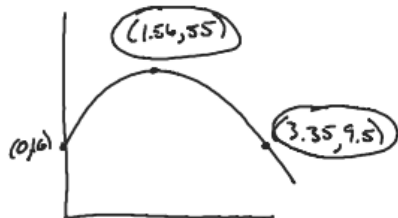


2. The parabolic reflectors that are used to send and receive microwaves and sounds have shapes determined by quadratic functions. Suppose that the profile of one such parabolic dish is given by the graph of  $y = 0.05x^2 - 1.2x$ , where dish width  $x$  and depth  $y$  are in feet.
- Sketch a graph 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.
    - If the edge of the dish is represented by the points  $y = 0$ , how wide is the dish?
    - What is the depth of the dish at points 6 feet from the edge?
    - How far from the edge will the depth of the dish be 2 feet?
    - How far from the edge will the depth of the dish be at least 3 feet?
  - 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.
- 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.
- Write a rule that relates the daredevil's height above the ground  $h$  at a time  $t$  seconds after the cannon is fired.



$$h(t) = h_0 + v_0 t - 16t^2$$

$$= 16 + v_0 t - 16t^2$$

$$55 = 16 + v_0(1.56) - 16(1.56)^2$$

$$v_0 = 49.95$$

$$h(t) = 16 + 49.95t - 16t^2$$