

23.0

3 CST items

Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.

Key Vocabulary

Quadratic

Gravitational Constant

Initial Height

Initial Velocity

Instructional Objectives

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| 1 | Use the relationship between height and time (in feet per second) to solve motion problems.
$height = -16t^2 + v_0t + h_0$

Note: the metric version of this formula (meters per second, with a gravitational constant of -9.8) is NOT likely to appear on the STAR. | 1 | An object is dropped from a height of 256 feet. How long will it take to hit the ground? |
| | | 2 | A man standing on the ground shot an arrow straight up with a velocity of 96 feet per second. How long will it take for the arrow to return to the ground? |
| | | 3 | Jessica is standing on a balcony 180 feet above the ground. If she throws an object straight down with an initial velocity of 12 feet per second, how long will it take to reach the ground? |
| | | 4 | A cannon is placed at the edge of a cliff 60 feet above the ocean. A strong wind is blowing out to sea. If the canon fires a shell straight up with a velocity of 200 ft/sec, about how long will it take for the shell to splash down into the ocean? |
| 2 | Set up and solve quadratic equations involving constrained areas of polygons. | 1 | The length of a rectangle is 4-times its width. The area of the rectangle is 144 square centimeters. What is the width of the rectangle? |
| | | 2 | The length of a rectangle is 4 inches greater than twice its width. The area of the rectangle is 96 square inches. What is the length of the rectangle? |
| | | 3 | The height of a triangle is 6-times its width. The area of the triangle is 175 square centimeters. What is the height of the triangle? |
| | | 4 | The base of a triangle is 6 inches greater than twice its height. The area of the triangle is 70 square inches. What is the height of the triangle? |