

**Algebra 2**  
**Chapter 2 Test**

NAME \_\_\_\_\_

**Write the letter for the best answer.**

**Describe the transformation of  $f(x) = x^2$  represented by  $g$ .**

1.  $g(x) = x^2 - 3$

- A. Translation 3 units up
- B. Translation 3 units down
- C. Vertical shrink by a factor of  $\frac{1}{3}$
- D. Vertical stretch by a factor of 3

2.  $g(x) = (x + 2)^2 + 5$

- A. Translation 5 units up, 2 left
- B. Translation 5 units up, 2 right
- C. Translation 5 units down, 2 left
- D. Translation 5 units down, 2 right

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

- A. Vertical shrink by a factor of 7, reflection
- B. Vertical stretch by a factor of 7, reflection
- C. Vertical shrink by a factor of  $\frac{1}{7}$ , reflection
- D. Vertical stretch by a factor of  $\frac{1}{7}$ , reflection

4.  $g(x) = \frac{1}{3}(x - 4)^2$

- A. Translation 4 units up, vertical shrink by a factor of  $\frac{1}{3}$
- B. Translation 4 units down, vertical shrink by a factor of  $\frac{1}{3}$
- C. Translation 4 units right, vertical shrink by a factor of  $\frac{1}{3}$
- D. Translation 4 units left, vertical shrink by a factor of  $\frac{1}{3}$

**Write a rule for  $g$  described by the transformations of the graph of  $f$ .**

5.  $f(x) = (x + 1)^2 - 2$ ; vertical stretch by a factor of 3, translation 1 units up, followed by a translation 3 unit to the right.

- A.  $f(x) = 3(x - 2)^2 - 1$
- B.  $f(x) = 3(x + 4)^2 - 5$
- C.  $f(x) = 3(x - 2)^2 - 7$
- D.  $f(x) = 3(x - 2)^2 - 5$

6.  $f(x) = 3(x - 4)^2 + 6$ ; vertical shrink by a factor of  $\frac{1}{3}$ , translation 3 units up, followed by a translation 1 units to the left.

- A.  $f(x) = (x - 3)^2 + 9$
- B.  $f(x) = (x - 5)^2 - 1$
- C.  $f(x) = (x - 3)^2 + 5$
- D.  $f(x) = \frac{1}{3}(x - 5)^2 + 5$

7.  $f(x) = 2(x - 1)^2 + 1$ ; vertical stretch by a factor of 2, translation 3 units down, followed by a reflection in the  $x$ -axis.

- A.  $f(x) = -4(x - 2)^2 - 1$
- B.  $f(x) = -4(x - 1)^2 - 2$
- C.  $f(x) = -4(x - 1)^2 + 1$
- D.  $f(x) = -4(x - 1)^2 - 1$

Find the vertex and the axis of symmetry for each function.

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

9.  $f(x) = -\frac{1}{4}(x - 4)^2 + 1$

A.  $V: (2,3), AS: x = 2$

B.  $V: (-2, -3), AS: x = -2$

A.  $V: (4, -1), AS: x = 4$

B.  $V: (4,1), AS: x = 4$

C.  $V: (-2,3), AS: x = -2$

D.  $V: (2, -3), AS: x = 2$

C.  $V: (-4, -1), AS: x = -4$

D.  $V: (-4,1), AS: x = -4$

Find the minimum or maximum value of each function.

10.  $f(x) = -2(x - 1)^2 + 4$

11.  $f(x) = 3(x + 2)^2 - 5$

A.  $Min = 4$

B.  $Max = 4$

A.  $Min = -5$

B.  $Max = -5$

C.  $Min = 1$

D.  $Max = 1$

C.  $Min = -2$

D.  $Max = -2$

Find the domain and range of each function.

12.  $f(x) = -3(x + 1)^2 + 7$

13.  $f(x) = \frac{2}{5}(x + 6)^2 - 4$

A.  $D: \mathbb{R}, R: y \leq 1$

B.  $D: \mathbb{R}, R: y \leq 7$

A.  $D: \mathbb{R}, R: y \geq -6$

B.  $D: \mathbb{R}, R: y \geq -4$

C.  $D: \mathbb{R}, R: y \geq 1$

D.  $D: \mathbb{R}, R: y \geq 7$

C.  $D: \mathbb{R}, R: y \leq -6$

D.  $D: \mathbb{R}, R: y \leq -4$

Graph each determine when the function is increasing and decreasing.

14.  $f(x) = 3(x - 1)^2 + 2$

15.  $f(x) = -\frac{1}{3}(x + 2)^2 - 5$

A.  $inc: x < 1, dec: x > 1$

A.  $inc: x < -5, dec: x > -5$

B.  $dec: x < 1, inc: x > 1$

B.  $dec: x < -5, inc: x > -5$

C.  $inc: x < 2, dec: x > 2$

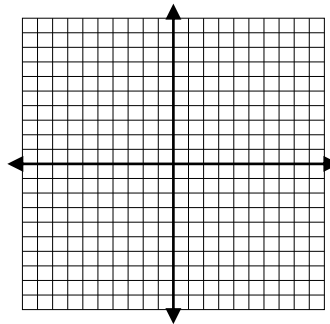
C.  $inc: x < -2, dec: x > -2$

D.  $dec: x < 2, inc: x > 2$

D.  $dec: x < -2, inc: x > -2$

Graph each function. Find the  $x$ -intercept(s), vertex, and the axis of symmetry.

16.  $f(x) = -2(x - 1)(x + 5)$



A.  $(0,1)(0, -5), V: (-2,18), AS: x = -2$

B.  $(0, -1)(0,5), V: (2, -14), AS: x = 2$

C.  $(-1,0)(5,0), V: (2, -14), AS: x = 2$

D.  $(1,0)(-5,0), V: (-2,18), AS: x = -2$

Answer the following.

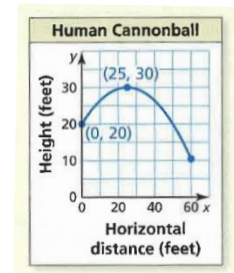
17. The graph shows the parabolic path of a performer who is shot out of a cannon, where  $y$  is the height (in feet) and  $x$  is the horizontal distance traveled (in feet). The performer lands in a net 60 feet from the cannon. What is the height of the performer when they are 50 feet from the cannon?

A. about 17 feet

B. about 18 feet

C. about 19 feet

D. about 20 feet



**Write an equation of the parabola in vertex form.**

18. passes through (4,1) and has vertex (2,-1)

A.  $f(x) = \frac{2}{5}(x + 2)^2 + 1$

B.  $f(x) = 2(x - 2)^2 - 1$

C.  $f(x) = \frac{1}{2}(x - 2)^2 - 1$

D.  $f(x) = \frac{1}{4}(x + 2)^2 + 1$

19. passes through (2,-3) and has vertex (-1,2)

A.  $f(x) = -\frac{5}{9}(x + 1)^2 + 2$

B.  $f(x) = -\frac{1}{9}(x + 1)^2 + 2$

C.  $f(x) = \frac{1}{8}(x - 1)^2 - 2$

D.  $f(x) = \frac{3}{16}(x - 1)^2 - 2$

20. passes through (1,3) and has vertex (2,0)

A.  $f(x) = \frac{1}{3}x^2 + 2$

B.  $f(x) = 3(x - 2)^2$

C.  $f(x) = 3x^2 + 2$

D.  $f(x) = \frac{4}{3}x^2$

21. passes through (-3,2) and has vertex (-1,7)

A.  $f(x) = -\frac{5}{4}(x + 1)^2 + 7$

B.  $f(x) = -\frac{9}{4}(x + 1)^2 + 7$

C.  $f(x) = -4(x - 2)^2 + 7$

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

**Write an equation of the parabola in intercept form.**

22. x-intercepts: 2 and 6; passes through (3,5)

A.  $f(x) = -\frac{5}{3}(x - 2)(x - 6)$

B.  $f(x) = \frac{1}{9}(x - 2)(x - 6)$

C.  $f(x) = \frac{3}{2}(x + 2)(x + 6)$

D.  $f(x) = -\frac{8}{3}(x + 2)(x + 6)$

23. x-intercepts: -7 and -1; passes through (-3,-2)

A.  $f(x) = -\frac{3}{10}(x - 7)(x - 1)$

B.  $f(x) = -\frac{1}{20}(x - 7)(x - 1)$

C.  $f(x) = \frac{1}{4}(x + 7)(x + 1)$

D.  $f(x) = \frac{3}{4}(x + 7)(x + 1)$

24. x-intercepts: -4 and 2; passes through (-2,-6)

A.  $f(x) = 0$

B.  $f(x) = \frac{1}{2}(x - 4)(x + 2)$

C.  $f(x) = \frac{2}{3}(x + 4)(x - 2)$

D.  $f(x) = \frac{3}{4}(x + 4)(x - 2)$

25. x-intercepts: 0 and 6; passes through (2,-5)

A.  $f(x) = \frac{3}{4}(x)(x - 6)$

B.  $f(x) = -\frac{5}{16}(x)(x + 6)$

C.  $f(x) = \frac{4}{5}(x)(x - 6)$

D.  $f(x) = \frac{1}{8}(x)(x + 6)$

**Write an equation of the parabola in intercept form.**

26. passes through  $(-3,12)(-1,-2)(2,7)$

A.  $y = 2x^2 - 3x - 5$

B.  $y = 2x^2 + x - 3$

C.  $y = 2x^2 - x + 1$

D.  $y = 2x^2 + x - 5$

**Answer the following.**

27. The table shows the number of hats a company can sell at different prices. Determine whether the data represents a function that is linear, quadratic, or neither. Write a function to determine how many hats the company will sell if it charges \$10 for each hat.

<i>Price (dollars),x</i>	5	6	7	8	9
<i>Hats sold (thousands),y</i>	192	154	124	102	88

A. 77,000    B. 82,000    C. 85,000    D. 89,000

28. The function  $y = -0.01x(x - 25)^2 + 36$  models the path of a football kicked by a player, where  $x$  is the horizontal distance (in yards) and  $y$  is the height (in yards). The player kicks the ball a second time so that it travels the same horizontal distance but reaches a maximum height that is 11 yards less than the maximum height of the first kick. Write a function that models the path of the second kick.

A.  $y = -\frac{1}{25}(x - 25)^2 + 47$

B.  $y = -\frac{1}{25}(x - 36)^2 + 47$

C.  $y = -\frac{1}{25}(x - 25)^2 + 25$

D.  $y = -\frac{1}{25}(x - 36)^2 + 25$