MFM 2P1 Name: _____

Analyzing Quadratics with Technology

1. A football is kicked into the air. Its height above the ground is approximated by the relation $h = -5t^2 + 20t$, where h is the height in metres and t is the time in seconds since the football was kicked.
   a) Use technology to sketch the relation.
   b) What are the zeros of the relation? When does the football hit the ground?
   c) What are the coordinates of the vertex?
   d) What is the maximum height reached by the football? After how many seconds does the maximum height occur?

2. A company that manufactures MP3 players uses the relation $P = -60x^2 + 120x$ to model its profit. The variable x represents the number of thousands of MP3 players sold. The variable P represents the profit in thousands of dollars. Use technology to sketch the relation.
   a) What is the maximum profit the company can earn?
   b) How many MP3 players must be sold to earn this profit?
   c) The company "breaks even" when the profit is zero. Are there any break-even points for this company? If so, how many MP3 players are sold at the break-even points?

3. An inflatable raft is dropped from a hovering helicopter to a boat in distress below. The height of the raft above the water, in metres, is approximated by the equation $y = 500 - 5x^2$, where x is the time in seconds since the raft was dropped. Use technology to sketch the relation.
   a) What is the height of the helicopter above the water?
   b) When does the raft reach the water?
   c) What is the height of the raft above the water 6 s after it is dropped?
   d) When is the raft 100 m above the water?