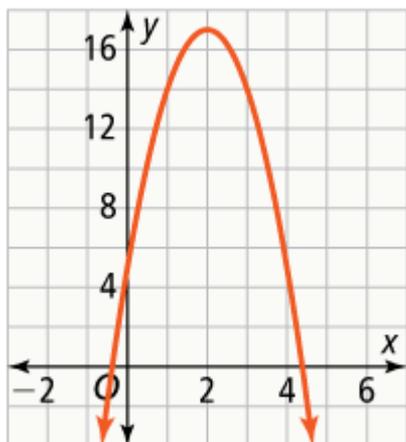


1. Answers may vary. Sample: You can use quadratic functions to determine the initial value, maximum or minimum, and axis of symmetry by rewriting them in standard or vertex form. You can make predictions by identifying the type of equation that best fits the data using first differences, second differences, and the ratios between consecutive terms, and determine an appropriate function using regression. This function can then be used to make predictions about the data.
2. parabola
3. quadratic parent function
4. vertical motion model
5. standard form of a quadratic function
6. quadratic regression
7. The graph of  $g(x) = 1.5x^2$  is narrower.
8. The graph of  $g(x) = -9x^2$  is narrower and opens downward.
9. When  $a > 0$ , the function has a minimum value. When  $a < 0$ , the function has a maximum value. The maximum or minimum value is always  $(0, 0)$ .
10. artificial turf:  $A(x) = 15x^2$ ; sod:  $s(x) = 15x^2$ ; The graph of  $A$  is narrower than the graph of  $s$  since the cost per square foot of artificial turf is greater than the cost per square foot of sod.
11. Both graphs open downward and have vertex  $(3, 2)$ . The graph of  $f$  is narrower than the graph of  $g$ .
12.  $(-8, 1)$ ;  $x = -8$ .
13.  $(5, -2)$ ;  $x = 5$
14. The maximum height is 15 m, which occurs 2.5 s after the rock is thrown.
15. 5;  $x = 2$ ;  $(2, 9)$
16. 1;  $x = \frac{7}{6}$ ;  $(\frac{7}{6}, \frac{61}{12})$

17. If  $a > 0$ , then the parabola has a minimum value. If  $a < 0$ , then the parabola has a maximum value.

18.

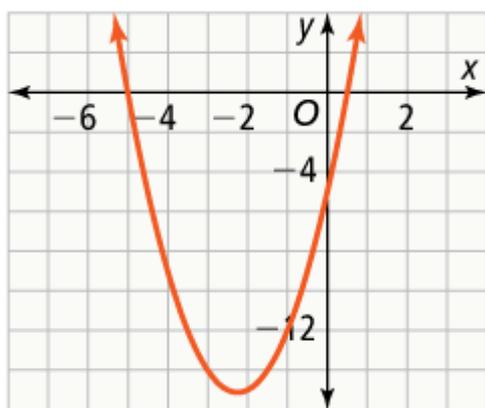


19. The ball was tossed into air at 5 ft.

20.  $h(t) = -16t^2 + 54t + 7$ ; 53.6 ft

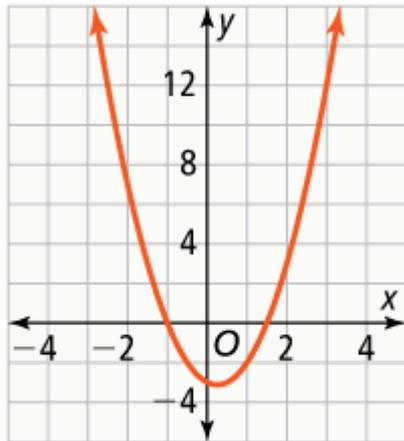
21.  $h(t) = -16t^2 + 18t + 9$ ; 14.1 ft

22.  $f(x) = 2x^2 + 9x - 5$



The vertex is  $(-2.25, -15.125)$ , which represents the minimum area of the rectangle when  $x = -2.25$  if the value of  $x = -2.25$  is possible, for which it is not. The  $x$ -intercepts represent when the area of the rectangle is 0. The  $x$ -intercepts are  $-5$  and  $0.5$ . The  $y$ -intercept represents the area when  $x$  is 0. The  $y$ -intercept is  $-5$ . The domain is all  $x$ -values so the side lengths and area are positive, so the domain is  $x > 0.5$ . The range is  $y > 0$ .

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



The vertex is  $(0.25, -3.125)$ , which represents the minimum area of the rectangle when  $x = 0.25$  if the value of  $x = 0.25$  is possible, for which it is not. The  $x$ -intercepts represent when the area of the rectangle is 0. The  $x$ -intercepts are  $-1$  and  $1.5$ . The  $y$ -intercept represents the area when  $x$  is 0. The  $y$ -intercept is  $-3.125$ . The domain is all  $x$ -values so the side lengths and area are positive, so the domain is  $x > 1.5$ . The range is  $y > 0$ .

24. Find the  $t$ -intercepts by graphing the function.
25. Determine if the differences in the  $x$ -values are constant.
26. quadratic
27. linear