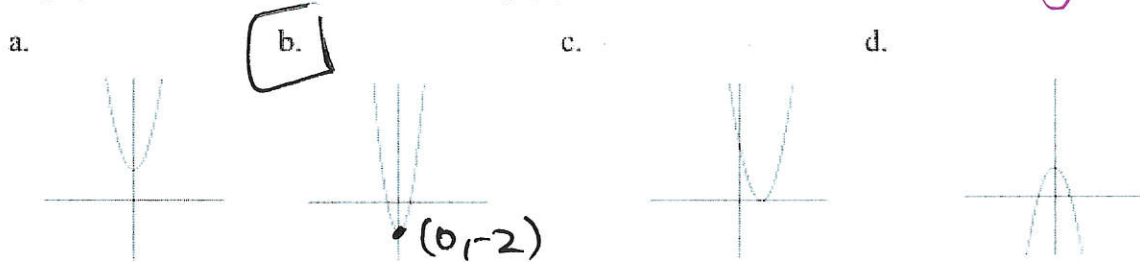


Ch 4 Practice Test - Functions

Name: Key

1. Circle the graph that best matches the function: $f(x) = 2x^2 - 2$



2. Which equation will shift the graph of $y = x^2$ left 5 units and up 6 units?

- a. $y = (x+6)^2 - 5$
- b. $y = (x+5)^2 - 6$
- c.** $y = (x+5)^2 + 6$
- d. $y = (x-5)^2 + 6$

3. What is the vertex for the quadratic equation $y = (x+3)^2 - 2$.

- a. (3, 2)
- b.** (-3, -2)
- c. (-2, 3)
- d. (2, -3)
- $(-3, -2)$

Given the parent function and a description of the transformation, write the equation of the transformed function, $f(x)$.

4. An absolute value function with a reflection across the x-axis, vertical shift up 5, and a horizontal shift right 3.

$y = -|x - 3| + 5$

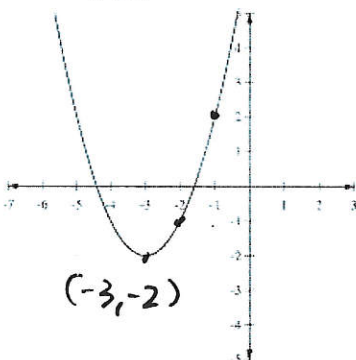
5. A quadratic function with a vertical stretch/compression by $\frac{2}{5}$, and a vertical shift down 2.

$y = \frac{2}{5}(x)^2 - 2$ or $y = \frac{2}{5}x^2 - 2$

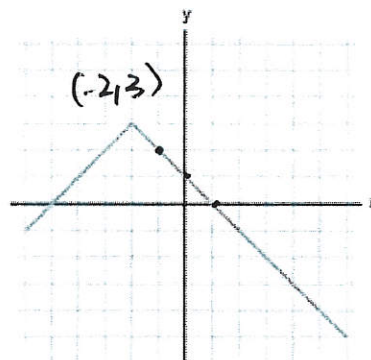
6. A square root function that has a stretch of 4, shifted left 3 units, and down 1.

$y = 4\sqrt{x + 3} - 1$

Write a function $f(x)$ to describe the following graphs:



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

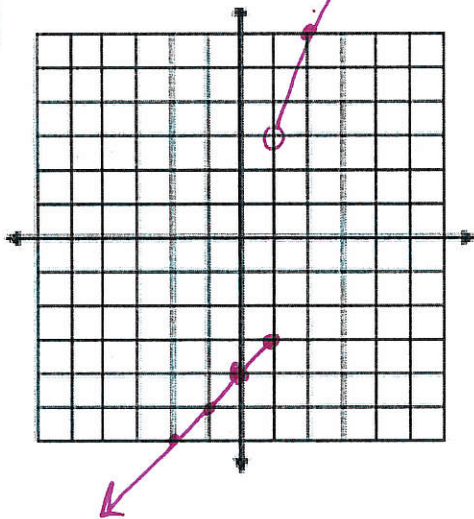


8. $y = -|x+2| - 3$

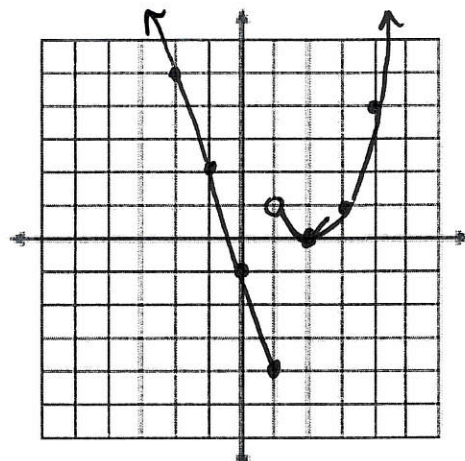
Graph the following piecewise functions:

Change domain on bottom to $x > 1$

9. $f(x) = \begin{cases} x-4, & \text{if } x \leq 1 \\ 3x, & \text{if } x > 1 \end{cases}$



10. $f(x) = \begin{cases} -3x-1, & \text{if } x \leq 1 \\ (x-2)^2, & \text{if } x > 1 \end{cases}$



Evaluate the function for the given value of x. $f(x) = \begin{cases} x-2, & \text{if } x < 0 \\ 3, & \text{if } x \geq 0 \end{cases}$

$g(x) = \begin{cases} 2x-1, & \text{if } x \leq -3 \\ 4x, & \text{if } x > -3 \end{cases}$

11. $f(0) = 3$

12. $f(4) = 3$

13. $g(-2)$

$4(-2) = -8$

COMBINING FUNCTIONS

Use the following functions to perform the given operation.

$f(x) = 3 - 2x$

$g(x) = x^2 + 1$

$h(x) = x^2 - 3x + 4$

14. $(g+h)(x)$

$x^2 + 1 + x^2 - 3x + 4$
 $= 2x^2 - 3x + 5$

15. $\left(\frac{g}{f}\right)(x)$

$\frac{x^2 + 1}{3 - 2x}, x \neq \frac{3}{2}$

$3 - 2x = 0$
 $-2x = -3$
 $x = \frac{3}{2}$

16. $f(g(x))$

$3 - 2(x^2 + 1)$
 $= 3 - 2x^2 - 2$
 $= -2x^2 + 1$

17. $(f \cdot g)(-1)$

$(3 - 2x)(x^2 + 1)$
 $= 3x^2 + 3 - 2x^3 - 2x$
 $= -2x^3 + 3x^2 - 2x + 3$

$f \cdot g(-1) = -2(-1)^3 + 3(-1)^2 - 2(-1) + 3 = 10$

18. $(f - g)(2)$

$3 - 2x - (x^2 + 1)$
 $= 3 - 2x - x^2 - 1$
 $= -x^2 - 2x + 2$
 $= -(2)^2 - 2(2) + 2$
 $= -4 - 4 + 2$

$= -8 + 2 = -6$

19. $(g+h)(0)$

$2x^2 - 3x + 5$
 $2(0)^2 - 3(0) + 5 = 5$

20. $(f \cdot h)(x)$

$3 - 2x$

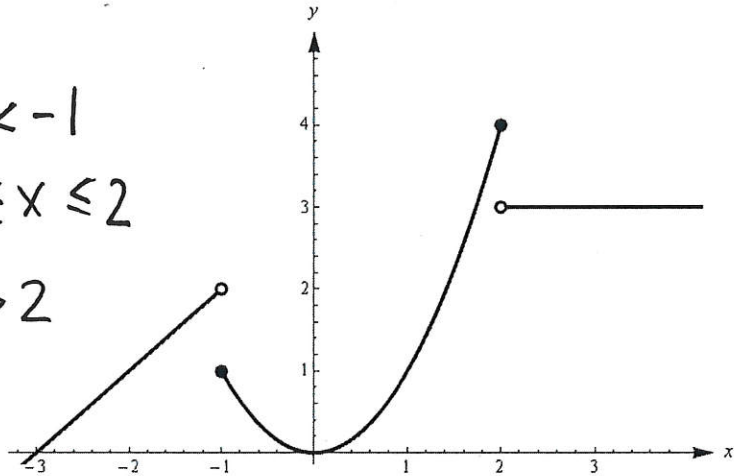
x^2	$3x^2$	$-2x^3$	$-2x^3 + 9x^2 - 17x + 12$
$-3x$	$-9x$	$6x^2$	
$+4$	12	$-8x$	

$-2x^3 + 9x^2 - 17x + 12$

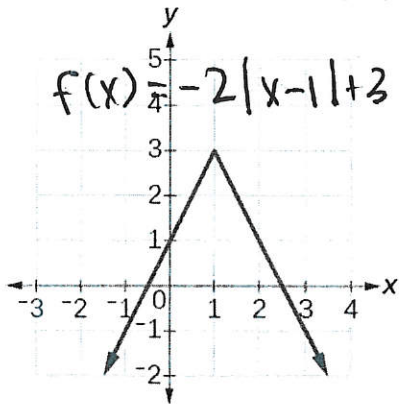
21. Write a piecewise function for the graph.

$$f(x) = \begin{cases} x + 3, & x < -1 \\ x^2, & -1 \leq x \leq 2 \\ 3, & x > 2 \end{cases}$$

$$\begin{aligned} x < -1 \\ -1 \leq x \leq 2 \\ x > 2 \end{aligned}$$

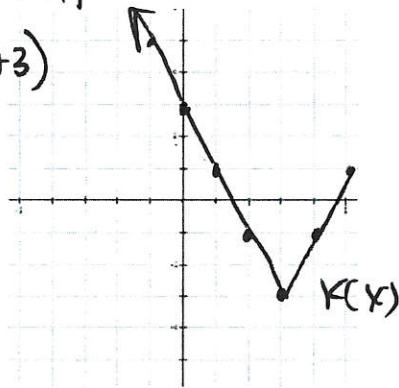


22. Let $f(x)$ be the function represented by the graph below. Perform the indicated transformation and graph the new function on the graph provided. $k(x) = -f(x - 2)$ flip over x-axis first, then right 2



$$f(x) = -2|x-1| + 3$$

$$\begin{aligned} k(x) &= -(-2|x-2-1|+3) \\ &= -(-2|x-3|+3) \\ &= 2|x-3|-3 \end{aligned}$$

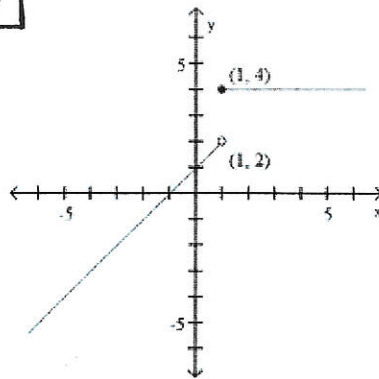
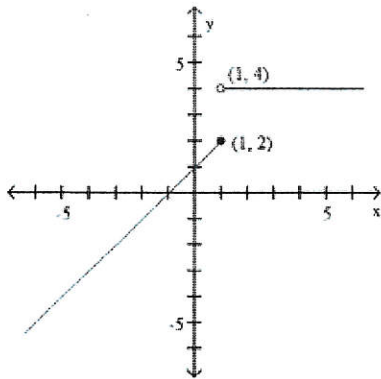


23. Match the piecewise function to its graph.

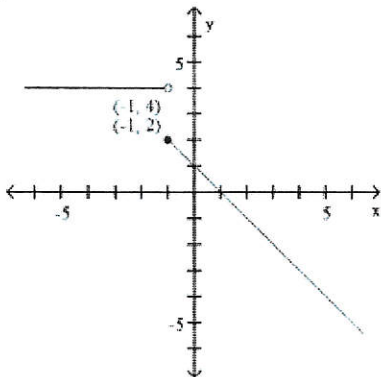
$$f(x) = \begin{cases} x + 1 & \text{if } x < 1 \\ 4 & \text{if } x \geq 1 \end{cases}$$

B)

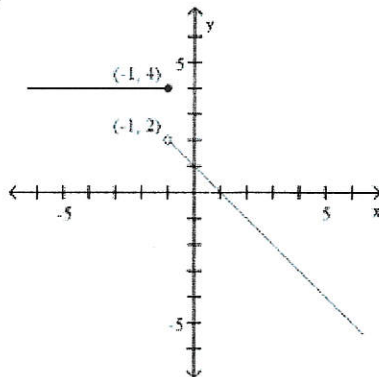
A)



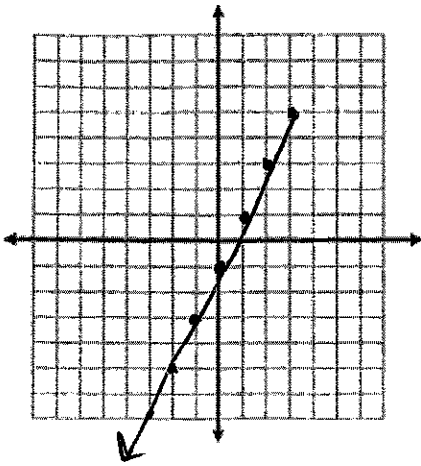
C)



D)



24. Graph the following function with the restricted domain.



$$y = 2x - 1, \quad x \leq 3$$

25. A supermarket has a discount on bulk candy. Candy costs \$3.50/lb up to 5 lbs. If you buy over 5 lbs. the cost is \$3.00/lb. Express the cost as a function of weight.

a. Write the piecewise function.

$$f(x) = \begin{cases} 3.50x, & 0 \leq x \leq 5 \\ 3.00x, & x > 5 \end{cases}$$

b. Graph the function.

