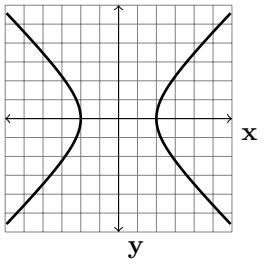
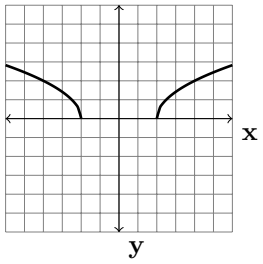
MAT 171 - TEST #3 sections 2.1 through 2.7

Name:_____

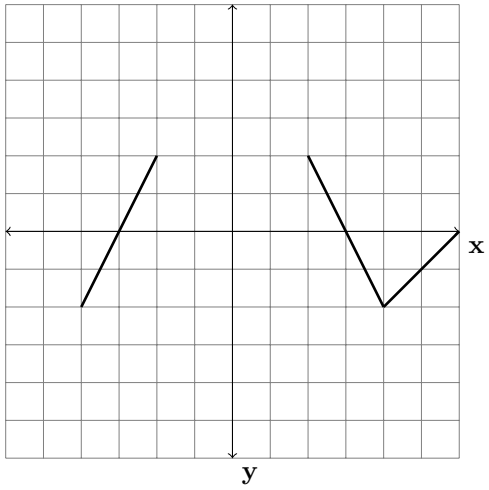
1. Determine whether the relation is a function. If it is, state the domain and range.
   (a) $\{(-5,1),(-3,-6),(-1,9),(2,7),(1,4)\}$
   (b) $\{(3,10),(5,8),(-1,3),(-3,8),(0,7),(-2,6)\}$
   (c) $\{(3,10),(5,8),(-1,3),(-3,8),(0,7),(-2,6),(-5,1),(-3,-6),(-1,9),(2,7),(1,4)\}$
   (d) $\{(3,10),(5,8),(-1,3),(-3,8),(0,7),(-2,6),(-5,1),(-3,-6),(-1,9),(2,7)\}$
   (e) $\{(3,10),(5,8),(-1,3),(0,7),(-2,6),(-5,1),(-3,-6),(-1,9),(2,7)\}$
2. Determine whether the following equation represents y as a function of x.
   (a) $y - x^2 = 1$
   (b) $y^2 - x = -4$
   (c) $y - x = y + 2$
   (d) $y - x = 0$
3. Determine whether the following are functions





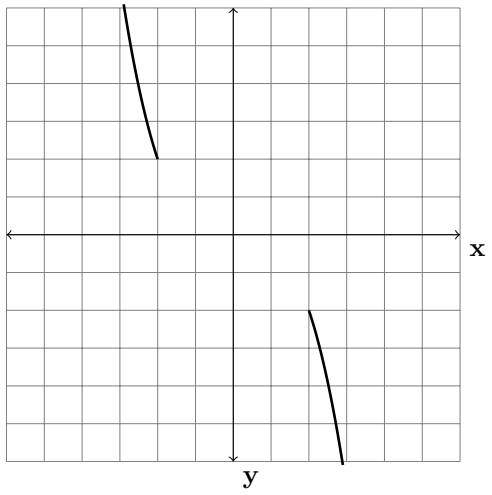
4. for $g(x) = \begin{cases} -\frac{1}{2}x + 4 & x \leq -1 \\ x^2 - 4x + 4 & x > -1 \end{cases}$, find:
   (a) $g(-4)$
   (b) $g(-1)$
   (c) $g(2)$
   (d) $g(1)$

5. Given the graph below, find the following:



a) $f(-2)$ b) $f(2)$
c) $f(-3)$ d) $f(4)$
e) Value of x for which $f(x) = 0$

6. Refer to the function f given by the graph below

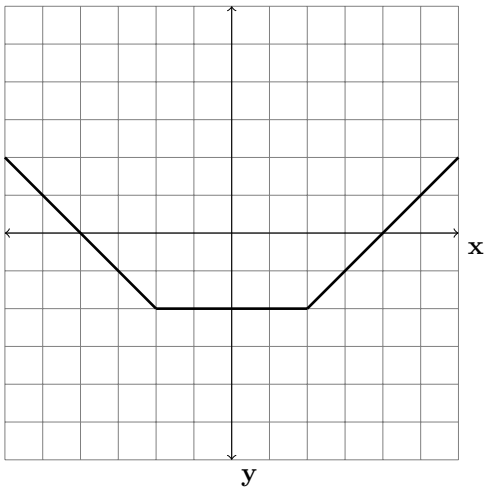


(a) Find the domain of f
(b) Find the range of f
(c) Find the interval where f is increasing

(d) Find the interval where f is decreasing

(e) Find the interval where f is constant

7. Refer to the function f given by the graph below



(a) Find the domain of f

(b) Find the range of f

(c) Find the interval where f is increasing

(d) Find the interval where f is decreasing

(e) Find the interval where f is constant

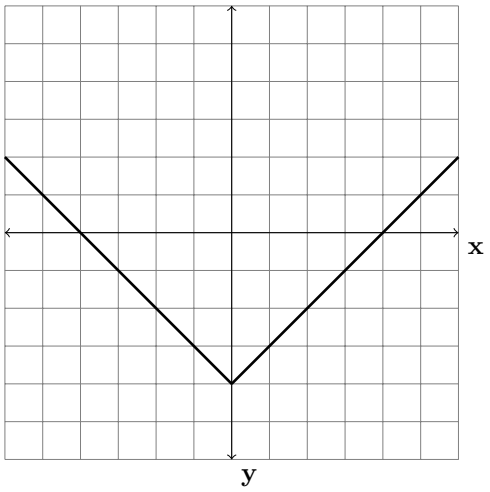
(f) Find the x-intercepts

(g) Find the y-intercept

(h) Find the values of x for which $f(x) \leq 0$

(i) Find the values of x for which $f(x) > 0$

8. Refer to the function f given by the graph below



   (a) Find the domain of f
   (b) Find the range of f
   (c) Find the interval where f is increasing
   (d) Find the interval where f is decreasing
   (e) Find the interval where f is constant
   (f) Find the x-intercepts
   (g) Find the y-intercept
   (h) Find the values at which the graph has a relative minimum
   (i) Find the values of of the relative minimum

9. Graph the equation $5x - 4y = 20$ and indicate the slope and y-intercept

10. Write the slope intercept form of the equation of the line with slope $\frac{2}{5}$ and y-intercept 7.

11. Write the equation of the vertical line passing through the point (-1,2) and give its slope.

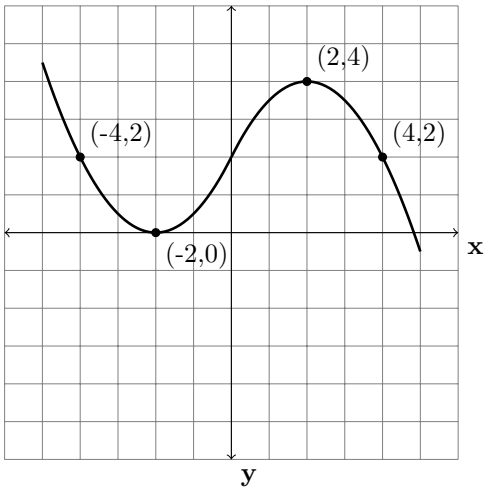
12. Write the equation of the horizontal line passing through the point (5,-7) and give its slope.

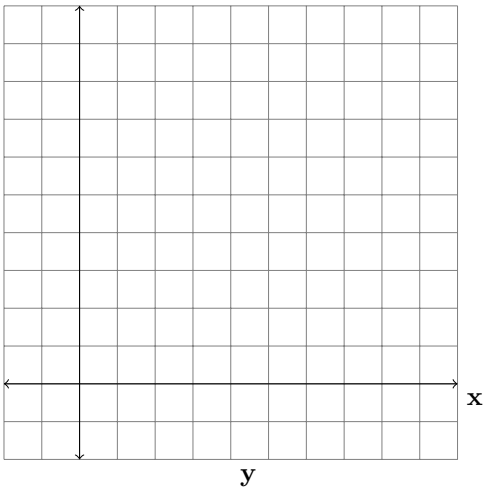
13. Find the equation of the line passing through the points (2,4) and (-1,3). Write the final equation in the slope-intercept form $y = mx + b$.

14. Find the equation of the line $3x + 6y = 12$ and passing through the point (-1,4). Write the final equation in the slope-intercept form $y = mx + b$.

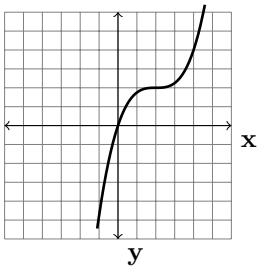
15. Write the equation of the line perpendicular to the line $9x + 3y = 10$ and passing through the point (-1,5). Write the final equation in the slope-intercept form $y = mx + b$.

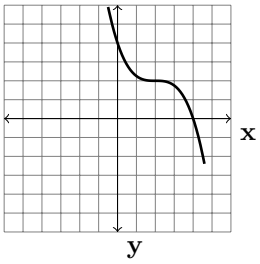
16. Use the following graph of f to sketch the graph y = f(x-2) + 3

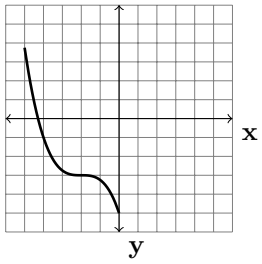


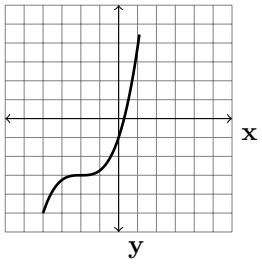


17. Use the graph of $f(x) = x^3$ to write an equation for each function whose graph is shown

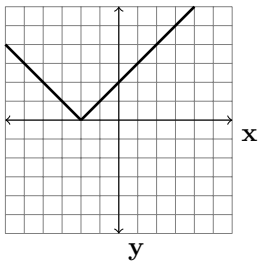


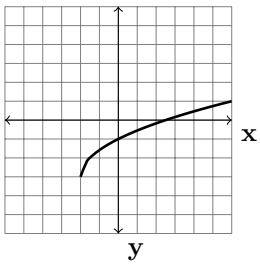


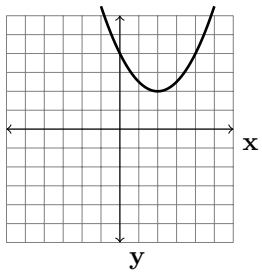




18. Identify the parent function and the transformation shown in the graph.







19. What is the parent function in each part below and describe the sequence of transformations?

    (a) $y = |x| + 4$

    (b) $y = (x - 2)^2$

    (c) $y = -3x^3$

20. Write the equation for the function that is described by the given characteristics. The shape of $f(x) = |X|$, but flipped over the x-axis, compressed horizontally by a factor of 4, moved to the left 1, and moved down 3.

21. Find the domain of each function below.

    (a) $f(x) = \sqrt{3x - 2}$

    (b) $g(x) = \frac{3}{x-5}$

22. Given $f(x)x^2 + 5x$ and $g(x) = 2x - 4$,

    (a) find $(f + g)(X)$ and give its domain.

    (b) find $(f - g)(X)$ and give its domain.

    (c) find $(fg)(X)$ and give its domain.

    (d) find $(\frac{f}{g})(X)$ and give its domain.

23. Given $f(x)x^2 + 4$ and $g(x) = \sqrt{2 - x}$,

    (a) find $(fg)(X)$ and give its domain.

    (b) find $(f \circ g)(x)$ and give its domain.

24. Evaluate the indicated function $f(x) = 4 - x^2$ and $g(x) = x - 2$

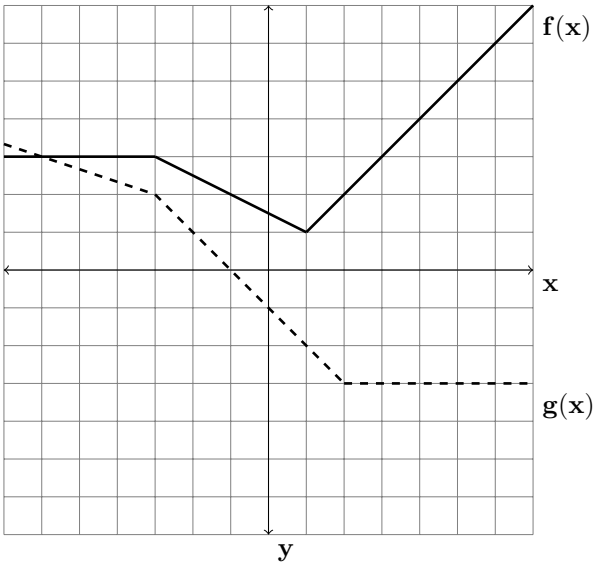
    (a) $(f - g)(3)$

    (b) $(fg)(-1)$

    (c) $(\frac{f}{g})(1)$

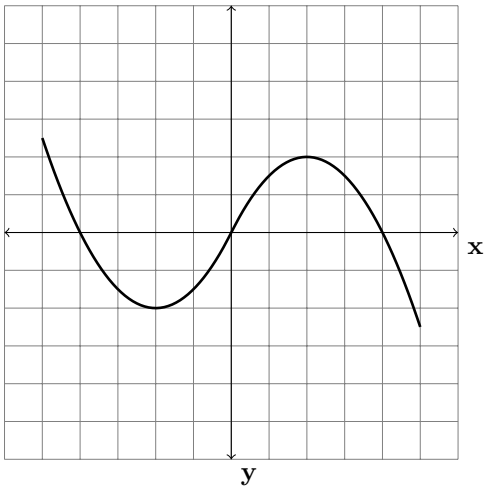
    (d) $(f \circ g)(4)$

25. Find the following using the given functions f and g:



(a) $(f+g)(1)$
(b) $(g-f)(-3)$
(c) $(\frac{f}{g})(-2)$
(d) $(g \circ f)(2)$

26. Does the following function have an inverse? Why or why not?



27. Given $f(x) = 5x + 7$, find $f^{-1}(x)$.