

1. Given $\triangle ABC$, with lengths shown in the diagram below, find the length of the line segment $[CD]$.

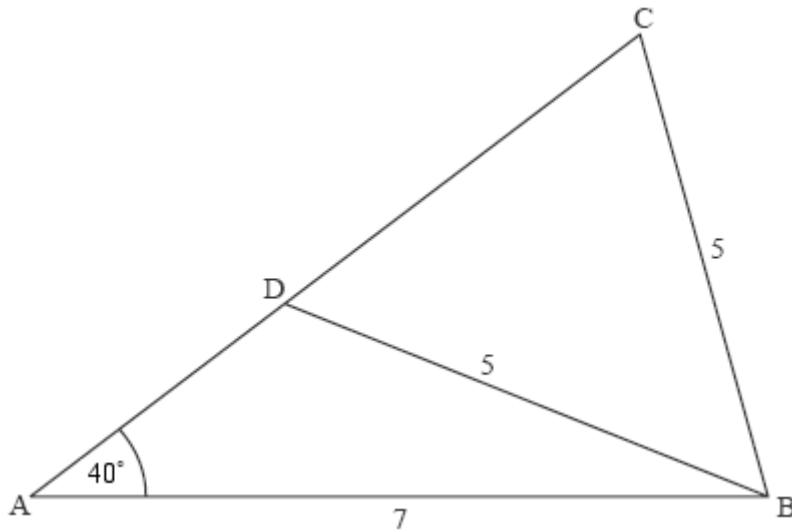


diagram not to scale

(Total 5 marks)

2. Consider the triangle ABC where $\hat{BAC} = 70^\circ$, $AB = 8$ cm and $AC = 7$ cm. The point D on the side BC is such that $\frac{BD}{DC} = 2$. Determine the length of AD .

(Total 6 marks)

3. Triangle ABC has $AB = 5\text{ cm}$, $BC = 6\text{ cm}$ and area 10 cm^2 .

(a) Find $\sin \hat{B}$.

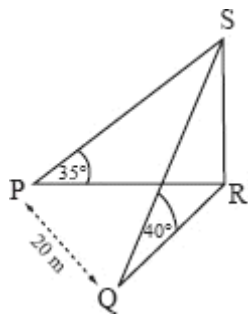
(2)

(b) **Hence**, find the two possible values of AC, giving your answers correct to two decimal places.

(4)

(Total 6 marks)

4.



The above three dimensional diagram shows the points P and Q which are respectively west and south-west of the base R of a vertical flagpole RS on horizontal ground. The angles of elevation of the top S of the flagpole from P and Q are respectively 35° and 40° , and $PQ = 20\text{ m}$.

Determine the height of the flagpole.

(Total 8 marks)

5. Consider triangle ABC with $\hat{BAC} = 37.8^\circ$, $AB = 8.75$ and $BC = 6$.

Find AC.

(Total 7 marks)

6. In a triangle ABC, $\hat{A} = 35^\circ$, $BC = 4$ cm and $AC = 6.5$ cm. Find the possible values of \hat{B} and the corresponding values of AB.

(Total 7 marks)

7. The lengths of the sides of a triangle ABC are $x - 2$, x and $x + 2$. The largest angle is 120° .

(a) Find the value of x .

(6)

(b) Show that the area of the triangle is $\frac{15\sqrt{3}}{4}$.

(3)

(c) Find $\sin A + \sin B + \sin C$ giving your answer in the form $\frac{p\sqrt{q}}{r}$ where $p, q, r \in \mathbb{Z}$.

(4)

(Total 13 marks)

8. A farmer owns a triangular field ABC. The side [AC] is 104 m, the side [AB] is 65 m and the angle between these two sides is 60° .

(a) Calculate the length of the third side of the field.

(3)

(b) Find the area of the field in the form $p\sqrt{3}$, where p is an integer.

(3)

Let D be a point on [BC] such that [AD] bisects the 60° angle. The farmer divides the field into two parts by constructing a straight fence [AD] of length x metres.

(c) (i) Show that the area of the smaller part is given by $\frac{65x}{4}$ and find an expression for the area of the larger part.

(ii) Hence, find the value of x in the form $q\sqrt{3}$, where q is an integer.

(8)

(d) Prove that $\frac{BD}{DC} = \frac{5}{8}$.

(6)

(Total 20 marks)