9.4   Applications of Quadratic Equations

More on solving formulas:

Example 1: Solve for the given variable.
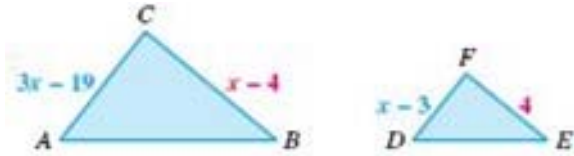
a) $a^2 + b^2 + c^2 = d^2$ for b b) $M = \dfrac{m_1 m_2}{2x^2}$ for x

c) $A = \pi r^2 + \pi r s$ for r

d) $m = \dfrac{m_0}{\sqrt{1 - \dfrac{v^2}{c^2}}}$ for v

*Example 2:* Find the length of side AC.

Example 3: For over 2000 yr, the proportions of a "**golden**" **rectangle** have been considered visually appealing. A rectangle of width w and length l is considered "golden" if $\dfrac{w}{l} = \dfrac{l}{w+l}$. Solve for l.

Example 4: Two ships leave port at the same time, one heading south and the other heading east. Several hours later, they are 170 mi apart. If the ship travelling south traveled 70 mi farther than the other ship, how many miles did they each travel?
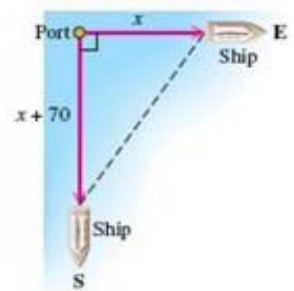
Example 5: The outside of a mosaic mirror frame measures 14 in. by 20 in., and 160 in^2 of mirror shows. Find the width of the frame.
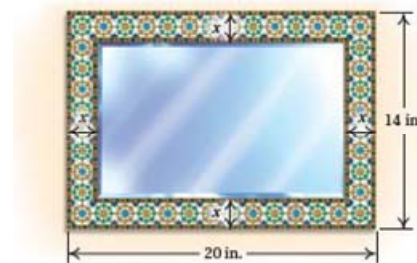
Example 6: Use the compound interest formula $A = P(1 + r)^2$ to find the interest rate r at which a principal P of $10,000 will increase to $10,920.25 in 2 yr.

Example 7: A sphere is inscribed in a cube as shown. Express the surface area of the sphere as a function of the surface area S of the cube.