Algebra RH

Essential Question: How do we solve quadratic equation word problems?

Do Now: Solve the following word problem using a quadratic equation.

If the square of a number is added to 5 times the number, the result is 36. Find the number.

x = a number = $4, -9$

$x^2 + 5x = 36$

$x^2 + 5x - 36 = 0$

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

$x+9=0$	$x-4=0$
$x=-9$	$x=4$

check

$(-9)^2 + 5(-9) = 36$

$81 - 45 = 36$

$36 = 36$ ✓

$(4)^2 + 5(4) = 36$

$36 = 36$ ✓

Solving Word Problems using Quadratic Equations

1. Find two positive numbers whose ratio is 2:3 and whose product is 600.

Let $2x$ = 1st positive number = $2(10) = 20$

Let $3x$ = 2nd positive number = $3(10) = 30$

$2x(3x) = 600$

$6x^2 = 600$

$x^2 = 100$

$\sqrt{x^2} = \pm\sqrt{100}$

$x = +10, -10$ reject

2. When the first of three positive consecutive integers is multiplied by the third, the result is one less than six times the second. Find the integers.

Let x = 1st positive con. integer = 5

Let $x+1$ = 2nd positive con. integer = 6

Let $x+2$ = 3rd positive con. integer = 7

$x(x+2) = 6(x+1) - 1$

$x^2 + 2x = 6x + 6 - 1$

$x^2 + 2x - 6x = 5$

$x^2 - 4x - 5 = 0$

$(x-5)(x+1) = 0$

$x-5=0$	$x+1=0$
$x=5$	$x=-1$ reject

3. The sum of two numbers is 10. The sum of their squares is 52. Find the numbers.

Let x = one number = 6

Let $10-x$ = other number = 4

$(x)^2 + (10-x)^2 = 52$

$x^2 + (10-x)(10-x) = 52$

$x^2 + 100 - 20x + x^2 = 52$

$2x^2 - 20x + 48 = 0$

$x^2 - 10x + 24 = 0$

$(x-6)(x-4) = 0$

$x=6$	$x=4$

4. The perimeter of a rectangle is 20 in., the area is 16 in^2. Find the dimensions of the rectangle.

$P = 20$ in

$A = 16$ in^2

x = width = 2, 8

$10-x$ = length = 8, 2

$P = 2w + 2\ell$

$P = 2x + 2\ell$

$20 = 2x + 2\ell$

$20 - 2x = 2\ell$

$10 - x = \ell$

$x(10-x) = 16$

$10x - x^2 = 16$

$x^2 - 10x + 16 = 0$

$(x-8)(x-2) = 0$

$x-8=0$	$x-2=0$
$x=8$	$x=2$