Pre-Calculus 20 8.2 Solving System of Equations Algebraically – Word Problems

Solve the following word problems using a system of equations (2 equations, 2 variables). Use the 5 step method. Some of the problems are linear-quadratic and some are quadratic-quadratic. Do all work on a separate sheet of paper.

1. The sum of two numbers is 16, and the sum of their squares is 146. Find the numbers.
2. The product of two numbers is 1 and the difference of their squares is 15/4. Find the numbers.
3. Two integers have a difference of -30. When the larger integer is increased by 3 and added to the square of the smaller integer, the result is 189. What are the integers?
4. Find two numbers such that the sum of their squares is 170 and the difference of their squares is 72.
5. Terri makes a good hit and the baseball travels on a path modelled by h = -0.1x2 + 2x. Ruth is in the outfield directly in line with the path of the ball. She runs toward the ball and jumps to try to catch if. Her jump is modelled by the equation h = -x2 + 39x – 378. In both equations, x is the horizontal distance in meters from home plate and h is the height of the ball above the ground on meters. Solve this system of equations algebraically and explain the meaning of the point of intersection. Round your answer to the nearest hundredth.
6. A piggy bank contains quarters and loonies. The total number of coins is 73. The total value of the coins is $37. How many of each type of coin is there?
7. Find the dimensions of a rectangle having perimeter 34 feet and a diagonal of length 13 feet.

Answers:

1. 5 and 11 2. 2 and ½: -2 and ½ 3. 12 and 42 or -13 and 17

4. 11 and 7 or 11 and -7 or -11 and 7 or -11 and -7. 5. x = 18.96 m and h = 1.97 m

6. 25 loonies and 48 quarters 7. 5 ft by 12 ft