THEORETICAL PART:

Theorem: The Law of Cosines

Given a triangle ABC, with sides labeled conventionally, the following equations are all true. These equations represent the **Law of Cosines**

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$b^2 = a^2 + c^2 - 2ac\cos B$$

$$c^2 = a^2 + b^2 - 2ab\cos C$$

Theorem (Area of a Triangle (Heron's Formula))

Given a triangle with sides a, b, and c, let $s = \dfrac{a+b+c}{2}$. Then the following is true

$$Area = \sqrt{s(s-a)(s-b)(s-c)}$$

PRACTICAL PART:

1. Determine the three angles for a triangle in which $a = 3$ inches, $b = 5$ inches, and $c = 7$ inches.

2. A set designer is putting together a backdrop for a play, and one element of the scene is a large triangular piece of wood. The edges of the triangle are of lengths 4 meters, 7 meters, and 9 meters. She wants to know the square area of the triangle in order to estimate the amount of paint needed to cover it.