A1 Name: _____

Factoring Word Problems HW

140

1. The number of books per shelf in a bookcase is one less than nine times the number of shelves. If the bookcase contains 140 books, find the number of shelves.

Let x = # of shelves

$$\frac{140}{x} = 9x - 1$$

$$140 = x(9x-1)$$

$-140 \quad -140$

$$0 = 9x^2 - x - 140$$

$$9x^2 - 36x + 35x - 140 = 0$$

$$9x(x-4) + 35(x-4) = 0$$

$$(x-4)(9x+35) = 0$$

$x = 4$ $\quad x = -\frac{35}{9}$ ✗

2. The combined area of a square and a rectangle is 225 square yards. The length of the rectangle is eight times the width of the rectangle, and the length of a side of the square is the same as the width of the rectangle. Find the dimensions of the square and the rectangle.

Let w = width of rectangle

$A_1 = w^2$ $\quad A_2 = 8w^2$

$$w^2 + 8w^2 = 225$$

$$9w^2 = 225$$

$$9w^2 - 225 = 0$$

$$9(w^2 - 25) = 0$$

$$9(w+5)(w-5) = 0$$

$w = -5$ ✗ $\quad w = 5$

5 × 5 $\quad$ 40 × 5

3. Suppose that we want to find two consecutive integers such that the sum of their squares is 613. What are they?

Let x = first number

$x+1$ = second number

$$x^2 + (x+1)^2 = 613$$

$$x^2 + x^2 + 2x + 1 = 613$$

$$2x^2 + 2x - 612 = 0$$

$$2(x^2 + x - 306) = 0$$

$$2(x+18)(x-17) = 0$$

$x = -18$ $\quad x = 17$

$-18, -17$ $\quad 17, 18$