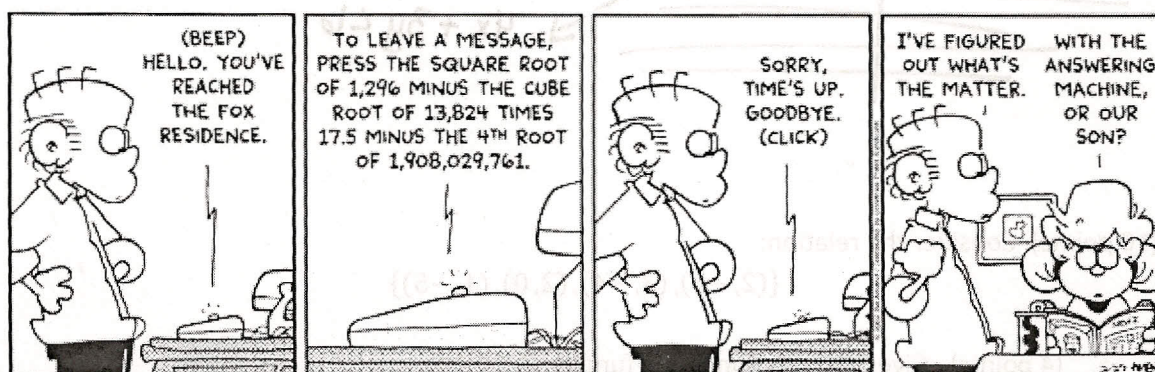


## Exam 3

PLEASE READ ALL THE DIRECTIONS CAREFULLY

- ❖ Show all work. Solutions without proper work will receive no credit.
- ❖ Present work in a clear, organized manner.
- ❖ No notes, books, or calculators allowed.
- ❖ Write answers in **lowest terms** when appropriate
- ❖ Good Luck!



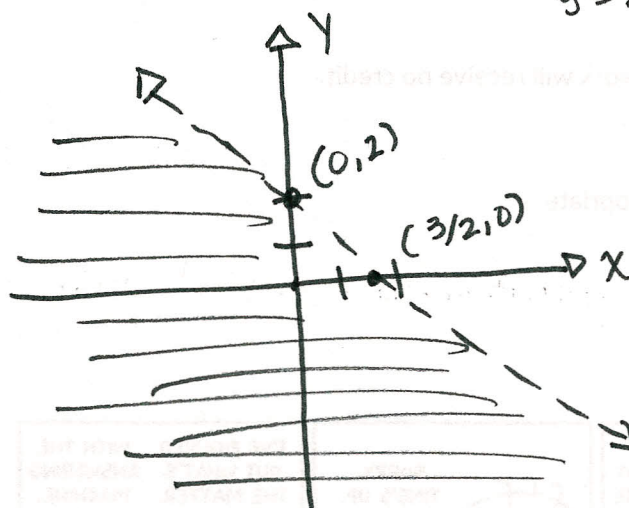
Problem	1	2	3	4	5	6	7	Bonus	Total
Score									
Possible	8	10	16	13	16	22	15	10	100

1. (8 points) Graph the inequality on the xy-plane. Label all parts of the graph (the y-axis, x-axis, two points, and the boundary line).

a. (8 points)  $4x + 3y < 6$

For Boundary  
Line

x-int:  $y=0 \rightarrow 4x = 6 \quad (3/2, 0)$   
 $x = \frac{3}{2}$   
 y-int:  $x=0 \rightarrow 3y = 6 \quad (0, 2)$   
 $y = 2$



Test Point (0,0)

$0 + 0 < 6$

$0 < 6$  True

2. (10 points) Consider the relation:

$\{(2, -5), (3, -4), (2, 0), (1, -5)\}$

- a. (4 points) Given the relation, is it a function? Explain.

Not a function because  $x=2$  is associated  
with two y values:  $(2, -5)$   
 $(2, 0)$

- b. (6 points) State the domain and range of the relation using set notation.

Domain:  $\{1, 2, 3\}$

Range:  $\{-5, -4, 0\}$

3. (16 points) Solve the following systems by using the indicated method.

a. (8 points) Solve by substitution.  $\begin{cases} x - 2y = -4 \\ 3x + y = -5 \end{cases} \rightarrow x = 2y - 4$

$$3x + y = -5$$

$$3(2y - 4) + y = -5$$

$$6y - 12 + y = -5$$

$$7y - 12 = -5$$

$$7y = 7$$

$$\boxed{y = 1}$$

Solve for  $x$

$$x = 2y - 4$$

$$x = 2(1) - 4$$

$$\boxed{x = -2}$$

$$\boxed{\text{Ans: } (-2, 1)}$$

b. (8 points) Solve by elimination.  $\begin{cases} 4x + 3y = 2 \\ 3x + 2y = 3 \end{cases}$

$$\begin{cases} -2 \cdot (4x + 3y) = 2 \cdot (-2) \\ 3 \cdot (3x + 2y) = 3 \cdot (3) \end{cases}$$

$$\begin{cases} -8x - 6y = -4 \\ + \quad 9x + 6y = 9 \end{cases}$$

$$\boxed{x = 5}$$

Solve for  $y$

$$4x + 3y = 2$$

$$4(5) + 3y = 2$$

$$20 + 3y = 2$$

$$3y = -18$$

$$\boxed{y = -6}$$

$$\boxed{\text{Ans: } (5, -6)}$$

4. (13 points) Simplify the expressions.

a. (4 points)  $7x^3 + 3x^2 - 2x + x - 5x^3 + 1$

$$= 2x^3 + 3x^2 - x + 1$$

b. (4 points)  $(-2x^2 - 3x + 9) + (3x^2 - 2x + 8)$

$$= x^2 - 5x + 17$$

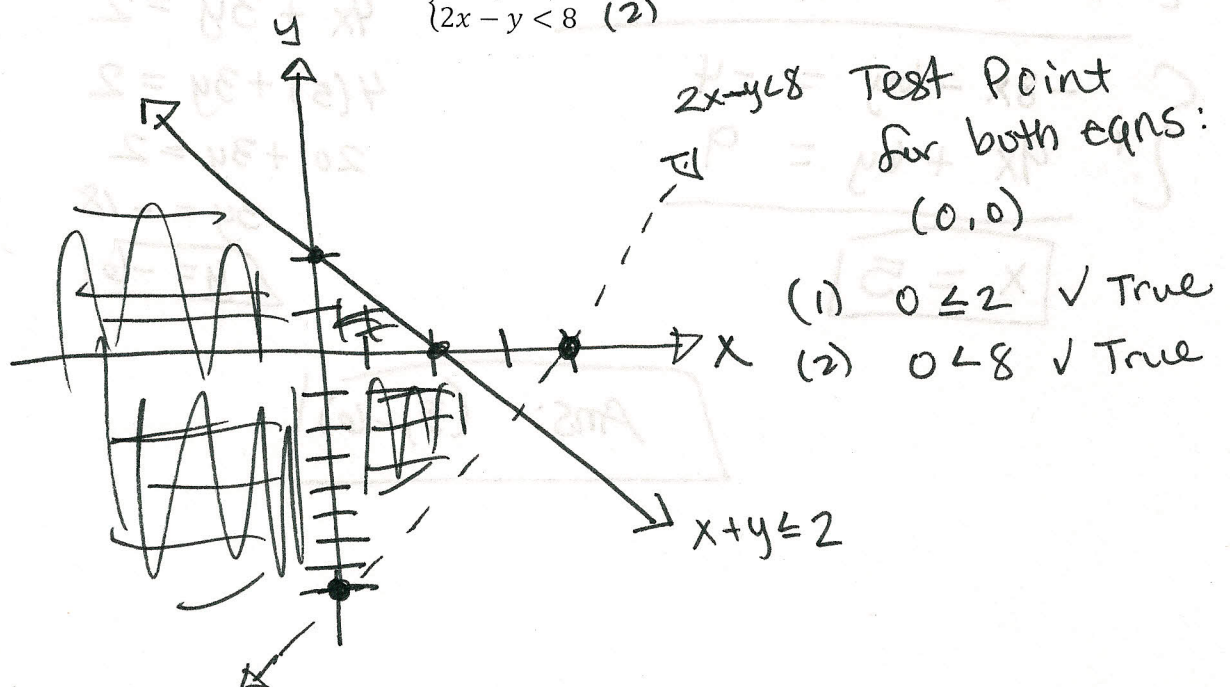
c. (5 points)  $(6x^2 + 11x + 2) - (4x^2 - 2x - 7)$

$$= 6x^2 + 11x + 2 - 4x^2 + 4x + 7$$

$$= 2x^2 + 15x + 9$$

5. (16 points) Solve the system of linear inequalities by graphing. Label all parts of the graph: y-axis, x-axis, each boundary line.

$$\begin{cases} x + y \leq 2 & (1) \\ 2x - y < 8 & (2) \end{cases}$$





6. (22 points) Simplify the following expressions so the exponents are positive.

a. (3 points)  $(6y^4)(5y^5)$

$$= 30y^9$$

b. (5 points)  $(-6a^3b^{-4})(4a^{-2}b^8)$

$$= -24ab^4$$

c. (5 points)  $\left(\frac{3x}{y^{-2}}\right)^{-1}$

$$= \frac{y^{-2}}{3x} = \frac{1}{3xy^2}$$

d. (4 points)  $(5 \times 10^4)(6 \times 10^3)$

$$= 30 \times 10^7 = 3.0 \times 10^8$$

e. (5 points)  $\frac{16 \times 10^7}{4 \times 10^9}$

$$= 4 \times 10^{-2}$$

← neg. exponent okay  
b/c scientific notation.

My directions were not accurate.

7. (15 points) Find each product.

a. (6 points)  $-x(x^3 + 5x - 4)$

$$-x^4 - 5x^2 + 4x$$

b. (4 points)  $(x - 3)(x + 5)$

$$\begin{aligned} &= x^2 + 5x - 3x - 15 \\ &= x^2 + 2x - 15 \end{aligned}$$

c. (5 points)  $(2x + 1)(x^2 - 7x + 2)$

$$\begin{aligned} &= x^2(2x + 1) - 7x(2x + 1) + 2(2x + 1) \\ &= 2x^3 + x^2 - 14x^2 - 7x + 4x + 2 \\ &= 2x^3 - 13x^2 - 3x + 2 \end{aligned}$$

Bonus: Solve the system.

$$\begin{cases} \frac{x}{5} + \frac{y}{4} = 3 & (1) \\ \frac{x}{10} - \frac{y}{2} = -1 & (2) \end{cases}$$

$$\begin{aligned} (1) \quad 20\left(\frac{x}{5} + \frac{y}{4}\right) &= 20(3) \\ (2) \quad 10\left(\frac{x}{10} - \frac{y}{2}\right) &= 10(-1) \end{aligned} \quad \left. \begin{array}{l} \\ \end{array} \right\} \rightarrow \begin{array}{l} 4x + 5y = 60 \\ x - 5y = -10 \end{array}$$

$$\begin{array}{r} 4x + 5y = 60 \\ x - 5y = -10 \\ \hline 5x = 50 \\ \boxed{x = 10} \end{array}$$

Solve for y

$$\begin{aligned} x - 5y &= -10 \\ 10 - 5y &= -10 \\ -5y &= -20 \end{aligned}$$

$$\boxed{y = 4}$$

$$\boxed{\text{Ans: } (10, 4)}$$