

1. Which of the following represent (list all that qualify for each and be able to support your answer)

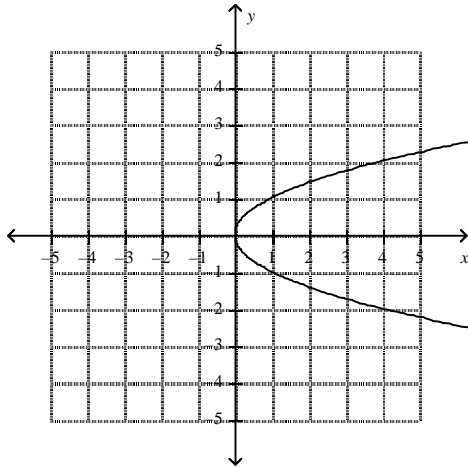
(a) relations \_\_\_\_\_ and (b) functions \_\_\_\_\_

a.  $\{(1,2), (2, 3), (-1, 4), (-3, -2)\}$

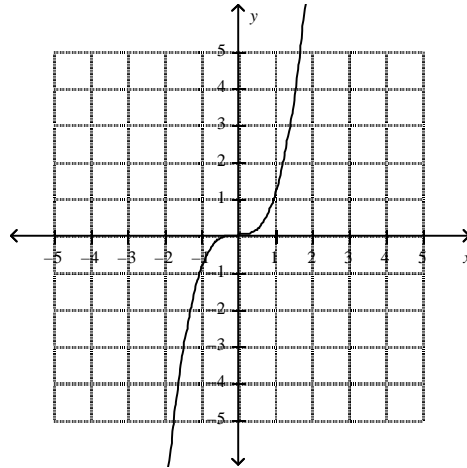
b.  $\{(-3,2), (1, 3), (-5, 4), (-3, -2)\}$

c.  $f(x) = x + 2$

d.  $f(x) = x^2 - 3x + 4$



e.



f.

2. Find the domain and range for each of the following functions. (Use appropriate set builder notation)

a.  $y = \lceil x \rceil$

b.  $f(x) = 5(2^x)$

c.  $y = \frac{2}{-x}$

d.  $f(t) = -2t^2 - 18$

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3. Let  $f(x) = 9x - 2$     $g(x) = 2x$     $h(x) = x^2 - 3x$     $d(x) = \frac{1}{x+1}$     $k(x) = \frac{1}{2}x$

a. Evaluate  $f(g(-1))$

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

c. Evaluate  $g(d(3))$

d. Find the simplified equation for  $f(g(x))$

e. Find the simplified equation for  $h(g(x))$

f. Are  $g(x)$  and  $f(x)$  inverses? (show work)

g. Are  $g(x)$  and  $k(x)$  inverses? (show work)

4. Which translation has the effect on a graph of moving each point 3 units down and 8 units to the right? (Circle one)

- a.  $T(x,y) = (x-3, y+8)$       b.  $T(x,y) = (x+8, y-3)$       c.  $T(x,y) = (x-8,y+3)$       d.  $T(x,y) = (x-8,y-3)$

5. Which dilation/scale change has the effect on a graph of *stretching* horizontally by a factor of 15 and *shrinking* vertically by a factor of 6? (Circle one)

- a.  $S(x, y) = (15x, 6y)$       b.  $S(x, y) = \left(\frac{x}{15}, 6y\right)$       c.  $S(x, y) = \left(15x, \frac{y}{6}\right)$       d.  $S(x, y) = \left(\frac{x}{15}, \frac{y}{6}\right)$

6. Find an equation (in  $y=$  form) for the image of  $y = x^2$  under the transformation:

- a.  $T(x, y) = (x+3, y-2)$       b.  $S(x, y) = \left(5x, \frac{y}{2}\right)$

Describe in words what happened to the parent function after each transformation:

- a. \_\_\_\_\_      b. \_\_\_\_\_  
\_\_\_\_\_

7. Find the equation (in  $y=$  form) for the image of  $y = |x|$  under the transformation.

- a.  $T(x, y) = (x-3, y+4)$       b.  $S(x, y) = \left(\frac{x}{3}, 4y\right)$

8. What is the rule for the transformation that maps  $y = \sqrt{x}$  onto the graph  $y = \sqrt{10x}$

- a. Describe: \_\_\_\_\_      b.  $(x, y) \rightarrow$  \_\_\_\_\_

9. What is the rule for the transformation that maps the graph of  $y = \frac{1}{x}$  onto the graph of  $y = \frac{3}{2x}$ ?

- a. Describe: \_\_\_\_\_      b.  $(x, y) \rightarrow$  \_\_\_\_\_

10. What transformation maps the graph of  $y = 5^x$  onto the graph of  $y = 5^x + 9$ ?

a. Describe: \_\_\_\_\_

b.  $(x, y) \rightarrow$  \_\_\_\_\_

11. What transformation maps the graph of  $y = \sqrt{x}$  onto the graph of  $y = \sqrt{x+25} - 18$ ?

a. Describe: \_\_\_\_\_

b.  $(x, y) \rightarrow$  \_\_\_\_\_

12. Determine if each function is odd, even, or neither. If the function is odd or even, prove it.

a.  $f(x) = 8x^3$

b.  $f(x) = 5x^2 - x^4$

c.  $f(x) = |3x - 4|$

d.  $f(x) = |x| - 3$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

13. If  $(p, q)$  is a point on the graph of a relation, what point must be on the graph of its inverse? (Circle one)

a.  $(-p, q)$

b.  $(p, -q)$

c.  $(-p, -q)$

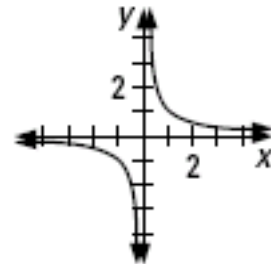
d.  $(q, p)$

**Use the graph to the right to answer questions 14-18.**

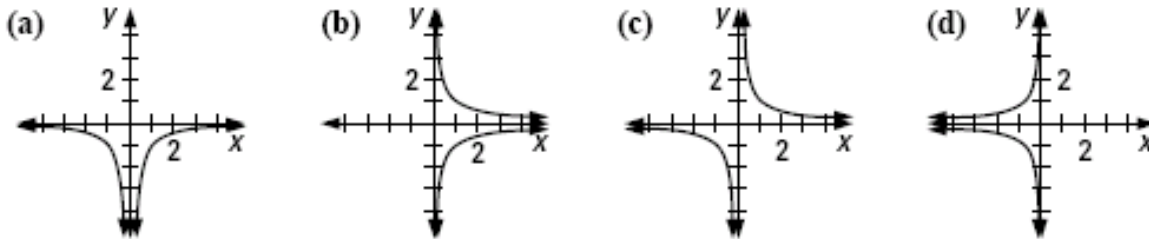
14. Give the formal name and equation for this parent function.

15. What kind of symmetry does this graph have?

16. Justify your answer to #15.



17. Which graph is the inverse of this function?



18. Is the inverse a function? Justify your answer.

19. Find the equation of the inverse to the following equations:

a.  $y = 2x + 7$

b.  $y = \frac{2}{x+1}$

c.  $y = 5x^2$

Function: Y or N

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20. Write the inverse of the given relation:  $\{(0,1), (1,1), (2,2), (3,3), (4,5)\}$

21. a) A manufacturing company packs boxes of whiteboard marker 4-packs to be shipped to various retail stores such as Staples. Each box can fit 36 packs. Write an equation that would represent the number of boxes B to hold x number of whiteboard marker packets.

b) Use your equation to determine how many boxes will be needed for 375 packs of markers.

c) Sketch a graph of this situation.

