Sine Rule, Cosine Rule and Area Rule - 2

1.

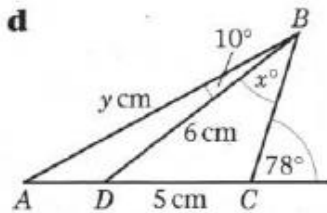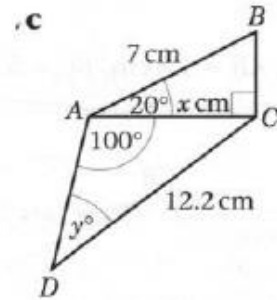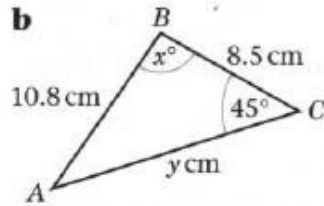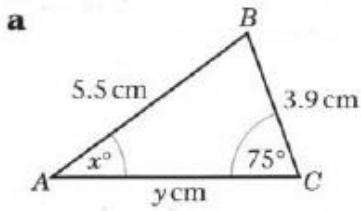In each of the following diagrams work out the values of x and y:

a

b

c

d

e

f
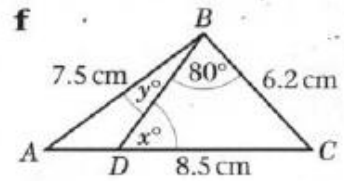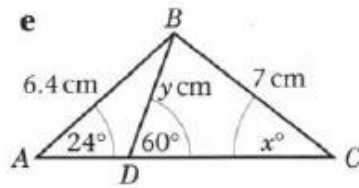
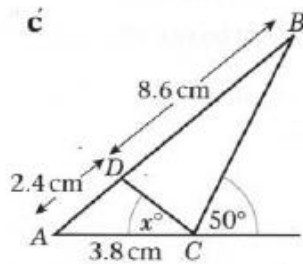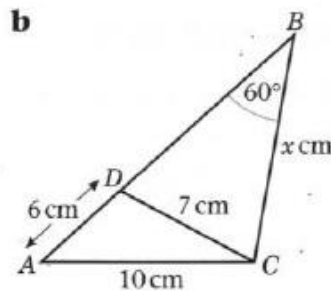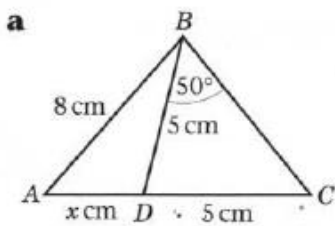**2.**

In $\triangle ABC$, $AB = x$ cm, $BC = (4 - x)$ cm, $\angle BAC = y°$ and $\angle BCA = 30°$.

Given that $\sin y° = \dfrac{1}{\sqrt{2}}$, show that $x = 4(\sqrt{2} - 1)$.

3.

Find x in each of the following diagrams:

a

b

c

4.

In $\triangle ABC$, shown right, $AB = 4$ cm, $BC = (x + 2)$ cm and $AC = 7$ cm.

a Explain how you know that $1 < x < 9$.

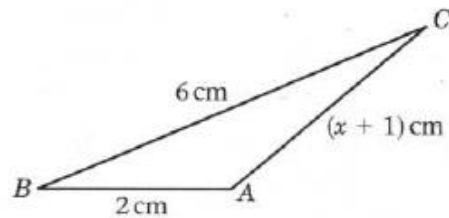**b** Work out the value of x for the cases when

   i $\angle ABC = 60°$ and

   ii $\angle ABC = 45°$, giving your answers to 3 significant figures.
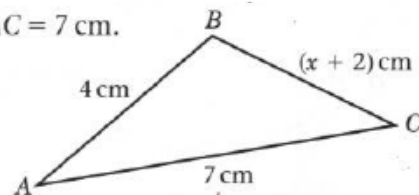
5.

In the triangle shown right, $\cos \angle ABC = \frac{5}{8}$.
Calculate the value of x.

6.

In $\triangle ABC$, $AB = \sqrt{2}$ cm, $BC = \sqrt{3}$ cm and $\angle BAC = 60°$. Show that $\angle ACB = 45°$ and find AC.

7.

In $\triangle ABC$, $AB = (2 - x)$ cm, $BC = (x + 1)$ cm and $\angle ABC = 120°$:

a Show that $AC^2 = x^2 - x + 7$.

b Find the value of x for which AC has a minimum value.

8.

Triangle ABC is such that $BC = 5\sqrt{2}$ cm, $\angle ABC = 30°$ and $\angle BAC = \theta$, where $\sin \theta = \dfrac{\sqrt{5}}{8}$.

Work out the length of AC, giving your answer in the form $a\sqrt{b}$, where a and b are integers.

9.

The perimeter of $\triangle ABC = 15$ cm. Given that $AB = 7$ cm and $\angle BAC = 60°$, find the lengths of AC and BC.

10.

In each of the figures below calculate the total area:

a

b