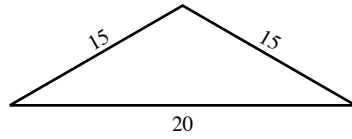


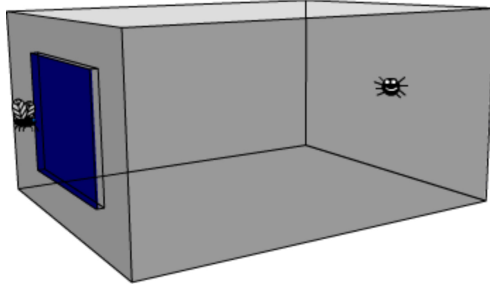
Trigonometry Assignment #2

Covers The Pythagorean Theorem Review and Trigonometry 1: Equation of a Circle

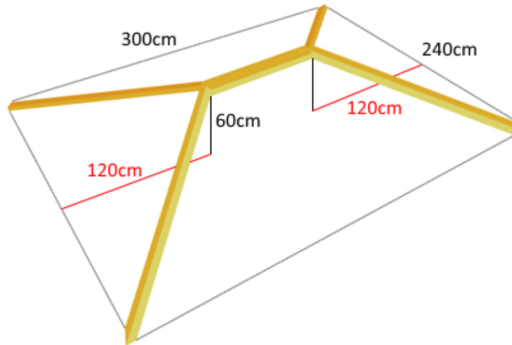
1. What is the height of the triangle in the figure below?



2. A spider is sitting in the middle of one of the smallest walls in my living room and a fly is resting by the side of the window on the opposite wall, 1.5m above the ground and 0.5m from the adjacent wall. The room is 5m long, 4m wide and 2.5m high. What is the shortest distance the spider would have to crawl to catch the fly?



3. [Challenge] Suppose we have a utility shed with a roof made from five wooden beams laid out as shown in the image below. Each of the four sloping beams is the same length. The roof of the shed is 300cm long, 240cm wide and 60cm high.



- What is the total length of wood needed to make these five main beams for the roof?
 - Can you reduce the amount of wood needed by changing the 120 cm lengths (marked in red)?
4. Consider a circle with radius $r = 2$ centered at the origin. Its equation is: $x^2 + y^2 = 4$. For each of the following points determine whether i) the point is on the circle, or ii) the point is inside the circle, or iii) the point is outside the circle. Defend your answer by showing your calculations.
- $(2, 0)$
 - $(1, \sqrt{3})$
 - $\left(\frac{3}{4}, \frac{\sqrt{55}}{4}\right)$
 - $(0.125, 1.996)$
 - $\left(\frac{3}{8}, \frac{\sqrt{248}}{8}\right)$
 - $\left(\frac{11}{8}, \frac{3\sqrt{15}}{8}\right)$
5. [Challenge] What are the coordinates of the vertices of the largest square (with horizontal and vertical sides) that can fit inside a circle of radius $r = 3$ (centered at the origin)? [The square is said to be *inscribed* in the circle.]
6. [Challenge] If an equilateral triangle were inscribed in a circle of radius $r = 1$,
- find the coordinates of the vertices of at least one such triangle.
 - If one vertex of one of these inscribed triangles had coordinates (x_1, y_1) , what are the coordinates of the other two vertices?