

Math 40 - Practice Problems for Final Exam

**Try to do all of the problems with out a calculator since you cannot use a calculator on the final.**

1. Evaluate the following expression and **reduce completely**. Show as many steps as you can and leave answer as an improper fraction if necessary.

a.  $0.4y + x(5.2 - x) + x^3$  Evaluate at  $x = 2$  and  $y = 3$

b.  $\frac{3\left(\frac{1}{2} - b\right) + \frac{5}{4}}{17 + 3a}$  Evaluate at  $a = -5$  and  $b = \frac{1}{3}$

2. Solve the following equations for  $x$ . Leave as improper fraction if necessary.

a.  $\frac{x+3}{5} = 14$

b.  $3.1(x - 2) = 1.3x + 2.8$

c.  $2(5x - 3) + 4x = 1 - 6(2x + 5)$

3. Solve the following system

$$\begin{cases} 3y = x + 6 \\ y + 2 = -x \end{cases}$$

- a. using substitution  
b. using addition/elimination

4. Perform the operations and simplify when possible

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

b.  $3(x^3 + 9x^2 - 3x + 7) - 2(11x^2 - 5x + 9)$

c.  $\frac{-2x^3}{y} \left( \frac{3x^2y}{4} - \frac{5y}{x^3} \right)$

5. Perform the operations and simplify when possible

a.  $-2x^3(3x^2 - x)$

b.  $(5x - 3z)(4x + 6z)$

c.  $(4t + 3)(t^2 + 2t + 3)$

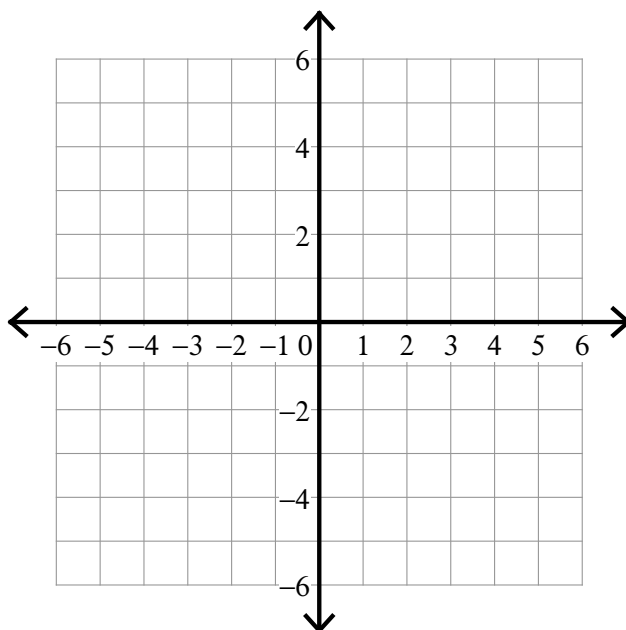
d.  $(2x + y)(11xy^2 + 2x^2y - 6)$

e. Use long division to divide  $\frac{4x^3 + x^2 - 3x + 7}{x + 1}$

6. Solve the following word problems. **Be sure to declare all variables, state an equation, solve that equation, and answer in a complete sentence with units (The five step process as we did in class). You may want to check your answer too.**
- Area.** The length of a rectangular garden is 5 feet longer than twice its width. Find the dimensions of the garden if the area is 33 feet.
  - Coins.** Coin Problem. Maria has \$2.95 in dimes and quarters. She has a total of 19 coins. How many of each does she have?
  - Mixtures.** How many liters of 10% alcohol solution and 5% alcohol solution must be mixed to obtain 40 liters of a 8% alcohol solution?
  - Number Problem.** The sum of two numbers is 15 and their product is 54? Find the numbers.

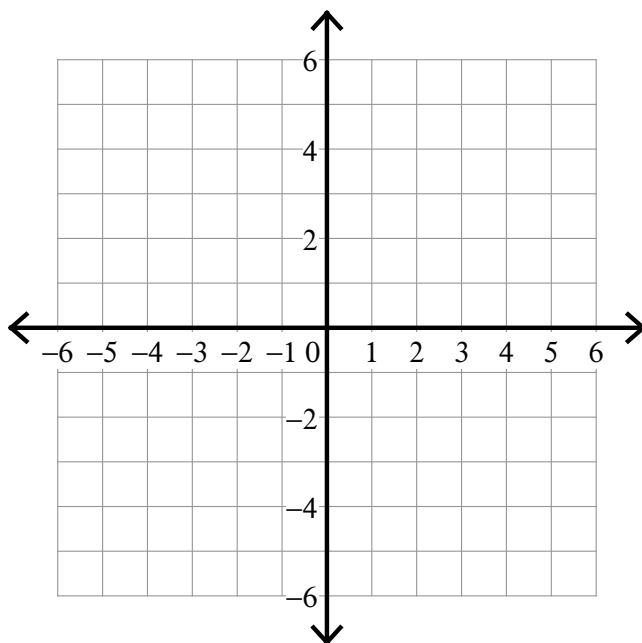
7. Graph the following linear equation using one of the three methods learned in class.

$$2y = -3x + 8$$



8. Graph the following two-variable inequality. Shade the graph in the appropriate area to represent the solution. Pick a test point to check your answer.

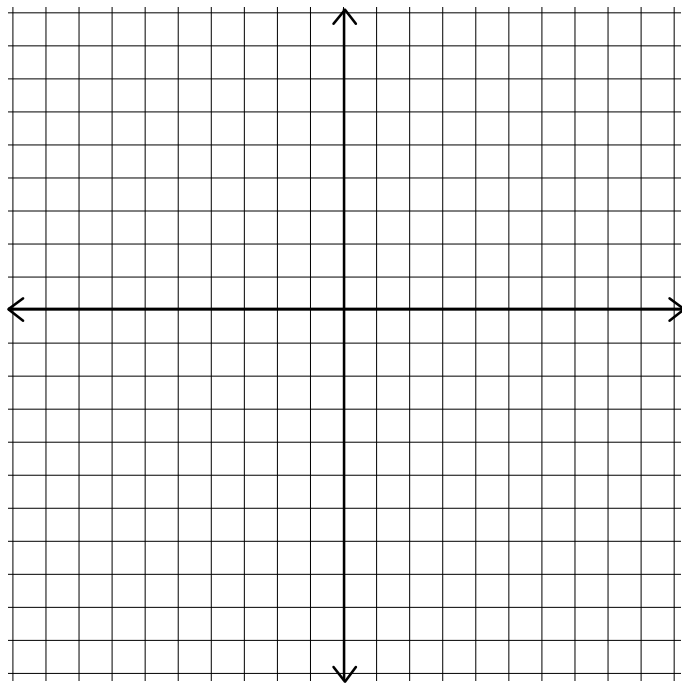
$$3x - 2y > 4$$



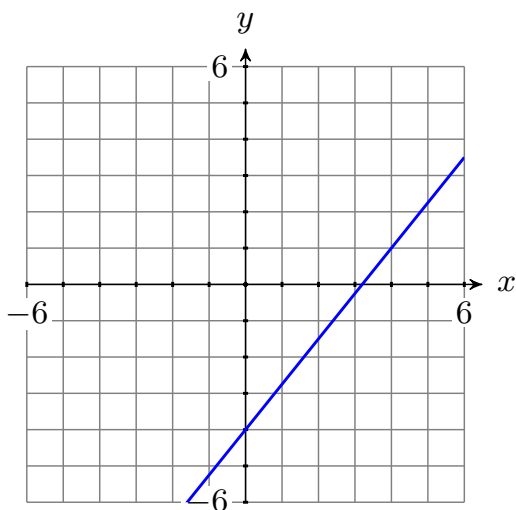
9. Given the two points

a. Using algebra, determine the whole **equation** of the line in **slope-intercept** form that passes through the points  $(-3, 7)$  and  $(6, 1)$ .

b. Accurately graph the equation found in part a. above by using the slope and  $y$  intercept or plotting points or plotting both of the intercepts (**Be sure to label and scale the axes**).



10. State the equation of the line in slope intercept form.



11. Use the properties of exponents to simplify. **Write without negative exponents.**

a.  $x^3 x^4 x$

b.  $\frac{(-2a^5 b^{-6})^3}{a^4 b^2}$

c.  $(x^6)^0$

d.  $\left(\frac{x^5 y^6}{z}\right)^2$

12. Factor the following:

a.  $x^5 y^2 + 2x^3 y^2 - 3x^2 y^2$

b.  $2ax + 6x - 5a - 15$

c.  $-12x - 2x^3 + 10x^2$

d.  $3x^2 y + 14xy^2 - 5y^3$

e.  $3x^6 - 300x^4$

f.  $35x^3 z^4 - 60x^2 z^4 - 20xz^4$

13. Solve the following equations by factoring

a.  $(5x - 6)(3x + 4) = 0$

b.  $x^2 + 7x = 8$

c.  $4t^3 - 36t = 0$

d.  $8x^3 - 10x = -16x^2$

**All material over the course of the semester is fair game for the final exam. Please study exam 3 material as well on factoring and word problems!**