Note: You may need to use Pythagoras Theorem which states that

In a right-angled triangle, \( a^2 = b^2 + c^2 \), where \( a \) is the length of the longest side, and \( b \) and \( c \) are the lengths of the other two sides.

TEAM EVENTS

T1. There are nine fractions between \( \frac{1}{5} \) and \( \frac{1}{2} \) such that the difference between any two successive fractions is constant. Find the sum of these eleven fractions.

T2. In the following figure, the small rectangles are identical and each has an area of 8 cm\(^2\). A, B, E, F and G are vertices of some small rectangles. C and D are points on the line segments AB. If CD = \( \frac{2}{3} \) AB, find the area of the shaded part.
T2. How many shortest path are there from P to Q?

T4. In $\triangle ABC$, point D is on AC, $AB = AD$ and $\angle ABC - \angle ACB = 30^\circ$. Find $\angle CBD$. 
T5. A structure is built with identical cubes. Figure 1 is the top view, Figure 2 is the front view and Figure 3 is the side view. What is the least number of identical cubes required to build this structure?

![Diagram of a structure built with cubes]

T6. In a rectangle made up of 2004 x 4002 square units, how many square units can a diagonal line pass through? (For example, the figure below shows a diagonal line of a 6 x 8 rectangle that passes through 12 square units.)

![Diagram of a rectangle with a diagonal line]

(For the purpose of this exercise, assume that the diagonal line passes through the center of each square unit for calculation purposes.)
T7. In the following figure, AB is a diameter of a circle with center C. Two semi-circles APC and CBQ are drawn on AB. The circle PQR touches all the three semi-circles. If AM = 28 cm, find the radius of the circle PQR.

T8. The following is a plane figure. BCDE is a square and ΔABC is a right-angled triangle. If AB = 3 cm and BC = 5 cm, find the area of ΔABE.
T9. In the following equation, each letter represents a distinct digit.

\[ 7(ABCXYZ) = 6(XYZABC) \]

A and X are not equal to zero. Find the six digit number ABCXYZ.

(Please show your steps/working/solution clearly.)
T10. Arrange the natural numbers 1, 2, 3, 4, ... in the order as shown in the figure. The numbers 2, 3, 5, 7, 10, ... are called ‘turning numbers’ as the arrow-in and arrow-out of these numbers changed directions at the corner. How many ‘turning numbers’ are there between 529 and 1000?

(Please show your steps/working.solution clearly)