Date: _____

Practise: Solve Problems Involving Quadratic Relations

Section 8.4

1. The path of a basketball can be modelled by the relation $h = -0.06d^2 + 0.6d + 3$, where h is the height of the ball in metres and d is the horizontal distance the ball travels in metres.

   a) Find the maximum height reached by the ball using technology.

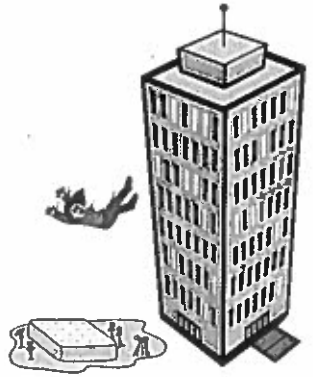
   _____

   b) What is the horizontal distance the ball has travelled when it reaches this maximum height?

   _____

distance (m)	height (m)

2. On the set for an upcoming movie, a stunt woman jumped from a window of a burning building. The path followed by the stunt woman can be modelled by the relation $h = -4.9t^2 + 71.7$, where h is her height, in metres, above the safety net and t is the time, in seconds, since she jumped.



   a) How far below the window is the safety net?

   _____

   b) Calculate how far the stunt woman falls in the first 1.6 s after jumping. Round your answer to three decimal places.

   c) Calculate how long it will take her to fall to the safety net. Round your answer to two decimal places.

3. Jeremy kicked a football that follows a path that can be modelled by the relation $h = -4.9t^2 + 26t + 0.25$, where h represents the height, in metres, and t represents the time, in seconds, after Jeremy kicked the ball. Round your answers to two decimal places.

   a) Find the zeros of the relation using a graphing calculator. Interpret their meaning.

   _____

   b) How long after the ball was kicked did it reach its maximum height?

   _____

   c) What is the maximum height? _____

Date: _____

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4. A baseball hit by a batter follows a path that can be described by the quadratic relation $h = -5t^2 + 10t + 1$, where h represents the height, in metres, and t represents the time, in seconds, after the ball was hit.

   a) Complete the table of values for the relation.

   $h = -5t^2 + 10t + 1$

time (s)	0	0.5	1	1.5	2	2.5	3
height (m)							

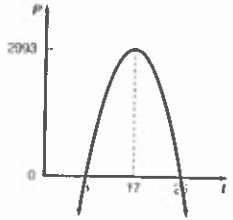
   b) How high off the ground was the ball when it was hit? _____

   c) What was the maximum height of the ball? _____

   How long did it take for the ball to reach its maximum height? _____

   d) Calculate the total time the ball was in the air to the nearest tenth of a second.

5. The organizers of a spring fair have developed a profit relation (P) that depends on the ticket price (t) charged per person. The profit is modelled using the relation $P = -37t^2 + 1258t - 7700$.



   a) What does the third term represent in this relation? _____

   b) Find the ticket price that would produce a maximum profit. _____

   c) What will be the maximum profit? _____