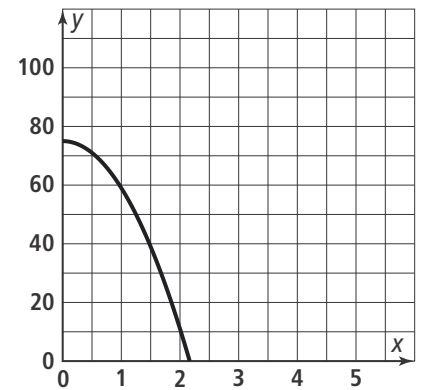




8-4 Additional Practice

Modeling with Quadratic Functions

- An acrobat is on a platform that is 25 feet in the air. She jumps down at an initial vertical velocity of 4 ft/s. Write a quadratic function to represent the height h of the acrobat t seconds after the jump. If a safety net is placed 5 feet above the ground, how long will it take for her to land safely on the net?
- A disc is thrown into the air with an upward velocity of 20 ft/s. Its height h in feet after t seconds is given by the function $h = -16t^2 + 20t + 6$. What is the maximum height the disc reaches? How long does it take for the disc to reach the maximum height? How long does it take for the disc to descend to 3 feet above the ground?
- During a physics experiment, a class drops a golf ball off a bridge toward pavement below. The bridge is 75 ft high. The function $h = -16t^2 + 75$ gives the golf ball's height h in feet above the pavement after t seconds. Use the graph of the function at the right. After how many seconds does the golf ball hit the pavement?
- The length of a rectangular park is twice its width. The park is surrounded by a 3-foot-wide path. Write a quadratic function to represent the total area of the park and the path.
- For the vertical motion model $h(t) = -16t^2 + 54t + 3$, identify the maximum height reached by an object and the amount of time the object is in the air before it hits the ground. Round to the nearest tenth.
- Compare the models $f(x) = -0.5x^2 + 0.5x + 10$ and $g(x) = -0.5x^2 + 0.45x + 10.25$ by evaluating the residuals. Analyze how the points are distributed about the line $y = 0$. Which function better represents the actual data?



$f(x)$					
x	1	2	3	4	5
residual	10	9	8	4	0

$g(x)$					
x	1	2	3	4	5
residual	10.2	9.15	7.1	4.05	0

- An object is thrown off a platform that is 15 ft high with an initial velocity of 8.5 ft/s. What function models the height h of the object after t seconds?