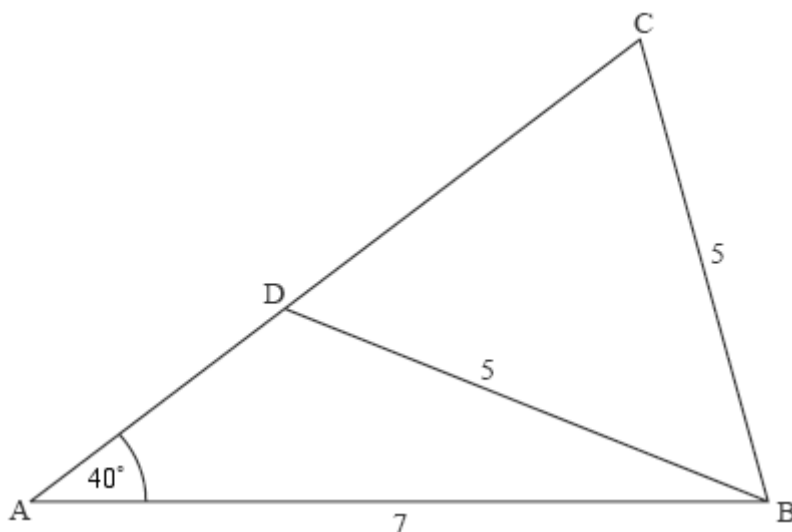


1. Given  $\triangle ABC$ , with lengths shown in the diagram below, find the length of the line segment [CD].



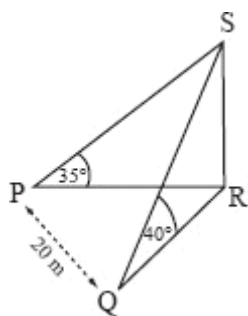
*diagram not to scale*

**(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.



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  $35^\circ$  and  $40^\circ$ , and  $PQ = 20$  m.

Determine the height of the flagpole.

**(Total 8 marks)**

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

Find AC.

(Total 7 marks)

5. 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)

6. 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  $60^\circ$ .

(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  $60^\circ$  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)