$k = \frac{25}{10} = 2.5$

$y = 2.5x$

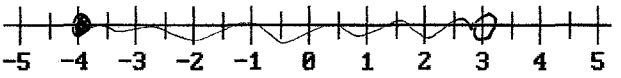
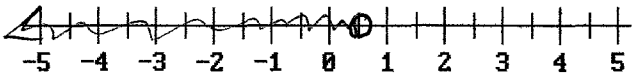
6b. Find the weight of an astronaut on Mars who weighs 140 pounds on Earth. Show your work.

~~$y = 2.5(140)$~~

$140 = 2.5x$

$x = \frac{140}{2.5} = 56$

7. (12 Pts) Each row in the following table contains one representation of a set of real numbers. Complete the table by finding the other two representations for each set.

inequality	*Interval Notation*	*Number Line Representation*
$-4 \leq x < 3$	$[-4, 3)$	
$x < 0.5$	$(-\infty, 0.5)$	
$x \geq -2.5$	$[-2.5, \infty)$	

8. (8 pts) Solve each of the following inequalities symbolically (by hand); write the solution sets in interval notation. Show your work.

8a. $3x - 2 > \dfrac{x+3}{-2}$

$-6x+4 < x+3$

$1 < 7x$

$\frac{1}{7} < x$

$(\frac{1}{7}, \infty)$

8b. $-5 < 4x + 1 \leq 17$

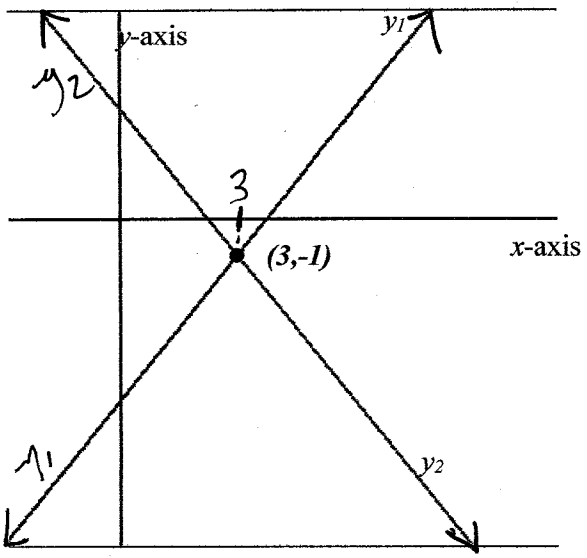
$-6 < 4x \leq 16$

$\frac{-6}{4} < x \leq 4$

$\frac{-3}{2} < x \leq 4$

$(-\frac{3}{2}, 4]$

9. (8 Pts) Use the graph to solve the inequalities and write your solutions in interval notation..



9a. Solve $y_1 < y_2$. $(-\infty, 3)$

9b. Solve $y_1 > y_2$. $(3, \infty)$

9c. Solve $y_1 \geq y_2$. $[3, \infty)$

9d. Solve $y_1 \leq y_2$. $(-\infty, 3]$

10. (9 Pts) Let $f(x) = \begin{cases} 6 - 2x & \text{if } 1 \leq x \leq 4 \\ 5 & \text{if } -3 < x < 1 \end{cases}$

10a. Evaluate: $f(3) =$ $6 - 2 \cdot 3 = \boxed{0}$

10b. Evaluate: $f(-2) =$ $\boxed{5}$

10c. Evaluate: $f(1) =$ $6 - 2 \cdot 1 = \boxed{4}$

10d. Evaluate: $f(7) =$ undefined

10e Find the domain of the function f. $(-3, 4]$

11. (10 Pts) Let $f(x) = |3x - 6|$

11a. Evaluate: $f(-1) =$ $|3(-1)-6| = |-3-6| = |-9| = \boxed{9}$

11b. Evaluate: $f(0) =$ $|3 \cdot 0 - 6| = |-6| = \boxed{6}$

11c. Evaluate: $f(2) =$ $|3 \cdot 2 - 6| = |0| = \boxed{0}$

11d. Evaluate: $f(4) =$ $|3 \cdot 4 - 6| = |6| = 6$

11e. Which of the following is the graph of $f(x) = |3x - 6|$? **Circle your answer.**