

College Algebra - Review 1**Name:** _____

1. Suppose $g(x) = \begin{cases} 1 - 3x & \text{if } x < 0 \\ \sqrt{4 - x^2} & \text{if } 0 \leq x \leq 2 \\ \frac{x^2}{4} - 4 & \text{if } x > 2 \end{cases}$. Evaluate the piecewise defined function at the values indicated below.

(a) $g(-9)$ (a) _____

(b) $g(0)$ (b) _____

(c) $g(1)$ (c) _____

(d) $g(-4)$ (d) _____

(e) $g(4)$ (e) _____

2. Sketch the graph of the piecewise function defined above.

3. Write the domain of $f(x) = \frac{1}{x-5}$ using interval notation. 3. _____

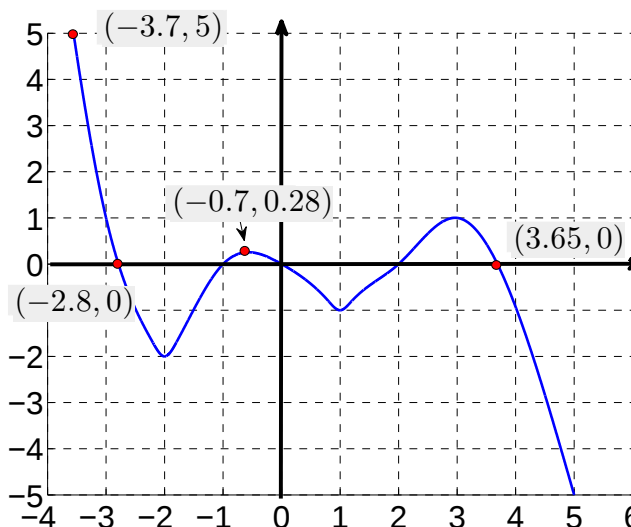
4. Write the domain of $f(x) = \sqrt{x-5}$ using interval notation. 4. _____

5. Evaluate and simplify the expression $\frac{f(x+h) - f(x)}{h}$ for $f(x) = 2x^2 - 1$. Assume x , h and $x+h$ are real numbers in the domain of f and that $h \neq 0$. Hint: You know you are finished when you can replace h with zero and not get a division by zero.

5. _____

6. Find the zeros of $g(x) = \sqrt{9-x^2}$. 6. _____

7. (12 points) The graph of a function f is given in the figure (right). Assume the entire graph of the function is shown.



- (a) Find all local and absolute maximum and minimum values of the function and the value of x at which each occurs.

- (b) State the x intervals for which $f(x) > 0$.

- (c) State the x intervals for which $f(x) < 0$.

- (d) Find the intervals on which the function is *increasing*.

- (e) Find the intervals on which the function is *decreasing*.

- (f) Find $f(4)$.

(f) _____

- (g) Find $f(5)$.

(g) _____

8. Find the average rates of change of $f(x) = x^3 - 3x$ from $x_1 = -2$ to $x_2 = -1$

8. _____

9. Determine if $f(x) = -x + x^3$ is even, odd or neither. If the graph of the function has symmetry, state which kind it has.

9. _____

10. What is the domain and range of $f(x) = \sqrt{x}$? Use interval notation to answer.

10. _____

Write an equation for the function described by the given characteristics.

11. The shape of $f(x) = \sqrt{x}$, but shifted five units right, reflected in the x axis and 12 units down.

11. _____

Directions: Sketch the graph of the function, not by plotting points, but by starting with the graph of a standard function and applying transformations. Label at least 3 points on your final graph.

12. $C(x) = 2|x + 2| - 3$

Find $f \circ g$ and $g \circ f$ and their domains.

13. $f(x) = \frac{1}{x}$ and $g(x) = 4x - 9$.

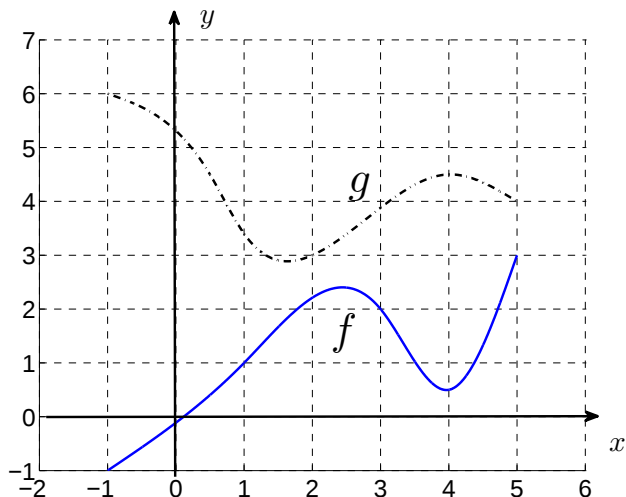
14. Use the graph to find the indicated functional values.

(a) $(f + g)(3)$

(b) $(f - g)(-1)$

(c) $\frac{f}{g}(5)$

(d) Find the domain and range of f



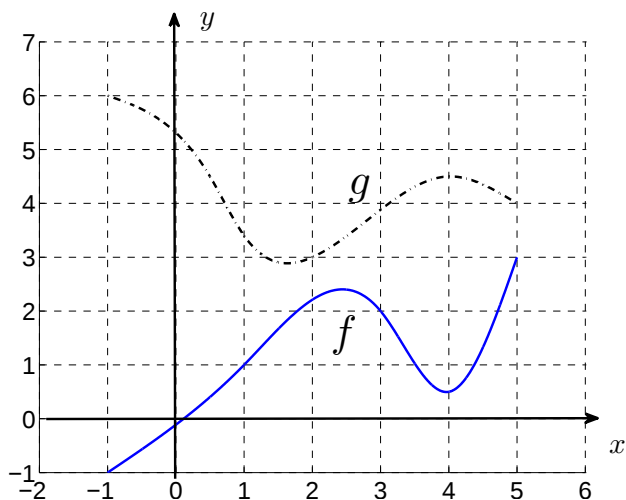
15. Use the graph to find the indicated functional values.

(a) $f(g(3))$

(b) $f(g(-1))$

(c) $g(f(3))$

(d) $g(g(3))$



16. Find f/g and its domains. $f(x) = \sqrt{7-x}$ and $g(x) = \sqrt{7+x}$

17. Find the inverse function of $f(x) = \frac{3x}{x-2}$

17. _____

18. Find the vertex of $g(x) = 3(x-5)^2 + 7$. Does f open up or down?

18. _____

19. What is the range of $g(x) = 3(x-5)^2 + 7$?

19. _____

Express the quadratic function in standard (vertex) form.

20. $g(x) = x^2 + 3x - 6$

20. _____

21. $g(x) = 2x^2 + 3x - 7$

21. _____

22. Find the quotient and remainder of $\frac{x^3 + x^2 - 10x + 8}{x - 3}$ using long division.