

Math 2

Name _____

Quadratic Review

Date _____

1. In Game 3 of the 1970 NBA championship series, the L.A. Lakers were down by two points with three seconds left in the game. The ball was inbounded to Jerry West, whose image is silhouetted in today's NBA logo. He launched and made a miraculous shot from beyond midcourt, a distance of 60 feet, to send the game into overtime (there was no 3-point line at that time). Through careful analysis of the game tape, one could determine the height at Jerry West released the ball, as well as the amount of time that elapsed between the time the ball left his hands and the time the ball reached the basket. This information could then be used to write a rule for the ball's height h in feet as a function of time in flight t in seconds.
 - a. Suppose the basketball left West's hands at a point 8 feet above the ground. What does that information tell about the rule giving h as a function of t ?

 - b. Suppose also that the basketball reached the basket (at a height of 10 feet) 2.5 seconds after it left West's hands. Use this information to determine the initial upward velocity of the basketball.

 - c. Write a rule giving h as a function of t .

2. The parabolic reflectors that are used to send and receive microwaves and sounds have shapes determined by quadratic functions. Suppose that the profile of one such parabolic dish is given by the graph of $y = 0.05x^2 - 1.2x$, where dish width x and depth y are in feet.
- a. Sketch a graph of the function $y = 0.05x^2 - 1.2x$ for $0 \leq x \leq 25$. Then write calculations, equations, and inequalities that would provide answers for parts i – iv. Use algebraic, numeric, or graphic reasoning strategies to find the answers.
- i. If the edge of the dish is represented by the points $y = 0$, how wide is the dish?
- ii. What is the depth of the dish at points 6 feet from the edge?
- iii. How far from the edge will the depth of the dish be 2 feet?
- iv. How far from the edge will the depth of the dish be at least 3 feet?
- b. What is the maximum depth of the dish and at what distance from the edge will that occur? Label the point (with coordinates) on your graph of $y = 0.05x^2 - 1.2x$.
3. Katie, a goalie for Riverside High School's soccer team, needs to get the ball downfield to her teammates on the offensive end of the field. She punts the ball from a point 2 feet above the ground with an initial upward velocity of 40 feet per second.
- a. Write a function rule that relates the ball's height above the field h to its time in the air t .
4. The opening of a cannon is 16 feet above the ground. The daredevil, who is shot out of the cannon, reaches a maximum height of 55 feet after about 1.56 seconds and hits a net that is 9.5 feet off the ground after 3.35 seconds. Use this information to answer the following questions.
- a. Write a rule that relates the daredevil's height above the ground h at a time t seconds after the cannon is fired.

b. At what upward velocity is the daredevil shot from the cannon?

c. Write a rule relating h as a function of t .

5. The table below shows the height (in feet) of a golf ball at various times (in seconds) after a golfer hits the ball into the air.

| | | | | | | | | | |
|-------------|---|-----|----|-----|-----|-----|----|-----|---|
| Times (s) | 0 | 0.4 | 1 | 1.8 | 2.3 | 2.6 | 3 | 3.5 | 4 |
| Height (ft) | 0 | 28 | 56 | 63 | 66 | 64 | 48 | 28 | 0 |

a. Use your calculator to write a rule that best fits the data.

b. Using your model what is the height of the golf ball after 3.2 seconds?

c. Using your model, estimate the time(s) where the golf ball is 50 feet off the ground.