8-4 Additional Practice

Modeling with Quadratic Functions

1. 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?

2. 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?

3. 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.

4. 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?

5. Which function models the area of a rectangle with side lengths of $2x - 4$ units and $x + 1$ units?

A $f(x) = 2x^2 - 4x + 4$ **C** $f(x) = 2x^2 - 8x + 4$

B $f(x) = 2x^2 + 8x - 4$ **D** $f(x) = 2x^2 - 2x - 4$

6. The function $h(t) = -16t^2 + 32t + 24$ models the height h, in feet, of a ball t seconds after it is thrown straight up into the air. What is the initial velocity and the initial height of the ball?

A 16 ft/s; 32 ft   **C** 32 ft/s; 24 ft

B 24 ft/s; 32 ft   **D** 48 ft/s; 24 ft