

Name: _____ Date: _____ Band: _____
Algebra 2

Quadratic Word Problems HW: Modeling a Dropped or Launched Object

Launched Object Problems:

1. The path of a diver is modeled by the function $f(x) = -9x^2 + 9x + 1$, where $f(x)$ is the height of the diver (in meters) above the water and x is the horizontal distance (in meters) from the end of the diving board.

A. What is the height of the diving board?

B. What is the maximum height of the diver?

C. Describe where the diver is ascending and where the diver is descending.

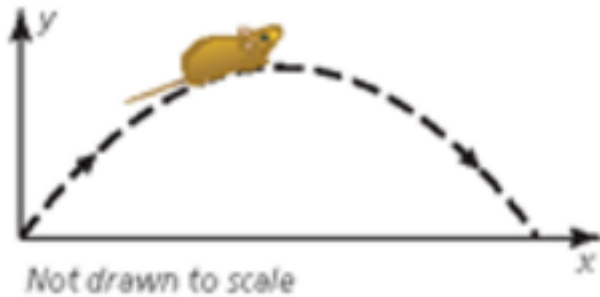


2. The engine torque y (in foot pounds) of one model of car is given by $y = -3.75x^2 + 23.2x + 38.8$, where x is the speed (in thousands of revolutions per minute) of the engine.

A. Find the engine speed that maximizes torque. What is the maximum torque?

B. Explain what happens to the engine torque as the speed of the engine increases.

3. A woodland jumping mouse hops along a parabolic path given by $y = -0.2x^2 + 1.3x$, where x is the mouse's horizontal distance traveled (in feet) and y is the corresponding height (in feet). Can the mouse jump over a fence that is 3 feet high? Justify your answer.



4. A firework explodes when it reaches its maximum height. The height h (in feet) of the firework t seconds after it is launched can be modeled by $h = -\frac{500}{9}t^2 + \frac{1000}{3}t + 10$. What is the maximum height of the firework? How long is the firework in the air before it explodes?



Dropped Object Problems:

5. According to legend, in 1589, the Italian scientist Galileo Galilei dropped rocks of different weights from the top of the Leaning Tower of Pisa to prove his conjecture that the rocks would hit the ground at the same time. The height h (in feet) of a rock after t seconds can be modeled by $h(t) = 196 - 16t^2$.

- A. Find and interpret the zeros of the function. Then use the zeros to sketch the graph.
- B. What do the domain and range of the function represent in this situation?

