**HW #18 - Mathematical Modeling with Parabolas   
(Given an Equation)**

1. The height in feet of a bottle rocket is given by h(t) = 160t – 16t2 where t is the time in seconds.
   1. How long will it take for the rocket to return to the ground?
   2. What is the height after 2 seconds?
2. A foul ball leaves the end of a baseball bat and travels according to the formula h(t) = 64t - t2 where h is the height of the ball in feet and t is the time in seconds. **How long will it take for the ball to reach a height of 64 feet in the air?**
3. A model rocket is projected straight upward from the ground level according to the height equation h = -16t2 + 192t, t > 0, where h is the height in feet and t is the time in seconds.
   1. At what time is the height of the rocket at its maximum?
   2. What is the maximum height?
4. While playing basketball this weekend Frank shoots an air-ball. The height h in feet of the ball is given by h = -16t2 + 32t + 8.
   1. How long will it take the ball to strike the ground?
   2. What is the maximum height of the ball?
5. While playing catch with his grandson yesterday Tim throws a ball as hard as possible into the air. The height h in feet of the ball is given by h = -16t2 + 64t + 8, where t is in seconds.
   1. How long will it take until the ball reaches the grandson’s glove if he catches it at a height of 3 feet?
   2. What is the maximum height of the ball?

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