

## STUDY GUIDE AND PRACTICE PROBLEMS FINAL EXAM MATH 70 FALL 2015

Below I have given a list of what I consider the major ideas you need to have as you move on into Math 89 or Math 90. As I write your exam I have this in mind, because my focus is that of preparing you for the next level. Below the list I have some details written out, and in the following pages I have some practice problems. I hope this will aid you in your study, but remember not to make this your only resource. You also have tests and quizzes you've taken in this class that have been graded and returned to you - as well as your notes, MyMathLab, and your textbook. Make good use of all your resources!

- Factoring
- Graphing
- Simplifying
- Solving
- Rules of Exponents
- Operations on Polynomials
- Word Problems

Also be able to work with FUNCTION NOTATION.

Remember that for SIMPLIFYING and SOLVING we have many sorts of equations and expressions that we have dealt with, including linear, quadratic, rational, and radical. Remember also that with solving quadratics we have three methods: factoring, completing the square, and using the quadratic formula. Be sure to review your FACTORING handout that lists the steps you should think through when factoring. Under the category GRAPHING there is the assumption that not only can you graph a line (or parabola) given an equation but also that you can find things such as slope and also equations of lines given information about them, such as knowing two points or knowing a point and the slope. Remember that we've worked with WORD PROBLEMS of many types including translation, consecutive integers, work, distance/rate/time, geometric shapes, etc. OPERATIONS means for us  $+$ ,  $-$ ,  $\times$ ,  $\div$  and exponentiation (raising something to a power).

**PLEASE NOTE:** Sometimes I'm asked when I put up a practice test or a study guide if I will also supply the answers. You have plenty of practice where the answers are provided (textbook and MyMathLab). As you work through the practice problems on the following pages without having the answers available puts you in more of a test-like situation and puts you in a position to rely more on yourself (which you need to do when taking a test!). As you work through this see if you can find ways to check your work and become more confident! Can you plug something back in to check? Can you estimate what your answer should be in order to see if your answer makes sense? If you've been asked to factor something can you multiply it back through to see if you get the original back? ETC.

## FACTORING

$$x^2 - 6x + 7x - 42$$

$$x^2 + 17x + 66$$

$$4x^2 - 49$$

$$20x^5 - 30x^4$$

$$40x^4 + 625x$$

$$8x^2 - 2x - 3$$

$$9x^2 + 12x - 5$$

$$x^4 - 1$$

$$2x^2 + 7xy - 15y^2$$

$$8x^3 + 125$$

$$10x^3 - 2160$$

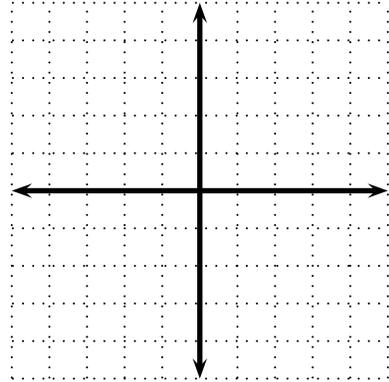
$$10x^3 - 2160$$

$$14x^2 + 13x - 12$$

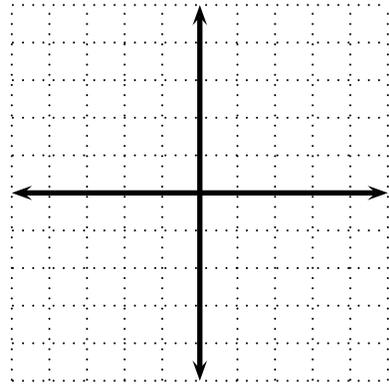
$$12a^2 + 10ab + 18ac + 15bc$$

## GRAPHING

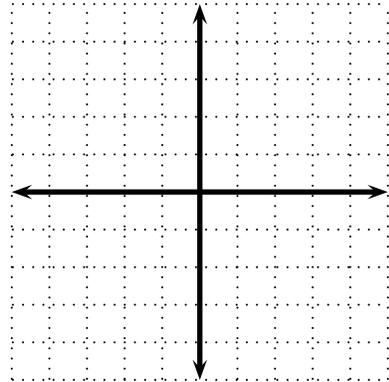
Graph  $y = -2x + 1$



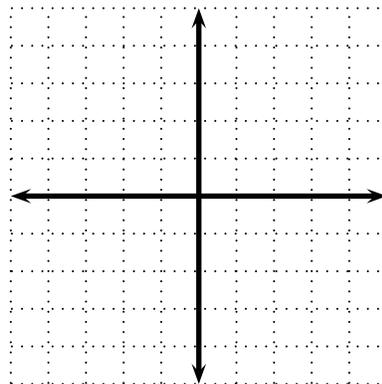
Graph  $f(x) = \frac{2}{3}x - 4$



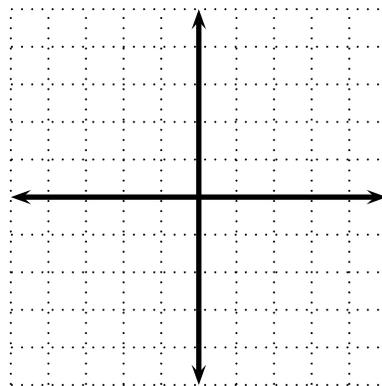
Graph  $4y < 4 - 2x$



Graph  $y = -x^2$



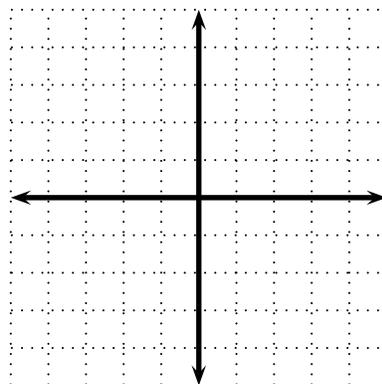
Graph  $g(x) = (x - 1)^2 - 4$



Graph the system of linear inequalities:

$$2x + 3y < 6$$

$$3x + 2y \geq 6$$



What is the slope of the line  $2x + 3y = 6$ ?

What is the slope of the line that goes through the points  $(0, -4)$ ,  $(-1, -6)$ ?

What is the equation of the line parallel to  $2x + 3y = 6$  and going through the origin?

What is the equation of a vertical line that goes through point  $(3, 7)$ ?

What is the equation of a line going through points  $(-2, -3)$  and  $(8, 2)$ ?

What sort of line is  $y + 2 = -7$ ?

What is the equation of the line going through point  $(2, 7)$  and having slope  $\frac{3}{4}$ ?

## SIMPLIFYING

$$\frac{x}{x^2 - 16} - \frac{1}{x + 4}$$

$$\sqrt{72x^{25}y^{49}}$$

$$2(x^2 - 5x + 6) - 5(3x^2 + 2x - 7) + (x + 1)$$

$$\frac{6 + \frac{2}{x}}{\frac{3x + 1}{4}}$$

$$\frac{2 + i}{3 - 2i}$$

$$2\sqrt{27} + 3\sqrt{75} - \sqrt{100}$$

$$8^{\frac{4}{3}}$$

$$\frac{(2x^4y^{-5})^{-2}(3x^{-2})^2}{24x^{-7}y^2}$$

$$\frac{5x^2 - 25x + 30}{x^2 + 6x + 9} \cdot \frac{x^2 - 2x - 15}{10x^2 - 40} \div \frac{4x^2 - 36}{x^3 - 27}$$

## SOLVING

$$x^2 - 5x = 3x + 48$$

$$x^2 - 4x + 7 = -10$$

$$2(x - 6) + 7(x + 1) = 5x + 10 - 4x$$

$$7 + \sqrt{2x + 1} = x$$

$$3 + \sqrt{x} = 10$$

$$\sqrt{x} = 1 + \sqrt{x - 5}$$

$$\frac{x}{2} - \frac{x - 1}{3} = 1$$

$$\frac{1}{2x^2 + 4x + 3} + \frac{1}{2x + 2} = \frac{3}{4x + 12}$$

Solve for  $y$ :  $\frac{1}{x} = \frac{1}{y} - \frac{1}{z}$

Solve for  $E$ :  $I = \frac{kE}{R}$

## SOLVING LINEAR SYSTEMS

$$\begin{cases} 2x + 8y = 3 \\ x = 8 - 4y \end{cases}$$

$$\begin{cases} 6x - 8y = 6 \\ -3x + 2y = -2 \end{cases}$$

## OPERATIONS ON POLYNOMIALS

$$(x^3 + 6x^2 + 11x + 7) \div (x + 2)$$

$$(x - 2)^3$$

$$(2x^2 - 3x + 4)(5x^2 - x + 1)$$

$$(-2x^2 - 4x - 6) + (5x^2 + 4x - 11) - (3x^2 + 3x - 17)$$

## WORD PROBLEMS

Julio flew his airplane 500 miles against the wind in the same time it took him to fly it 600 miles with the wind. If the speed of the wind was 10 miles per hour, what was the average speed of his plane?

A pharmacist needs 100 liters of a 50% alcohol solution. She has on hand 30% alcohol solution and 80% alcohol solution, which she can mix. How many liters of each will be required to make the 100 liters of 50% solution?

Twice the larger of two consecutive odd integers is 19 less than 3 times the smaller. Find the integers.

Fred went fishing and caught a total of 37 fish. If he caught 19 more in the morning than he did in the afternoon, how many fish did Fred catch in the morning?

Twice the sum of a number and four is equal to ten minus the number. What is the number?

If a toddler is goofing around and turns on the hot water tap and the cold water tap in the bath tub how long will it take the tub to fill if the cold water tap would take 6 minutes to fill the tub alone, the hot water tap would take 9 minutes to fill the tub alone, and the drain, which has been left open, takes 12 minutes to empty the tub?

A cashier has a total of 126 bills, made up of fives and tens. The total value of the money is \$840. How many of each kind of bill does he have?

Two cars leave Baton Rouge, Louisiana, at the same time and travel east on Interstate 10. One car travels at a constant speed of 55 miles per hour and the other travels at a constant speed of 63 miles per hour. In how many hours will the distance between them be 24 miles?

If the longer leg of a right triangle is 8 inches and the hypotenuse is 4 inches longer than the shortest leg, what are the lengths of the sides of this right triangle?

If the perimeter of a rectangle is 72 feet and the length is 8 times the width, what are the dimensions of this rectangle?

### FUNCTION NOTATION

Given that  $f(x) = 3x + 2$  and that  $g(x) = x^2 - x + 7$  find the following:

$f(0)$

$f(10)$

The value of  $x$  if  $f(x) = 11$

$g(-1)$

$g(10)$

The value of  $x$  if  $g(x) = 8$

The value of  $x$  if  $g(x) = 79$