<u>Week 19 Algebra 2 Assignment:</u>

Day 1: pp. 366-367 #1-33 odd, omit #25, 27
Day 2: pp. 366-367 #2-32 even, omit #28
Day 3: pp. 373-375 #1-25 odd
Day 4: pp. 373-375 #2-24 even
Day 5: pp. 377-379 #1-21 odd, 27

<u>Notes on Assignment:</u>

<u>Pages 366-367:</u>

<u>General notes for this section</u>: When adding rational expressions, follow these steps:

1. Factor all denominators.
2. Find the LCM (least common multiple) of all of the denominators.
3. Multiply each fraction times 1 in the form of $\frac{n}{n}$ in order to get the LCM in the denominator of each fraction.
4. Add or subtract and place the result over the common denominator.
5. Simplify the expression if possible.

Work to show:

#1-24: Factor the denominators as you write the problem down. Write down LCM = _____ and fill it in. Then show what you are multiplying each fraction by to get the LCM. Do the addition or subtraction and then simplify your answer if possible.
#29-33: Show work
#30,32: Graphs

#3: The negative in the 2^{nd} fraction can be written in the numerator of the fraction instead.

#7: Remember that to change the order of subtraction in a denominator, multiply the fraction by $\frac{-1}{-1}$.

#10: Make sure to subtract all of the way through the numerator of the 2^{nd} fraction. Also, when you are finished subtracting and combining like terms, see if you can factor the numerator and denominator to simplify the fraction.

#13-14: Factor and cancel within each fraction first. Then get a common denominator if needed, and add or subtract.

#21-24: There are 2 methods for working out this type of problem:

Method 1: Take the numerator, get a common denominator, and add/subtract to get a single fraction. Then take the denominator and do the same to get a single fraction. Then write the division as multiplication and solve.

Method 2: Find the LCM of all of the denominators within the complex fraction. Multiply the complex fraction by $\frac{LCM}{LCM}$ and simplify.

Example: Simplify $\dfrac{\frac{1}{x}+3}{\frac{5}{x^2}+\frac{2}{x}}$

Method 1: Simplify the numerator: $\frac{1}{x}+\frac{3}{1}\frac{(x)}{(x)}=\frac{1+3x}{x}$

Simplify the denominator: $\frac{5}{x^2}+\frac{2}{x}\cdot\frac{(x)}{(x)}=\frac{5+2x}{x^2}$

Put these back into the fraction to get: $\dfrac{\frac{1+3x}{x}}{\frac{5+2x}{x^2}}$

Change the division into multiplication and simplify:

$$\frac{1+3x}{x}\cdot\frac{x^2}{5+2x}=\frac{x(1+3x)}{5+2x}=\frac{x+3x^2}{5+2x}$$

Method 2: Find the LCM of the individual denominators: x^2

Multiply the complex fraction by $\frac{x^2}{x^2}$

$$\frac{\left(\frac{1}{x}+3\right)}{\left(\frac{5}{x^2}+\frac{2}{x}\right)}\cdot\frac{x^2}{x^2}$$

As we usually do when we multiply through to clear fractions, it is helpful to actually write the x^2 beside each term, like this:

$$\frac{(x^2)\frac{1}{x}+\frac{3(x^2)}{1}}{(x^2)\frac{5}{x^2}+\frac{2(x^2)}{x}}$$

Cancel and simplify: $\frac{x+3x^2}{5+2x}$

#26: Factor both numerators as the difference of squares. Then factor the sums and differences of cubes. (Refer to page 25 if needed.) The first denominator does not factor, but the 2nd one does. Simplify *before* looking for an LCM.

#29: You must rationalize the denominator by using the conjugate.

#31: Isolate the radical before squaring both sides. Don't forget to check your solution.

#32: This is a parabola. You should be able to tell the vertex, whether it opens up or down, and if it is more narrow or flatter than the standard shape. Plot just 1 or 2 other points other than the vertex to get the correct shape.

#33: To find the zeros, you let f(x) = 0 and solve. That means you need to try to solve this by factoring. Remember that your options for binomial factors need to take into consideration the constant, 4. You need to try the following factors: (x ± 1), (x ± 2), and (x ± 4). You can either test these using long division or synthetic division. Once you find one binomial factor, you will be able to factor the quadratic that remains. When it asks for the multiplicity, it is asking how many time a factor is used. If you completely factor a problem, and the same binomial factor shows up twice, then that zero would have a multiplicity of 2.

Pages 373-375:

Work to show:

#1-4: Three answers for each

#5-8: Write the fraction in factored form, then write the answers.

#9-12: Each problem has 2 answers. Show the factored form of the fraction, then find the intercepts.

#13-17: Do these on graph paper (your own or downloaded from our math website). Show all 5 steps as listed below. I should see the intercepts and asymptotes listed as well as graphed. Also, show a small x-y table used to find a few points.

#18-21: Show work.

#22-25: Same instructions as for #13-17.

#5-8: Vertical asymptotes occur at values that make the function undefined. These values are most easily seen if you factor the denominators.

#9-12: To find x-intercepts, let $y = 0$ and solve. To find y-intercepts, let $x = 0$ and solve.

#13-17: Steps for Graphing rational functions:

1. Find the y-intercepts by letting $x = 0$.
2. Find the x-intercepts by letting $y = 0$.
3. Determine the vertical asymptotes by looking at the restrictions on the denominator.
4. Determine the horizontal asymptotes by asking yourself what happens to the value of the fraction as x gets incredibly large (i.e. approaches infinity).
5. After putting all of the above items on your graph, plot a few points and sketch the graph.

*Note: Sometimes a function may cross the horizontal asymptote around the origin.

#18-21: The easiest way to find the domain is to ask yourself if there is any number(s) that you can ***not*** put into the function. This would include numbers that make the denominator =0 or numbers that would make the quantity under a radical negative, etc. Your domain will then be the set of all real numbers ***except*** those values.

#23: It is important to note here, that as x approaches infinity, the fraction approaches 0, so the x-axis is a horizontal asymptote. However, the value of the fraction will always be positive, which means it will approach the x-axis from the top. You may not always notice something like this, but if you plot a point somewhere to the right of 1 (your x-intercept) you will see that it is positive. This is one of those graphs in which the graph actually crosses the intercept, as mentioned in the note above.

Pages 377-379:

General notes for this section: To solve a rational equation:

1. Factor all denominators.
2. State your restrictions on the variable, based on the denominators.
3. Determine the LCM.
4. Multiply through by the LCM to clear the fractions. (Write the LCM beside each fraction and cancel. Be careful in multiplying what is left.)
5. Solve the resulting equation.
6. Check for extraneous solutions. (The solution cannot be one of your restrictions.)

Work to show:

#1-21: Follow the steps above. You can factor the denominators as you write them down if you want. I should see "x ≠ _____" and also "LCM = _____________" written down. I should also see the LCM written beside each fraction.

#27: This problem is telling to find $f(g(x))$. Put your function $g(x)$ into the function f and simplify.