

Quite the Assortment of Quadratic Applications!

Example 1

The function $h = -5t^2 + 20t + 2$ gives the approximate height (h in metres) of a thrown football as a function of time (t in seconds). The ball hits the ground before the receiver could get to it!

- (a) What was the maximum height of the football?
- (b) How long did it take the football to reach its maximum height?
- (c) How long was the ball in the air?
- (d) How high was the ball when it was thrown?

Example 2

A flaming arrow is fired upwards from the deck of a ship. The flaming arrow hits the water. The height (h in metres) of the arrow above the water t seconds after it is fired can be modelled by the equation

$$h = -4.9t^2 + 98t + 8$$

- (a) Determine the maximum height the arrow will reach.
- (b) How long does it take the arrow to reach its maximum height?
- (c) How long does it take for the arrow to hit the water?
- (d) How high is the arrow above the water when it is released?

Example 3

Find two consecutive whole numbers such that the sum of their squares is 265.

Example 4

The perimeter of a right triangle is 36 m and the length of the hypotenuse is 15 m. Determine the length of the other two sides.

Example 5

A square flower garden with a side measuring 20 m is to be surrounded by a uniform flagstone border. If the area of the border equals the area of the flower garden, find the width of the flagstone border, rounded to 1 decimal place.

