Week 28 Algebra 2 Assignment:

Day 1: Chapter 12 test
Day 2: p. 578 #1-20
Day 3: pp. 584-585 #1-16
Day 4: pp. 590-591 #1-19
Day 5: pp. 595-597 #1-18

Notes on Assignment:

Chapter 12 test:

For the test:

- Use the laws of logs to either expand or condense a logarithmic expression.
- Write the inverse of the function $f(x) = 2^x$.
- Find the inverse of a function given in set notation or as an equation.
- Write log expressions in exponential form.
- Write exponential expressions in using logarithms.
- Match functions with their graphs.
- Simplify logs and inverse trig functions.
- Given a graph of a function, sketch its inverse.
- Solve log equations.

Page 578:

General notes for this section: The standard form of a circle with center (h,k) and radius r is

$$(x-h)^2 + (y-k)^2 = r^2.$$

Work to show:

- #1-10: Answers only.
- #11-15: Graphs
- #16-20: Show work.

#16-20: To write an equation of a circle in standard form, you must:

1. Group the x-terms together and the y-terms together.
2. Put two +___'s on each side.
3. Complete the squares for the x's and the y's.
4. Factor.

Pages 584-585:

Work to show:
#1-10: Graphs
#11-16: Show any work needed.

#1: You know that the vertex is (1, 4) and the parabola opens up. This means that the focus will be (1, "*something*") and the directrix will be y = "*something*". More accurately, when we find the value of p, we will know that the focus is (1, 4+p) and the directrix will be y = 4 – p. (The focus is p units up from the vertex and the directrix is p units down from the vertex.)

From the equation we know that $\frac{1}{3}=\frac{1}{4p}$. Solving this for p, we get $p=\frac{3}{4}$. That means that the focus is $(1,\ 4\frac{3}{4})$ and the directrix is $y=3\frac{1}{4}$.

#6-7: These open left and right instead of up and down.

#9: You must complete the square first to put it in the proper form.

#10: When you complete the square, you must first pull out the $\frac{-1}{2}$ from the first 2 terms.

This gives us $y=-\frac{1}{2}(y^2-4y+\_\_\_)-3-\_\_\_$. Now fill in the blanks, but be careful! What you put in the first blank must be multiplied by -1/2 before putting it in the 2nd blank.

#11: The distance from the vertex to the focus is 2 units. This is p. Put this value and the vertex into the standard form of the parabola $x=\frac{1}{4p}(y-k)^2+h$ (because the parabola opens to the left. This gives us $x=\frac{1}{8}(y-7)^2+3$. Now finally, because it opens to the left instead of the right, you must make the $\frac{1}{8}$ negative. The final answer is $x=\frac{-1}{8}(y-7)^2+3$.

#13: The distance from the vertex to the directrix is 5 units, so p = 5.

Pages 590-591:

General notes for this section: For an ellipse:

The standard form of an ellipse is $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ or $\frac{x^2}{b^2}+\frac{y^2}{a^2}=1$ where a ≥ b.

- The square root of the number under the x^2 tells us how far left and right to go from the center for the edge of the ellipse.
- The square root of the number under the y^2 tells us how far up and down to go from the center for the edge of the ellipse.
- The distance from the center to the focus is found by taking $a^2=b^2+c^2$ and solving for c.

Work to show:

#1-5: Graphs
#6-11: Show any work needed.
#12-15: Show work.
#16-18: Graphs
#19: Answer only

#5: If there is no denominator, put a 1.

#8: The larger denominator is always the a^2 and the smaller number is always the b^2. To find the focus distance, solve $a^2=b^2+c^2$ for c. In this problem that gives us

$$49=9+c^2$$
$$40=c^2$$
$$c=\pm 2\sqrt{10}$$

This means that the focus is $2\sqrt{10}$ units to the left and right of the center (0,0). That means the coordinates are ($2\sqrt{10}$,0) and (-$2\sqrt{10}$, 0).

#10-11: Since the number on the right side of the equals sign should always be 1, you need to divide through the equation to make it a 1. That should put your equation in the correct form.

#12: You can tell that the center must be (0,0) since that is half-way between the 2 vertices. Since the foci lie on the major axis, you also know that the major axis for this ellipse is horizontal (i.e. the ellipse is wider than it is tall). This means that a must be 6 and c must be 4. Use $a^2=b^2+c^2$ to find b and finish the equation.

#16-18: Your values for a, b, and c may not be whole numbers. Approximate their values.

Pages 595-597:

General notes for this section: For a hyperbola:

The standard form of a hyperbola is $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ or $\frac{y^2}{a^2}-\frac{x^2}{b^2}=1$ where a ≥ b.

- The square root of the number under the x^2 tells us how far left and right to go from the center for the edge of the axis (box).
- The square root of the number under the y^2 tells us how far up and down to go from the center for the edge of the axis (box).
- If the x^2 is listed first, the hyperbola opens left and right (cuts through the x-axis).
- If the y^2 is listed first, the hyperbola opens up and down (cuts through the y-axis).
- The distance from the center to the focus is found by taking $a^2+b^2=c^2$ and solving for c.
- When graphing, use your values of a and b to determine your box. The asymptotes will fall along the line of the diagonals of the box.

Work to show:

- #1-4: Graphs
- #5-6: Show work.
- #7-10: Graphs
- #11-18: Show any work needed.

#1: This hyperbola is centered at the origin. For your box, go 2 units left and right from the origin, and then 4 units up and down from the origin. From these points, sketch a box and then draw the asymptotes through the opposite corners of the box. Since the x is listed first, our hyperbola opens left and right. Sketch it.

#5: The hyperbola must open up and down, which means it must be of the form $\frac{y^2}{a^2}-\frac{x^2}{b^2}=1$. In addition, a must be 3, because of the vertices given. The foci distance is 6, so to find b, use the equation $a^2+b^2=c^2$.

#7: Put a 1 under the y^2. Also, realize that the center of this hyperbola is (-2, 0).

#9: Divide through the equation by 100, since the right side must always equal 1.

#10: Graph this with an = instead of >. When you are finished, check a point to see where to shade. You will either shade between the 2 curves or outside of each.

#12-14: Graph these asymptotes on a graph. The rise and run of the slope actually give you values for a and b.

#15: Draw this first and then figure out what the equation must be. You will need to use $a^2 + b^2 = c^2$.

#17: You will need to fine c using $a^2 + b^2 = c^2$.

#18: Divide through by 24 first. Leave your answer in radical form.