

## EXTRA PRACTICE — Exercises

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### Unit V – First Degree Relations with Two Placeholders

#### Part D – Problem Solving Using Two Placeholders

#### Lesson 4 – “Formula” Problems

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Solve each of the following story problems by substituting appropriately in the given formula and solving the resulting higher order relation.

1. The number of diagonals that can be drawn from the vertices of a polygon is given by  $d = \frac{1}{2}n^2 - \frac{3}{2}n$  where  $n$  is the number of sides of the polygon and  $d$  is the number of diagonals.  
If 20 diagonals can be drawn inside a given polygon, how many sides does the polygon have?
2. The relationship between the speed of a car and the braking distance in feet required to stop it, at a specified speed, is given by  $d = .0725s^2 - .490s + 19.71$ . If a car is traveling at 45 mph, find the distance required to stop the car.
3. Suppose the cost of making “ $x$ ” lap-top computers is given by  $C = \frac{1}{9}x^2 + 2x + 1$ , where cost is in thousands of dollars. If the revenue from the sale of “ $x$ ” lap-top computers is given by  $R = \frac{5}{36}x^2 + 2x$ , where  $R$  is in thousands of dollars, how many laptops must be sold in order for the company to break even. (i.e. when will Revenue = Cost)
4. The formula for determining the height of a ball thrown upward  $t$  seconds after its release is given by  $h = -16t^2 + 40t + 5$  where 40 is the initial velocity of the ball and 5 is the height from which it is thrown. How long will it take a ball to reach a height of 21 feet.
5. If there are “ $n$ ” teams in a league and each team plays every other team once, the total number of games played  $N$  is given by  $N = n^2 - n$ . If 72 games are played in one season, how many teams are in the league?

# EXTRA PRACTICE — Answer Key

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Solve each of the following story problems by substituting appropriately in the given formula and solving the resulting higher order relation.

1. The polygon has 8 sides
2. The distance required to stop the car is 143.46 feet.
3. The company must sell 6 computers to break even.
4. The ball reaches 21 feet at .5 seconds going up and 21 feet high at 2 seconds coming down.
5. There are 9 teams in the league.