Name: _____   Date: _____

Practice: Solve Problems Involving Quadratic Relations

1. Michael owns a trampoline. He wants to see how high he can jump. The path of one jump can be modelled by the relation $h = -4t^2 + 80t + 12$, where h represents Michael's height above the ground in centimetres and t represents time in seconds.
   a) What is the height of the trampoline?
   b) What is the maximum height Michael reaches?
   c) How long does it take Michael to reach this height?

2. A textbook falls from the top shelf of a shaky bookcase. The path of the book can be modelled by the relation $h = -9t^2 + 90$, where h represents the height of the book above the floor, in centimetres, and t represents time in seconds.
   a) What is the height of the top shelf?
   b) How long does it take the book to reach the floor?

3. Rory is a competitive diver. One of Rory's dives can be modelled by the relation $h = -2t^2 + 4$, where h represents Rory's height above the water, in metres, and t represents time in seconds.
   a) From what height does Rory dive?
   b) How long does it take Rory to reach the water?

4. Two balls of different weights are dropped from the roof of the school. The path of the first ball can be modelled by the relation $h = -4t^2 + 20$, where h represents the height of the ball above the ground, in metres, and t represents time in seconds. The path of the second ball can be modelled by the relation $h = -5t^2 + 20$.
   a) From what height are the two balls dropped?
   b) Which ball reaches the ground first?

5. The circus sells tickets for $6. The circus owners want to increase their revenues, so they increase prices. They have noticed that ticket sales decrease by 60 tickets every time the price increases by $0.60. The situation can be modelled by the relation $R = -30n^2 + 600n + 6000$, where R represents revenue in dollars and n represents the number of times the price is increased by $0.60.
   a) Determine the maximum revenue.
   b) How many times does the ticket price have to be increased to reach the maximum revenue?
   c) What is the ticket price that results in the maximum revenue?