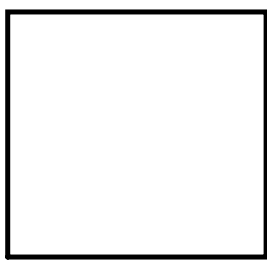


6.4 Applications of Quadratics

Geometry Problem

- A picture is 4" taller than it is wide and has an area of 192 in². What are the dimensions of the picture?



x

x+4

$$A = l \cdot w$$

$$192 = (x)(x+4)$$

$$\begin{array}{r} 192 = x^2 + 4x \\ -192 \quad \quad -192 \\ \hline \end{array}$$

$$0 = x^2 + 4x - 192$$

$$0 = (x + 16)(x - 12)$$

$$x + 16 = 0 \quad \text{or} \quad x - 12 = 0$$

$$\cancel{x = -16}$$

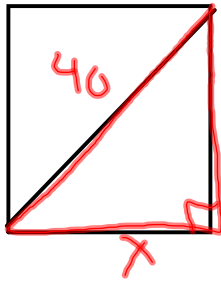
$$x = 12 \text{ in}$$

$$12 + 4 = 16 \text{ in}$$

The perimeter of a rectangle is 112 cm and the length of the diagonal is 40 cm.

Find the dimensions of the rectangle.

(Diagonal = Triangle problem)



$$56-x \quad a^2 + b^2 = c^2$$

$$x^2 + (56-x)^2 = 40^2$$

$$x^2 + (56-x)(56-x) = 1600$$

$$x^2 + 3136 - 112x + x^2 = 1600$$

$$2x^2 - 112x + 3136 = 1600$$

$$-1600 - 1600$$

$$\frac{2x^2}{2} - \frac{112x}{2} + \frac{3136}{2} = 0$$

$$x^2 - 56x + 768 = 0$$

$$(x - 24)(x - 32) = 0$$

$$x - 24 = 0 \quad x - 32 = 0$$

$$x = 24 \text{ cm} \quad x = 32$$

$$56 - 24$$

$$32 \text{ cm}$$

Number Problem

The product of 2 consecutive positive integers is 10 more than 4 times the smaller integer. What are the integers?

small integer: x

bigger integer: $x+1$

$$\overbrace{x(x+1)} = 4x + 10$$

$$\begin{array}{r} x^2 + x = 4x + 10 \\ -4x - 10 \quad -4x \quad -10 \\ \hline \end{array}$$

$$x^2 - 3x - 10 = 0$$

$$(x-5)(x+2) = 0$$

$$x-5=0 \quad x+2=0$$

$$x=5$$

$$\cancel{x=-2}$$

$$\begin{array}{l} x+1 \\ 5+1=6 \end{array}$$

HW: p. 397

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