John

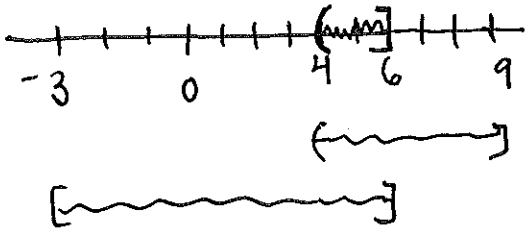
Name: Key.
Recitation Instructor, Day, Time:

TRADITIONAL MATH 100 – Exam 1 – Spring 2015

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

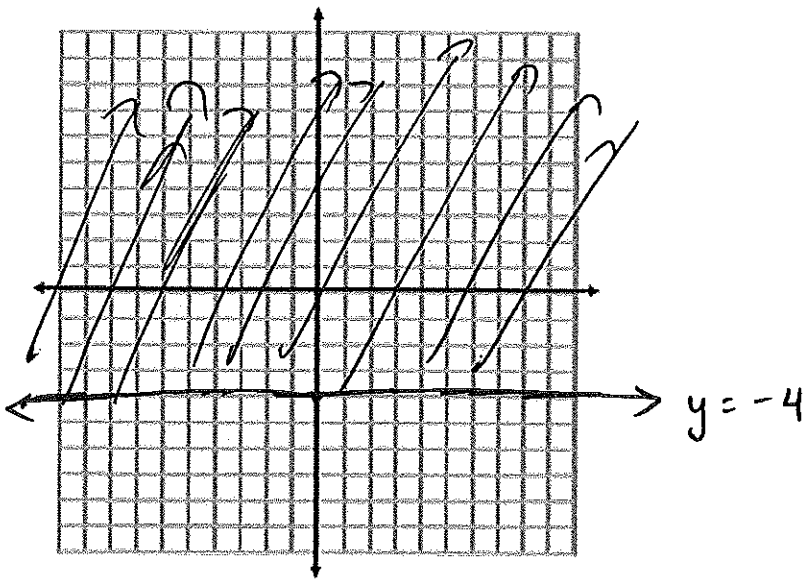
1. (6 points) Find the intersection. Express answers in **interval notation** and on a **number line**: $(4, 9] \cap [-3, 6]$



Answer on number line

Interval notation: $(4, 6]$

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 $(2, 7)$ and $(-4, 12)$. Leave answer in simplified radical form, i.e., decimal approximations are NOT allowed.

$d = \sqrt{(4-2)^2 + (12-7)^2} = \sqrt{36+25} = \boxed{\sqrt{51}}$.

CJ 4. (8 points) Evaluate and complete the following function table for $g(t) = t^2 - 3Kt$, where K is some unspecified parameter.

t	-2	-1	0	1	2
$g(t)$	$4+6K$	$1+3K$	0	$1-3K$	$4-6K$

$g(-2) = (-2)^2 - 3K(-2)$
$= 4+6K$

$g(-1) = (-1)^2 - 3K(-1)$
$= 1+3K$

$g(0) = 0$

$g(1) = 1^2 - 3K(1)$
$= 1-3K$

$g(2) = 2^2 - 3K(2)$
$= 4-6K$

CJ 5. (6 points) Solve for x: $12(x-1) - 4 = 6(x-1) + 14$

$12x - 12 - 4 = 6x - 6 + 14$

$6x - 16 = 8$

$6x = 24$

$\boxed{x = 4}$

Raul 6. (6 points) Is the function $f(x) = x^3 - 1$ even, odd, or neither? Use the definitions of even/odd to justify your answers.

$f(-x) = (-x)^3 - 1 = -x^3 - 1$

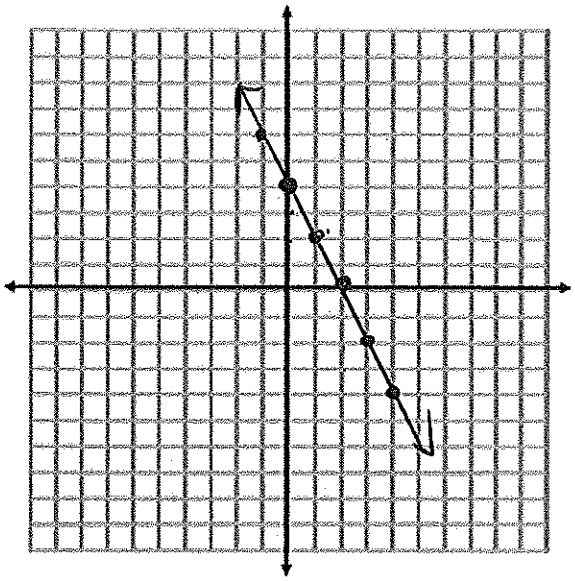
$-f(x) = -1(x^3 - 1) = -x^3 + 1$

Since $f(-x) \neq f(x)$ and $f(-x) \neq -f(x)$,

$f(x)$ is neither even nor odd.

Rank

7. (6 points) Graph $y = -2x + 4$ on the grid below. Include at least 6 points on your graph, including the intercepts.



y-intercept:

$-2(0)+4 = 4$

$(0,4)$

x-intercept:

$0 = -2x + 4$

$2x = 4$

$(2,0)$

8. (8 points) Given $f(x) = 2x + 5$, find the difference quotient $\frac{f(x+h) - f(x)}{h}$.

Anisha

$$\frac{f(x+h)-f(x)}{h} = \frac{2(x+h)+5-(2x+5)}{h}$$

$$= \frac{2x+2h+5-2x-5}{h} = \frac{2h}{h} = \boxed{2}.$$

Anisha

9. (6 points) Suppose the cost function for a certain product is given by $C(x) = 5x + 250$ and the revenue function for the product is given by $R(x) = 25x$. Find a formula for the following functions:

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

$$P(x) = R(x) - C(x) = 25x - (5x+250) = \underline{20x - 250}$$

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

$$\overline{C(x)} = \frac{C(x)}{x} = \frac{5x+250}{x}$$ } either one fine.

OR $$\overline{C(x)} = 5 + \frac{250}{x}$$

Lec

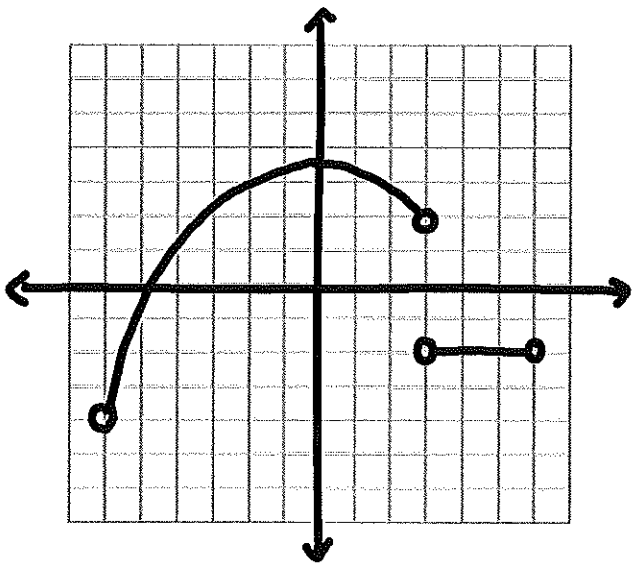
10. (6 points) Find the domain of the function $f(x) = \dfrac{5x}{x-7}$.

$x \neq 7$.

11. (6 points) Find the midpoint of the points $(3, -4)$ and $(-1, 7)$.

$\left(\frac{3-1}{2}, \frac{-4+7}{2}\right) = \left(1, \frac{3}{2}\right)$

12. (8 points) Consider the function $g(x)$ whose graph is given below.



(a) Over what x-interval(s) is the graph of $g(x)$ increasing?

$(-6, 0)$

(b) Over what x-interval(s) is the graph of $g(x)$ decreasing?

$(0, 3)$

(c) Over what x-interval(s) is the graph of $g(x)$ constant?

$(3, 6)$.

Paul.

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

$(fg)(-4) = f(-4) \cdot g(-4)$

$= 4(16) \cdot (-4-5)$

$= 64(-9)$

$= \boxed{-576}$

14. (6 points) Consider the graph of $h(x) = x^3$. Describe how the graph of $h(x+7) - 1$ would look in terms of translations.

$h(x+7)-1$ is the graph of $h(x)$ shifted left 7 units and 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.

$$f(x) = \begin{cases} 9, & x \leq -3 \\ x^3, & -3 < x \leq 2 \\ x, & x > 2 \end{cases}$$

(a) $f(-3) = 27$. false. $f(-3) = 9$

(b) $f(2) = 8$.

(c) $f(-3) = 9$.

(d) $f(-3) = -3$. false. $f(-3) = 9$

(e) $f(-6) = 9$.

(f) $f(4) = 2$. false. $f(4) = 4$.