

Math 95, (Instructor: Mr. Diss) Final Test: Do all steps on separate paper. Please do not write on this sheet. Please work in a vertical format and skip lines between problems.

1. Given the function, $f(x) = x^2 + x + 4$, complete the following:
- Solve $f(x) = 16$
 - Evaluate $f(-3)$.
 - Simplify $3f(x)$

2. Factor completely.
- $6x^2 - 13x - 8$
 - $3x^3 - 36x^2 + 33x$
 - $x^2 + x - 24$

3. Solve the following and include steps for finding the LCD and include steps for the restrictions.

$$\frac{1}{x^2 - 16} + \frac{4}{x + 4} = \frac{5}{x - 4}$$

4. Simplify the following. Make sure you include hidden restrictions.

$$\frac{x + 5}{x^3 - x} \div \frac{x^2 - 25}{x^3}$$

5. Simplify the following. Make sure you include hidden restrictions.

$$\frac{2}{x^2 - 1} - \frac{2}{x - 1}$$

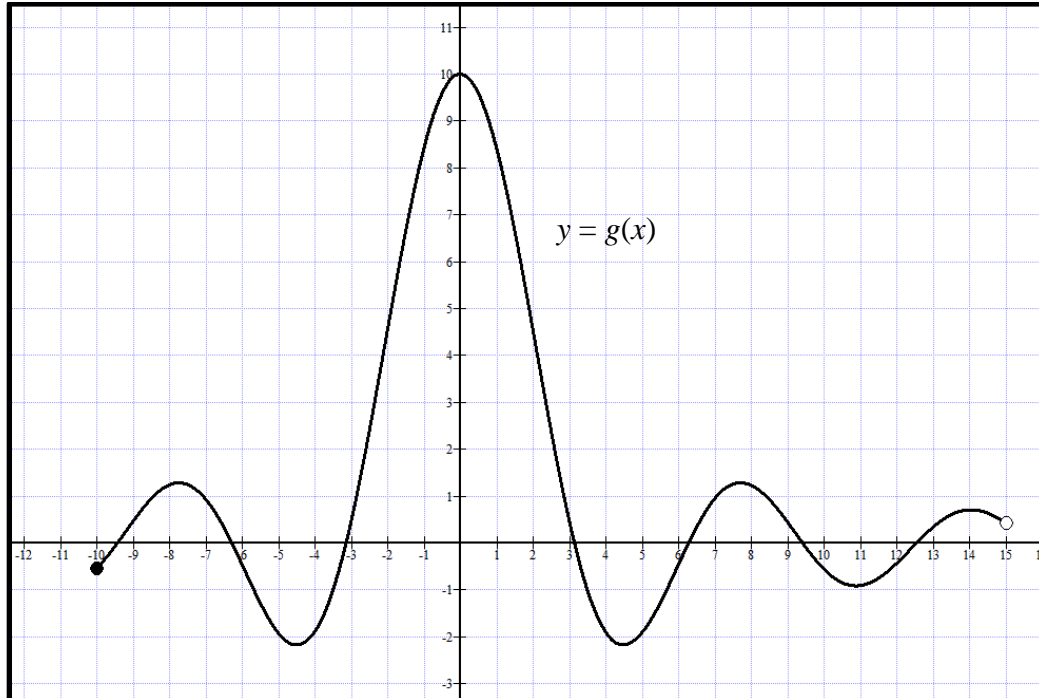
6. Solve the following worded problems:

- Use the formula $d \approx 1.22\sqrt{h}$, where d is distance in miles a person can see out to the horizon at a height, h , where h is in feet. Solve the equation for h [Hint: Square both sides of the equation]. Determine the height of the viewer if they want to see out to a distance of 10 miles.
- One machine cuts the metal in 12 minutes and the second machine can cut the metal in 6 minutes. How long would it take to cut the metal if both machines work together?

7. Solve and check.

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

8. Answer the following on functions. [Note: Approximate values may be used.]



- Find $g(-12)$.
- Find $g(4)$.
- Solve $g(x) = 5$.
- Solve $g(x) = -3$.
- State the domain and range of $g(x)$ in interval notation.

9. Solve by completing the square and by using the quadratic formula and answers from both methods should be the same.

$$3x^2 - 2x = 2$$

10. Put the following function, $f(x) = -x^2 - 2x + 8$ in vertex form by competing the square, and then do the following:

- Write down the open direction
- Write the Vertex
- Axis of symmetry
- Find the y intercept
- Find the x intercepts
- Graph and show the axis of symmetry in a dashed line.