Math 150 - Week-In-Review 2

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Problem Statements

1. Perform the operations and simplify.

   (a) $\dfrac{2x^2-5x-3}{6x^2+3x} \cdot \dfrac{3x^2+12x-15}{x^2+2x-15}$

   (b) $\dfrac{x^2+5x-14}{x^2+8x+7} \div \dfrac{x^2-x-2}{x-3}$

   (c) $\dfrac{x+2}{x^2-2x-8} - \dfrac{x-2}{x^2-4}$

   (d) $\dfrac{\dfrac{1}{x} - \dfrac{1}{2x^2}}{\dfrac{2}{x} - 1}$

2. Determine whether the function is even, odd, or neither. Then describe the symmetry.

(a) $f(x) = \dfrac{x(x^2-1)}{5x^4+1}$

(b) $g(x) = \sqrt[3]{x^2-1}$

(c) $h(x) = \dfrac{x^3-1}{x^4+2}$

3. If $h(x) = \dfrac{3x}{2} + 1$ evaluate the following:

(a) $h(a)$

(b) $h(a+b)$

(c) $\dfrac{h(a+b) - h(a)}{b}$

4. Consider the complex numbers $z_1 = 1 + \sqrt{-27}$ and $z_2 = 2 - \sqrt{-12}$.
   (a) Write z_1 and z_2 in standard form.

   (b) Find $z_1 + z_2$, $z_1 - z_2$, and $z_1 z_2$.

   (c) Find the complex conjugate of z_1.

   (d) Find $z_2 \div z_1$.

5. Solve the equation by using the quadratic formula. $x^2 = 5 - 2x$

6. Solve the equation $5x^2 + 2x - 1 = 0$ by completing the square.

7. Perform the indicated operation on the functions $f(x) = \dfrac{x-1}{x+2}$ and $g(x) = \sqrt{2x+3}$ and determine the domain of each new function.

   a. $(f+g)(x)$

   b. $(fg)(x)$

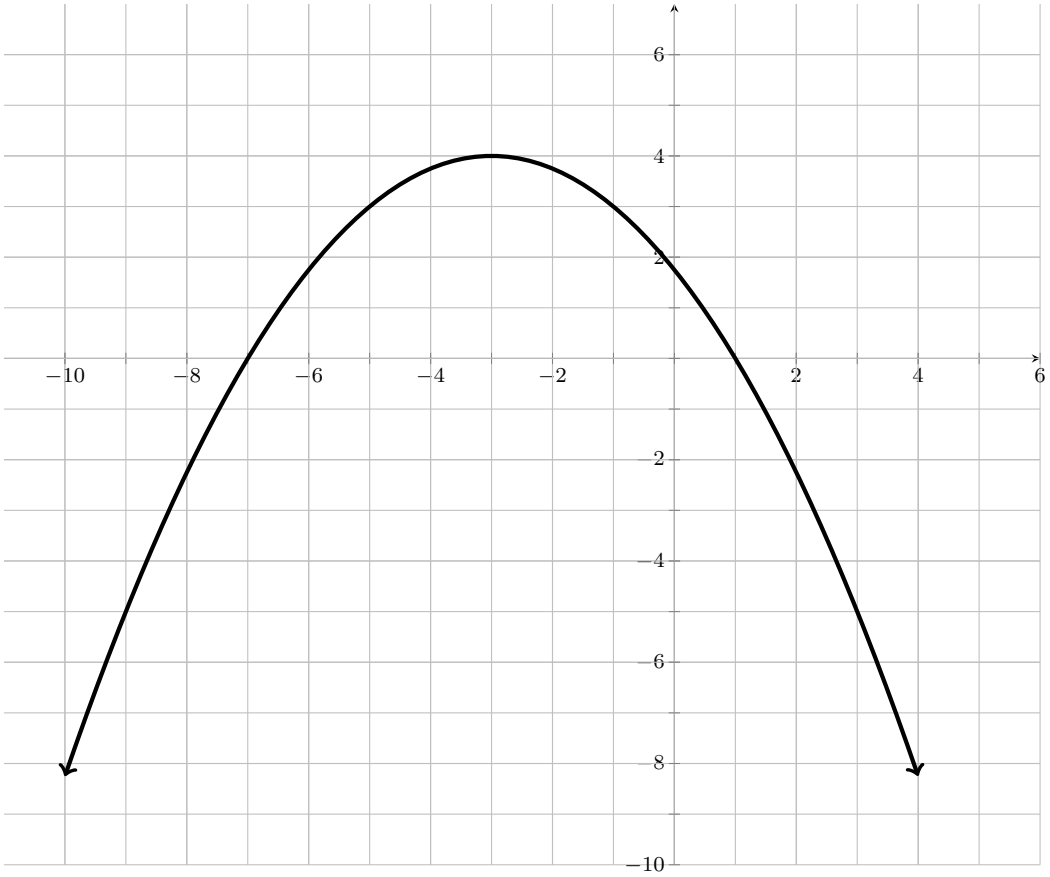
   c. $\left(\dfrac{f}{g}\right)(x)$

d. $(f \circ g)(x)$

e. $(g \circ f)(x)$

f. $(f \circ f)(x)$

8. The graph of a function g is given below.



a) Identify the parent function f.

b) Describe the sequence of transformations from f to g.

c) Find the function g.

d) Use function notation to write g in terms of f.

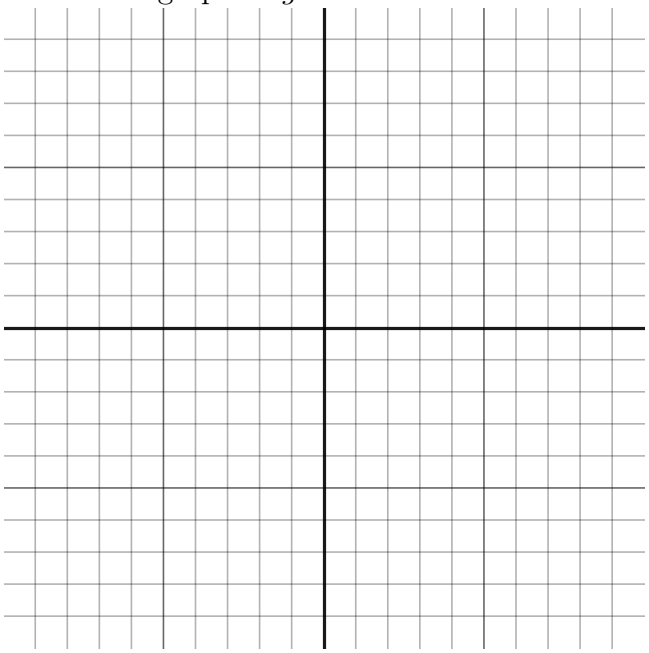
9. Consider the function $g(x) = -2|-x+3| - 4$.

a) Identify the parent function f.

b) Describe the sequence of transformations from f to g.

c) Use function notation to write g in terms of f.

d) Sketch the graph of g.



10. Write the given functions in standard form. Then determine the vertex, whether the vertex is a maximum or minimum, and the axis of symmetry.

a) $g(x) = -3x^2 - 18x - 2$

b) $f(x) = 4x^2 + 2x + 9$

11. Find the x-intercepts of the following functions.

a) $h(x) = \frac{1}{3}x^2 - 4x + 3$

b) $f(x) = 2x^{\frac{5}{2}} - x^{\frac{3}{2}} - x^{\frac{1}{2}}$

12. A farmer decides to enclose a rectangular stall against a river so his horses have water access. The figure below shows the shape he wants to make. If he has 1800 feet of fencing, what values for x and y will maximize the enclosed area with no fencing against the river? What is the maximum area he can enclose?