1.5 – Applications and Modeling with Quadratic Equations

Ex **1.**

A piece of machinery can produce rectangular sheets of metal such that the length is twice the width. Also, equal-sized square measuring 10 cm on a side can be cut from the corners so that the resulting piece of metal can be shaped into an open box by folding up the flaps. If the volume of the box needs to be 7500 cm^3, what should the dimensions of the original piece of metal be?

Pythagorean Theorem:

For right triangle with legs of length a and b, and hypotenuse of length c, $a^2 + b^2 = c^2$.

Ex 2.

The longer leg of a right triangle is 1 m shorter than twice the length of the shorter leg. The hypotenuse is 2 m longer than the longer leg. Find the lengths of the sides of the triangle.

Height of a Projected Object

$$s = -16t^2 + v_0 t + s_0$$

v_0 is initial velocity (in ft/s)

s_0 is initial height (in ft)

t is # of seconds after object projected

Ex 3.

A rubber duckie is thrown into the air from the ground with an initial velocity of 100 ft/s. Neglecting air resistance, what is the formula for its height (in feet) above the ground t seconds after being thrown? After how many seconds will duckie be 50 ft above the ground?

How long will it take for the duck to return to the ground?