Week 7 Algebra 2 Assignment:

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Notes on Assignment:

Chapter 3 Test

You need to be able to:

- Write a relation in circle notation, set notation (list the ordered pairs), or by graphing.
- Determine whether a relation is a function (function machine or vertical line test).
- Given the function f and g, you should be able to add, subtract, multiply, and divide the functions. You should also be able to find fog and gof (i.e. *f(g(x))* and *g(f(x))*).
- Given values for x, put those values into functions like the greatest integer function (Example: [4.7] = 4), absolute value function (Example: |-4| = 4), a linear function, or an exponential function (Example: $2^3 = 8$, $2^{-3} = 1/2^{-3} = 1/8$).
- Given 2 points, find the slope of the line that contains them.
- Given 2 points, find the equation of the line that contains them. (Remember to find the slope first and then put the slope and one of the points into the equation *y=mx+b* in order to find *b*.)
- Given the graph of a line, figure out the slope (by taking the rise/run) and then given the equation. (See where it crosses the y-axis, as this will be the *b* in your equation *y=mx+b*.)
- Graph the following:
    - A set of points
    - A constant function (y = #)
    - A vertical line (x = #)
    - A linear equation (If it is not in slope-intercept form, put it in slope-intercept form first. Graph the y-intercept first and then from there do your rise over your run using the slope to get your next point.)
    - An inequality (Graph the boundary first, deciding whether it is dotted or solid. Then test a point to see which side to shade. Always shade the “true” side.)
    - An absolute value equation (Make a table. You know it will be V-shaped.)
    - An exponential equation (Make a table.)
    - The Greatest Integer Function (Make a table using some positive numbers, including decimal numbers, until you get an idea of what the steps look like. Then continue the pattern into the negative part of the graph.)
- Know the names of the functions learned in section 3.5.

Page 137-138:

Work to show:

#1-25: See the steps listed below.
#29-33: Show work.

#1-25: Here are the steps for solving a quadratic equation by factoring:

1. Place the equation in standard form (i.e. Get all of the terms on one side of the equals sign and zero on the other side.).
2. Factor completely. (Always look for a Greatest Common Factor to pull out first!)
3. Set each factor equal to zero. Connect the equations with the word "or."
4. Solve each resulting equations.

#25: Do this the same as above, but when you do backwards FOIL, you will have $(x^2 \quad)(x^2 \quad)$ instead of $(x \quad)(x \quad)$.

#29: The "stuff" must equal 4 or -4.

#32: Remember that greater than goes to "or" and that you need to do the flip-n-switch.

Pages 142-143:

Work to show:

#1-19: Show all work like that shown below in the 2 examples.
#25-31: Answers only

I am putting in a couple of examples of completing the square to use as an example:

Example: Solve $x^2 - 6x - 7 = 0$

1. Since $x^2 – 6x –7$ is not a perfect square trinomial, we must **make** it one. Move the 7 over to the other side of the equation and put in a "+ ____" (blank) on *both* sides, so we can pick the number that will give us a perfect square trinomial and also keep the equation balanced.

$$x^2 – 6x + \_\_\_ = 7 + \_\_\_$$

2. Decide what number to put in the blank so that you will be able to factor the trinomial into something of the form $(x – h)^2$. (This is a perfect square trinomial.) To do this, take half of the coefficient of the linear term (the term with the x) and square it.

Half of 6 is 3. We square the 3 to get 9. This goes in both blanks.
(i.e. ½(6) = 3 and 3^2 = 9)

$x^2 - 6x + \underline{\ 9\ } = 7 + \underline{\ 9\ }$

3. Now we can factor using backwards FOIL.

$x^2 - 6x + \underline{\ 9\ } = 16$
$x^2 - 6x + \underline{\ 9\ } = 16$
$(x-3)(x-3) = 16$
$(x-3)^2 = 16$

<u>Note</u>: *The number in the (   ) will always be half of the coefficient of x in the original function.*

4. Now we can take the square root of both sides, remembering our +/-.

$x-3 = \pm 4$

5. Now solve for x by adding 3 to both sides.

$x = 3 \pm 4$
$x = 7 \text{ or } -1$

Example: Solve $2x^2 + 8x + 12 = 0$

If there is a coefficient on x^2, then you need to divide through by it. Divide through by 2. After that, follow the same process as above.

$2x^2 + 8x + 6 = 0$	
$x^2 + 4x + 3 = 0$	*Divide through by 2.*
$x^2 + 4x + \underline{\quad}) = -3 + \underline{\quad}$	*Move the 3 to the other side..*
$x^2 + 4x + \underline{\ 4\ }) = -3 + \underline{\ 4\ }$	$\frac{1}{2}(4) = 2 \Rightarrow 2^2 = 4$
$(x+2)^2 = 1$	*Factor*
$x+2 = \pm 1$	*Take the square root of both sides.*
$x = -2 \pm 1$	*Solve by subtracting 2 from both sides.*
$x = -1 \text{ or } -3$	

#1: This one is ready for blanks on each side.

#3: You must move the -8x to the left side first, and then put in your blanks.

#7: Move the -12 to the other side and then put in your blanks.

#11-19: These all have a coefficient on the squared term. Divide through by the coefficient so that that the coefficient is 1. Then solve by completing the square. Be careful in working with fractions and radicals.

#27-28: For the domain, ask if there are any numbers that can't go into the function. If not, then the domain is the set of real numbers. If there are some that can't, state those excluded values. For the range, ask what kind of numbers will come out of the function. Will it just be positive numbers? Just negative numbers? Just integers? etc.

#31: What x-values are used here? In other words, which values on the x-axis have points above them? This would be the domain. For the range, ask what y-values are used. In other words, which values on the y-axis have points across from them?

Pages 146-147:

Work to show:

#1-21: Show work.
#26-30: Answers only is ok

#1-19: Make sure the equations are in standard form: $ax^2 + bx + c = 0$. Some of the equations will have the terms out of order, so watch that, too. Finally, remember that the sign in front of the number belongs to the number. If you have $5x^2 - 7x + 2 = 0$, then make sure that you write down $b = -7$. Simplify any radicals and fractions.

#15: The discriminant is a large number, but it is a perfect square. Use your calculator to find it.

#21:   This is referring to the derivation on page 144. At what step is it important to state that $a \neq 0$?

#26-30: We know from an earlier chapter, that if the degree of the equation is 1, then there is only an x-term and no x raised to any other power. These are simple linear equations that have 1 solution. In this chapter we have solved quadratic equations, which are of degree 2 because they have an x^2 as the largest power. These have a max of 2 solutions. If the degree is 3, then there is a max of 3 solutions, etc. Look at these problems and see if you can figure out what type of variable terms you get. Then answer the question regarding the max number of solutions.

Pages 153-154

Work to show:

#1-3: Answers only

#5-25: Calculate and show the value of the discriminant. Then write the number and nature of solutions.

#1-3: Your choices are factoring, square roots, completing the square, and quadratic formula.

#5-9: Work out the discriminant $b^2 - 4ac$ and see what kind of number you get.

- If it is negative, then you have 2 complex solutions, and those solutions are conjugates.
- If it is zero, then you have one real, rational solution.
- If it is positive, then see if it is a perfect square or not.
    - If it is a perfect square, then you have 2 real, rational solutions.
    - If it is not a perfect square, then you have 2 real, irrational solutions.

#11-25: You can solve these by any method you want. When you finish, state the number and nature of the solutions.

#29: Put the point in for x and y, and the slope in for m in the equation $y = mx + b$ to find out what b is.

#30: Use the 2 points to find the slope, then put one of the points and the slope into the equation $y = mx + b$ to find out what b is.

#31: Since the y-intercept is b, put that and the point into the equation $y = mx + b$ to find out what m (the slope) is.

#32: Put the equation in slope-intercept form ($y = mx + b$) so that you can tell what the slope is. Use that slope for your line since they are supposed to be parallel. Put the point and the slope into the equation $y = mx + b$ to find out what b is.

#33: The slope of your line is perpendicular, so the slope is the negative reciprocal of the slope in the given line. Figure out your perpendicular slope, and then use the slope and the point and find the equation of the line as you have been doing for the above problems.