Pythagoras was a Greek philosopher who lived around 500 BC. He was born on the island of Somas and was well educated. He is best known for the Pythagorean Theorem, although he made contributions to many other areas in both math and music.

The Pythagorean Theorem is a mathematical expression which states that the sum of the squared length of two short sides of a right angle triangle equals the square length of the longest side (called the hypotenuse). It allowed builders to either create perfect right angles or to judge if something was properly square.

Consider the problem to the right. We do not know if the angle with the question mark is a right angle (90 degrees) or not. How can we use the Pythagorean Theorem to see if it is or not? If it is a right angle, the sum of the square of the two shorter sides should equal to the square of the longest side. If it is significantly longer or shorter, the angle is not 90 degrees.

**Activity 1:** Below are the measurements of two triangles. Use the Pythagorean Theorem to determine if each is a right angle triangle as was done in the example above. Remember that the longest side would be the hypotenuse (side c).

Triangle 1.

Side a: 12 cm
Side b: 35 cm
Side c: 40 cm

Triangle 2: measures 9 in 40 in 41 in

The Pythagorean Theorem is also used to determine the value of an unknown side in a right angle triangle where two lines are known. You already know how to find the value of the hypotenuse. If it one of the legs we are looking for we need to derive the formula. Use the derived formula to determine the length of the unknown leg. See diagram to the left.

**Activity 2:** Determine the missing line length.

a)  

```
5 cm

4 cm

?  
```

b) 

```
13 cm

12 cm

? 
```

```
16 in

18 in

? 
```
Homework:
1) The measurements of 4 triangles are given below. Determine if each is a right angle triangle or not using the Pythagorean Theorem. Remember that the longest side should be the value of the hypotenuse (side c). Show all work or no mark.
   a) 8 cm 10 cm 6 cm  
   b) 8 in 15 in 17 in  
   c) 13 m 11 m 6 m  
   d) 7 ft 24 ft 25 ft

2) Use a ruler and, as accurately as possible, measure the lines indicated and calculate the third marked with a (?)
   a)  
   b)  
   c)  
   d)  

3) Determine the missing line length. Remember that you may need to use the derived formula found on the other side of this sheet.
   a)  
   b) 16 in  
   c)  

   ?  
   ?  
   ?  
   ?  
   ?  
   ?  
   ?