Horace

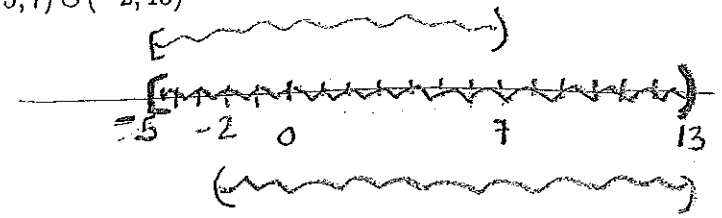
Name: Key
Recitation Instructor, Day, Time:

TRADITIONAL MATH 100 – Exam 1 – Spring 2017

Directions: You will find 15 problems listed below. No notes/books/friends are allowed. Graphing calculator models above the level of a TI-84 plus are not allowed. You have one hour to complete this exam.

Page 1 20 pts.	Page 2 20 pts.	Page 3 20 pts.	Page 4 20 pts.	Page 5 20 pts	TOTAL 100 pts

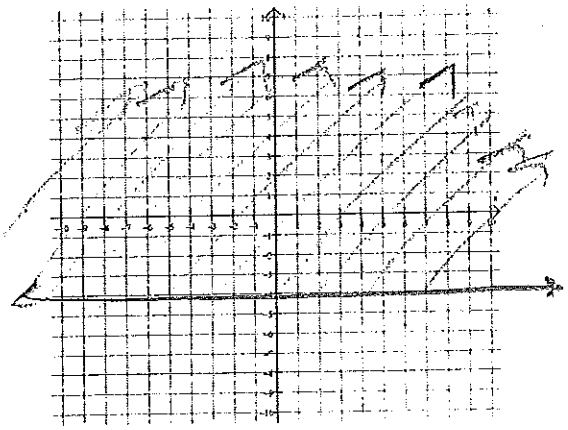
1. (6 points) Find the ~~intersection~~ union. Express answers in **interval notation** and on a **number line**:
$[-5, 7) \cup (-2, 13)$



number line answer:

$[-5, 13)$ interval notation answer.

2. (7 points) On the grid below, graph the relation $\{(x, y) | y \geq -4\}$



3. (7 points) Find the distance between the two points $(10, 3)$ and $(-5, 7)$.

$x_1\ y_1 \quad x_2\ y_2$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(-5 - 10)^2 + (7 - 3)^2} = \sqrt{225 + 16}$$

$$= \sqrt{241}$$

(decimal is fine)

Bret.

4. (8 points) Consider $g(x) = 4x^2 - 3dx$, where d is some external parameter. Answer the following:

(a) Find $g(-1)$. $g(-1) = 4(1) - 3d(-1) = \boxed{4 + 3d}$

(b) Find $g(2)$. $g(2) = 4(4) - 3d(2) = \boxed{16 - 6d}$

(c) Find $g(3)$. $g(3) = 4(9) - 3d(3) = \boxed{36 - 9d}$

(d) Find $g(-4)$. $g(-4) = 4(16) - 3d(-4) = \boxed{64 + 12d}$

5. (6 points) Solve for x in the equation $-4(2x - 3) - 7 = 3(x + 5) + 4$.

$$-8x + 12 - 7 = 3x + 15 + 4$$

$$-11x + 5 = 19$$

$$-11x = 14$$

$$\boxed{x = \frac{-14}{11}}$$

6. (6 points) Is the function $f(x) = x$ even, odd, or neither? Use the definitions of even/odd to justify your answers.

Defn even function: $f(x) = f(-x)$

Defn odd : $f(-x) = -f(x)$

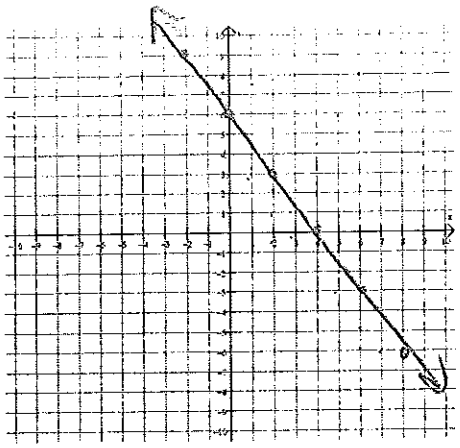
$f(-x) = -x$.

$-f(x) = -x$.

$\boxed{\text{Since } f(-x) = -f(x), \quad f(x) \text{ is odd.}}$

Nathali

7. (6 points) Graph $y = -\frac{3}{2}x + 6$ on the grid below. Include at least 6 points on your graph, including the intercepts.



8. (8 points) Given $f(x) = 3x + 7$, find the difference quotient $\frac{f(x+h) - f(x)}{h}$.

$$\frac{f(x+h)-f(x)}{h} = \frac{3(x+h)+7-[3x+7]}{h}$$

$$= \frac{3x+3h+7-3x-7}{h} = \frac{3h}{h} = \boxed{3}$$

9. (6 points) Suppose the total cost function for a certain product is given by $C(x) = 6x + 130$ and the revenue function for the product is given by $R(x) = 17x$. Find a formula for the following functions:

(a) Profit Function, $P(x)$

$$P(x) = R(x) - C(x) = 17x - (6x + 130) = 11x - 130$$

(b) Average Cost Function, $\overline{C(x)}$

$$\overline{C(x)} = \frac{6x+130}{x} = 6 + \frac{130}{x}$$

CJ

10. (6 points) Find the domain of the function $f(x) = \dfrac{3}{x-6}$.

$x \neq 6$

$x_1\ y_1 \qquad x_2\ y_2$

11. (6 points) Find the midpoint of the points $(10, -4)$ and $(-9, 3)$.

$$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

$$\left(\frac{10+(-9)}{2}, \frac{-4+3}{2}\right) = \left(\frac{1}{2}, \frac{-1}{2}\right)$$

12. (8 points) Consider $x + y = 6$. Is y a function of x? Explain in COMPLETE SENTENCES, using terminology learned in class.

$y = -x + 6$.

For each input value for x, there will only be 1 y-value assigned to it, so yes, y is a function of x

(Saying this is linear & passes vertical line test of course is fine too)

Prem

13. (8 points) Given $f(x) = 4x^2 + 6$ and $g(x) = x - 5$, find $(fg)(x)$.

$(fg)(x) = (4x^2+6)(x-5)$

$= 4x^3 - 20x^2 + 6x - 30.$

14. (6 points) Consider the graph of $h(x) = x^3$. Describe how the graph of $h(x+5) - 1$ would look in terms of translations.

The graph of $h(x)$ shifted left 5 units and vertically downward 1 unit.

15. (6 points) Consider the following piecewise function. Which of the statements given below are true? You may circle more than one choice if necessary.

$$f(x) = \begin{cases} 10, & x \leq -3 \\ x+1, & -3 < x \leq 2 \\ -x, & x > 2 \end{cases}$$

(a) $f(-3) = 10.$ ✓
(b) $f(2) = 3.$ ✓
(c) $f(-3) = -2.$ ✗
(d) $f(-3) = 3.$ ✗
(e) $f(-6) = 6.$ ✗
(f) $f(4) = -4.$ ✓