

**PRECALCULUS: FUNCTIONS TEST REVIEW**

**PLEASE DO ALL WORK ON A SEPARATE PIECE OF PAPER!**

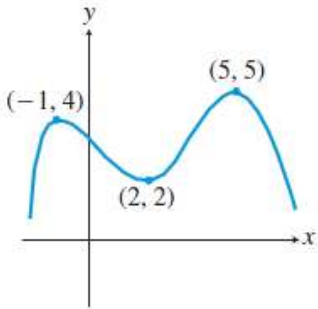
Perform the requested operation or operations. Then, state the domain.

1.  $f(x) = 4x + 12$ ;  $g(x) = 2x - 1$  Find  $f(g(x))$ .      2.  $f(x) = \frac{x-10}{7}$ ;  $g(x) = 7x + 10$  Find  $g(f(x))$ .  
 3.  $f(x) = x^2 + 2$ ;  $g(x) = \sqrt{x-1}$  Find  $g(f(x))$ .

Find the domain of the given function.

4.  $f(x) = \frac{x}{x-9}$       5.  $f(x) = \sqrt{x^2 + 6}$       6.  $f(x) = \sqrt{17-x}$       7.  $f(x) = \frac{(x+6)(x-6)}{x^2 + 36}$   
 8.  $f(x) = \frac{3}{x^2}$       9.  $f(x) = \frac{\sqrt{x+3}}{x^2 - 4}$

Use the graph of  $f$  to estimate the extremas (local minimum, local maximum, absolute minimum, absolute maximum), domain and range, and end behavior.



10. extremas: Local minimum: \_\_\_\_\_  
 Local maximum: \_\_\_\_\_  
 Absolute minimum: \_\_\_\_\_  
 Absolute maximum: \_\_\_\_\_  
 11. Domain: \_\_\_\_\_  
 Range: \_\_\_\_\_  
 12. End behavior:  $\lim_{x \rightarrow \infty} =$  \_\_\_\_\_       $\lim_{x \rightarrow -\infty} =$  \_\_\_\_\_

Determine algebraically whether the function is even, odd, or neither even nor odd.

13.  $-2x^5 + 4x^3$       14.  $f(x) = 4x^2 - 4$       15.  $f(x) = \sqrt{x^2 + 18}$

Describe how the graph of  $y = x^2$  can be transformed to the graph of the given equation.

16.  $y = x^2 - 17$       17.  $y = (x - 10)^2$

Find the inverse of the function.

18.  $f(x) = 5x + 8$       19.  $g(x) = 3x^3 + 7$       20.  $f(x) = \frac{x+1}{x+2}$

Solve the equation.

21.  $(y - 11) - (y + 8) = 6y$       22.  $\frac{x+2}{3} = \frac{x+3}{4}$

Find the (x,y) pair for the value of the parameter. Then "eliminate the parameter".

23.  $x = 5t$  and  $y = t^2 - 3$  for  $t = 5$

Perform the requested operation. Find the domain of each.

24.  $f(x) = 5x + 4$ ;  $g(x) = 4x - 3$ . Find  $\frac{f}{g}$ .      25.  $f(x) = 2x + 9$ ;  $g(x) = 5x^2$ . Find  $(f + g)(x)$ .  
 26.  $f(x) = 4x + 5$ ;  $g(x) = 2x^2$ . Find  $(fg)(x)$ .

27. Determine the intervals on which the function  $y = |x - 1|$  is increasing and decreasing. (Hint: draw a graph)

28. Determine the intervals on which the function  $y = \sqrt[3]{x} + 2$  is increasing and decreasing. (Hint: draw a graph)

29. Mark received a 4.5% salary increase. His salary after the raise was \$39,492. What was his salary before the raise?

30. A square of side  $x$  inches is cut out of each corner of an 12 in. by 14 in. piece of cardboard and the sides are folded up to form an open-topped box (Figure 1.80). Write the volume  $V$  of the box as a function of  $x$ . Find the domain of  $V$  as a function of  $x$ .