A particular triangle can be constructed from only 3 pieces of information. Similar triangles and Pythagorean’s Theorem allow us to determine missing values in a triangle when others are known. Trigonometry uses this nature of the triangle, right angled ones specifically, to allow us to solve certain problems.

Let’s review some of the facts about triangles first before we go too much further. We know:

- The internal angles in any triangle add up to 180°.
- Pythagorean Theorem uses right angled triangles and the formula $c^2 = a^2 + b^2$.
- The longest side of any right angle triangle is called the hypotenuse and is given the letter “c” in the above equation. The triangle’s legs are given the values “a” and “b”.
- Every angle has one opposite side and two adjacent sides.

**Activity 1:** Determine the unknown values:

(a) 
\[ \text{Unknown angle} = 180° - (90° + 56°) \]
\[ = 34° \]
\[ \text{Unknown side} \]
\[ c^2 = a^2 + b^2 \]
\[ = 9^2 + 6^2 = 81 + 36 = 117 \]
\[ c = \sqrt{117} \approx 10.81 \text{ cm} \]

(b) 
\[ \text{Missing angle} = _____ \]
\[ \text{Missing side} = _____ \]

We can figure out the missing values in these cases because there is enough information present. If we only had one side and one angle (other than the 90° one) we would need another method. This is where trigonometry fits in.

Trigonometry uses the principles of the right angle triangle to help us solve such problems. There are three parts of the triangle we need to identify relative to any angle. There are also three basic functions which we need to know. These are:

- Opposite: the side opposite to the angle in question
- Adjacent: the side touching the angle in question, but not the hypotenuse
- Hypotenuse: the longest side of a right angle triangle
- Sine (sin) = the opposite divided by the hypotenuse
- Cosine (cos) = the adjacent divided by the hypotenuse
- Tangent (tan) = the opposite divided by the adjacent

**Activity 2:** Label each side of every triangle using **opposite, adjacent, and hypotenuse**.
Homework:
1. Determine the unknown / missing values as shown in Activity 1 on the front of this sheet.

   ![Diagram with unknown values]

   a) missing angle = ______  
   b) missing angle = ______  
   c) missing angle = ______
   missing side = ______  
   missing side = ______  
   missing side = ______

   ![Diagram with unknown values]

   d) missing angle = ______  
   e) missing angle = ______
   missing side = ______  
   missing side = ______

2. Define the terms opposite, adjacent, and hypotenuse as they relate to trigonometry.
   a) opposite: __________________________________________
   b) adjacent: ____________________________________________
   c) hypotenuse: _________________________________________

3. Label each side of every triangle; **use opposite, adjacent, and hypotenuse**.
   Use the asterisk (*) as the means of identifying which label belongs to which angle.

   a) ![Diagram with labeled sides]
   b) ![Diagram with labeled sides]
   c) ![Diagram with labeled sides]
d)  

e)