# <u>Week 10 Algebra 2 Assignment:</u>

Day 1: pp. 195-196 #2-20 even, 21-23
Day 2: pp. 202-203 #1-31 odd, omit 27
Day 3: pp. 209-211 #1-15 odd
Day 4: pp. 214-215 #1-17 odd, 21-30
Day 5: Chapter 5 test

## <u>Notes on Assignment:</u>

### <u>Pages 195-196</u>

**Work to show:**

#2-8: For all of these problems:

1. Write down the boundary equation and write whether it is dotted or solid.
2. If it is not in standard form, put it in standard form.
3. Graph the parabola.
4. Check a point in the original equation (Show this test.)
5. Shade the "true" side.

#10-12: Answers and sketched graphs
#14-16: Same as for #2-8 listed above
#18-20: Three answers for each
#21-30: Answers only

#10-12: For the domain, it will be all real numbers except any values that might make the equation undefined. Are there any? For the range, you need to sketch the graph. The range is all of the y-values that have a point associated with them. If there is shading across from a y-value, it is included in the range.

#14: For this problem:

1. Write it with an equals sign for the boundary equation. (Decide dotted or solid.)
2. Put in your + ____ and your - ______.
3. Put in your (        ).
4. Factor out a -1.
5. Complete the square.
6. In your - ____ the number you put there is actually -1 times whatever number is in your + _____.
7. Factor your perfect square trinomial.
8. Sketch the graph.

#16: Do this the same as for #14, but instead of factoring out a -1, you factor out a 3.

#18-20: Find the domain and range the same way you did for #10-12. For the line of symmetry, remember that it is a vertical line through your vertex, so it will be of the form x = #, where the # is the x-coordinate of your vertex.

#21: Look at your graph for #4. How was it shaded? #21 would be shaded the same way (except for the boundary being solid in #21).

#22: Look at the graph for #6. How was it shaded? #22 would be shaded the same way (except for the boundary being dotted in #22).

#23: This is just like #21 except for the boundary.

#24: This is just like #22 except for the boundary.

#25-30: If you don't know these, look the terms up in the glossary or index.

## Pages 202-203:

**Work to show:**

#1-7: Calculations, not synthetic division
#9-15: Long division
#17-19: Synthetic division
#21-25: Use synthetic division or long division to find factors.
#29-31: Factor as needed to find zeros.

#1: The remainder theorem says that if you divide (x-1) into the polynomial, the remainder will be the same as the number you get when you find P(1). So, to find the remainder, put 1 into the function P. When you do this you get 14. That means 2 things. It means that the point (1, 14) is on the graph of the function. It also means that if you divide the polynomial by (x-1) the remainder is 14.

#3-7: Do these the same as #1.

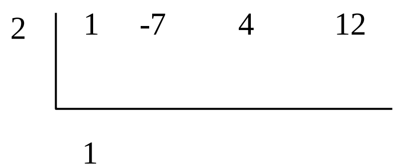
#9: The factor theorem says that if (x-5) is a factor of the polynomial, then if you divide the polynomial by (x-5), the remainder will be zero. So divide using long division. (ugh!)

#11-15: Divide using long division to see if there is a remainder.

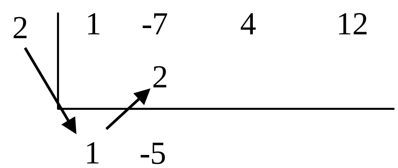
#17: Your possibilities come from the factors of 8. They are ±1, ±2, ±4, ±8. Start trying them in your synthetic division. When you find one that gives a remainder of 0, you should be able to factor the remaining quadratic.

<u>Example of synthetic division</u>: Divide $(x^3-7x^2+4x+12)\div(x-2)$

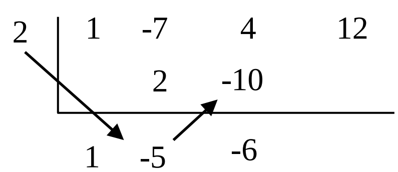
- Put a 2 outside and then list the coefficients of the polynomial.
- Bring down the first number.




- Multiply the 2 times 1 and then add to the -7 to get -5.




- Repeat the process. Multiply 2 times the -5 and add to 4 to get -6.

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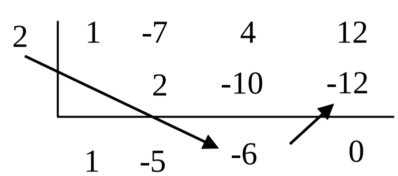


- The last number is the remainder, and since it equals zero, that means that (x-2) divides evenly. The rest of the numbers on the bottom become the coefficients of the quotient. Thus,

$$(x^3-7x^2+4x+12)\div(x-2)=(x^2-5x-6)$$

- This also means that $(x^3-7x^2+4x+12)=(x-2)(x^2-5x-6)$.
- If we continue to factor, we get $(x^3-7x^2+4x+12)=(x-2)(x-6)(x+1)$. We can see by this that the numbers that make this polynomial = 0 are 2, 6, and -1.

#19: Your possible factors come from the 6. Remember that if a number works in synthetic division, that in the factor itself, the sign will be the opposite. For example, if you use 2 for your synthetic division and your remainder is 0, then your factor is (x-2).

#21: To solve this you must factor it completely first as you did in #17 and 19 above. Then set each factor equal to zero and solve.

#23: Get everything on one side of the equals sign first.

#25: Remember that finding f(7) by putting it into our function will give us the same number as we would get as the remainder when we do synthetic division with 7.

#29-31: To find the y-intercept, let x = 0. To find the zeros (i.e. x-intercepts) let y = 0 and solve by factoring.

## Pages 209-211:

**Work to show:**

#1-7: Show work needed to factor these and find zeros (quadratic equation, synthetic division, etc.) Put quadratics in vertex form.

#9-15: Show work needed to factor these and find zeros (quadratic equation, synthetic division, etc.) Put any quadratics in vertex form. Make a table for key points and then graph.

#1: To find the zeros, you must let y = 0 and solve. In this case we have P(x) instead of y, so we let P(x) = 0 and solve by factoring.

#3: This is a quadratic. If it does not factor, use the quadratic formula.

#5: Your zeros will all be factors of 5. You will need to do one of the following to find them:

- Use long division. (If the remainder = 0, then the binomial is a factor.)
- Use synthetic division. (If a # gives you a remainder of 0, then (x - #) is a factor.)
- Find P(#) for all of the factors of 5 to see which one(s) give you 0. (If P(#) = 0, then (x - #) is a factor.

After you find the first factor, continue factoring the resulting polynomial to find the other factors. Once you get a quadratic, you may use the quadratic formula if you want.

#9-15: For all of these, follow these steps:

1. Find the y-intercept and graph it. (Let x = 0 and solve.)
2. Find the zeros (x-intercepts) and graph them. (Let y = 0 and solve by factoring. You may need to use synthetic division to help you find some of the factors.)

**NOTE**: If you cannot find any zeros, you will have to approximate them using and x-y table. When the y-coordinates go from positive to negative, you know that there is a zero between the 2 x-coordinates that gave you those y-coordinates.

3. Make an x-y table to find at least one point between the zeros, and one point to the left and right of the outside zeros.
4. Sketch the graph.

#9: Put in 2 points on each side of your single zero to get an idea what this looks like.

#11: The numbers that you try for possible zeros are ±1 and ±3. Don't forget to put in a 0 for $x^2$ since there is no $x^2$ term. When you do the synthetic division, you will find that none of these 4 numbers give you 0 for your remainder. But, they do give you 4 points on your graph and will help you narrow down where your zero is. Put in a few more values for x in your table and sketch the graph.

#13: Do this just like you did #11.

#15: Do this just like you did #11. Put a few values into your table to approximate where the graph crosses the x-axis.

## Pages 214-215:

**Work to show:**

#1: Table and graph
#3-9: Show completing the square process for problems not in vertex form. Graph (tables optional).
#11: 5-step word problem
#13: Show border equation, whether dotted or solid, and test point. Graph.
#15-17: Show work needed to factor
#21-26: Answers only
#27: Graph
#28-30: Use #27 to draw graphs without using tables.

Chapter Review – no notes

## Chapter 5 Test

(See next page)

**Notes on the test:**

- For an equation like $y = 5(x-4)^2 + 7$ be able to tell the following:
    - What is the vertex? [(4, 7)]
    - Does it open up or down? [up]
    - Is the vertex a minimum or maximum point? [minimum]
    - What is the line of symmetry? [x = 4]
    - Is the graph narrower or wider than the graph of $y = x^2$? Why? [narrower, since 5 >1]
    - Would the graph be solid or dotted? Why? [solid because of the =]
- For an equation such as $y = x^2 - 4x - 21$ be able to tell the following:
    - Find f(-1). [-16]
    - Find the zeros. [-3 and 7]
    - Complete the square. [$y = (x – 2)^2 -25$]
    - Give the vertex. [(2, -25)]
- For an equation like $P(x) = x^3 +2x^2 – 11x – 12$ be able to tell the following:
    - Use the remainder theorem to find the remainder in dividing P(x) by x – 2. [Find P(2), which equals -18, so the remainder is -18.]
    - Factor P(x) completely. [Use synthetic division to help with this to get P(x) = (x+1)(x+4)(x-3).
    - Find the zeros of P(x). [Using the factored form above we get the zeros -1, -4, and 3.]
- Read a graph involving a parabola, being able to pick out the max or min value.
- Match equations with their graphs.
- Graph 2 quadratic equations.
    - Put the graph in standard form.
    - Determine the vertex.
    - Does it open up or down?
    - Is the graph narrower or wider than the graph of $y = x^2$? If it is not the standard shape, find a couple of points to help determine the shape. Mirror these points across the line of symmetry for additional points.
- Graph 2 quadratic inequalities.
    - Write down the boundary equation and write whether it is dotted or solid.
    - If it is not in standard form, put it in standard form.
    - Graph the parabola.
    - Check a point in the original equation.
    - Shade the “true” side.
- Graph 1 polynomial function.
    - Find the y-intercept and graph it. (Let x = 0 and solve.)
    - Find the zeros (x-intercepts) and graph them. (Let y = 0 and solve by factoring. You may need to use synthetic division to help you find these.
    - Make an x-y table to find at least one point between the zeros, and one point to the left and right of the outside zeros.
    - Sketch the graph.

WATCH THE REVIEW VIDEOS ONLINE!!!!!!!!