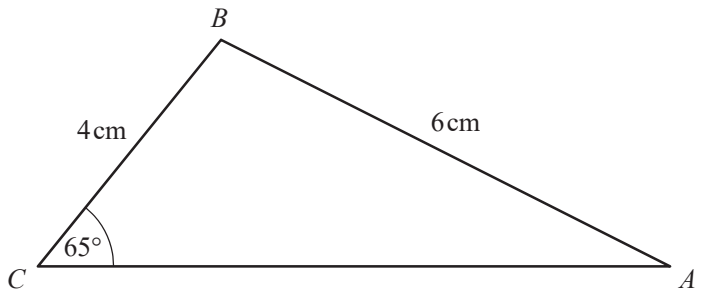
EXAM PAPERS PRACTICE

Area of Triangle

Model Answer

Question 1



NOT TO SCALE

In triangle ABC, $AB = 6$ cm, $BC = 4$ cm and angle $BCA = 65°$.

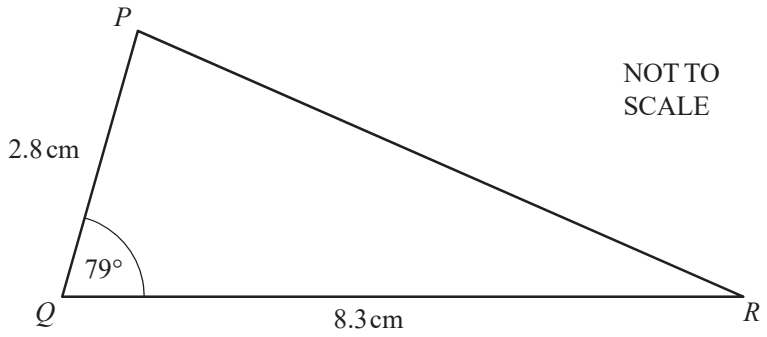
Calculate

(a) angle CAB, [3]

$$\frac{AB}{\sin \angle BCA} = \frac{BC}{\sin \angle CAB}$$
$$\sin \angle CAB = 0.6$$
$$\angle CAB = 37°$$

(b) the area of triangle ABC. [3]

$$\text{Area} = \tfrac{1}{2} \times AB \times h$$
$$\text{Area} = \tfrac{1}{2} \times 6 \times (4 \times \sin(65°))$$



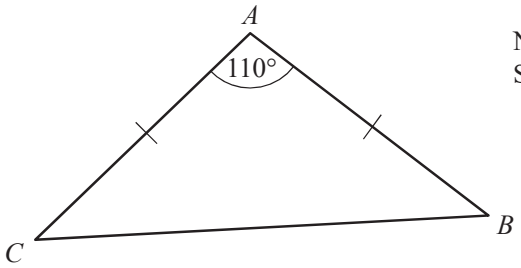
(a) Calculate the area of triangle PQR. [2]

$$S = \frac{1}{2} PQ \cdot QR \cdot \sin \angle PQR$$
$$= \frac{1}{2} \times 8.3 \times 2.8 \cdot \sin 79^\circ$$
$$= 11.41 \text{cm}^2$$

(b) Triangle PQR is enlarged by scale factor 4.5 .

Calculate the area of the enlarged triangle. [2]

$$S = \frac{1}{2} \cdot 4.5PQ \cdot 4.5QR \cdot \sin \angle PQR$$
$$= 4.5^2 \cdot S_1$$
$$= 231.05 \text{ cm}^2$$
{ Simple operation of math }



NOT TO SCALE

Triangle ABC is isosceles with $AB = AC$.
Angle $BAC = 110°$ and the area of the triangle is $85\,cm^2$.

Calculate AC. [3]

$\angle BAC = 110°$
$AB = AC =$ let a cm.
$\triangle ABC$ area $= 85\ cm^2$.
So,
$\triangle ABC$ area $= 85\ cm^2$.
$(1/2) * AB * AC * \sin \angle BAC = 85\ cm^2$.
$(1/2) * a * a * \sin 110° = 85$
$a^2 \sin 110° = 170$
$a^2 0.94 = 170$
$a^2 = 170/0.94$
$a^2 = 180.85$
$a = AC = \mathbf{13.45}$ cm

In a triangle PQR, $PQ = 8$ cm and $QR = 7$ cm.
The area of this triangle is 17 cm^2.

Calculate the two possible values of angle PQR. [3]

Since $PQ = 8, QR = 7$ and the area is $S = 17$, we get:

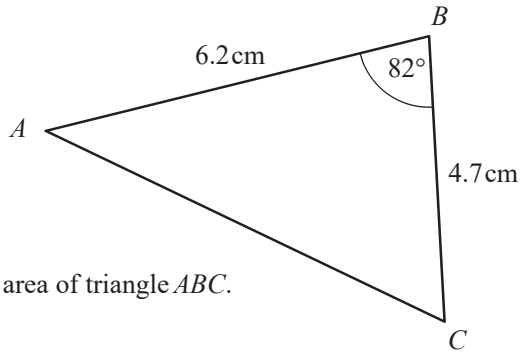
$$\frac{1}{2} PQ \cdot QR \cdot \sin \angle PQR = S$$

$$\frac{1}{2} \times 8 \times 7 \sin \angle PQR = 17$$

$$\sin \angle PQR = \frac{17}{28}$$

So $\angle PQR = \arcsin \frac{17}{28}$ or $\angle PQR = \pi - \arcsin \frac{17}{28}$

(a)



NOT TO SCALE

Calculate the area of triangle ABC.

[2]

$\angle B = 82°$, $AB = 6.2$ cm and $CB = 4.7$ cm

So $S_{\triangle ABC} = \frac{1}{2}\sin\angle B \cdot AB \cdot CB$ {triangle area formula}

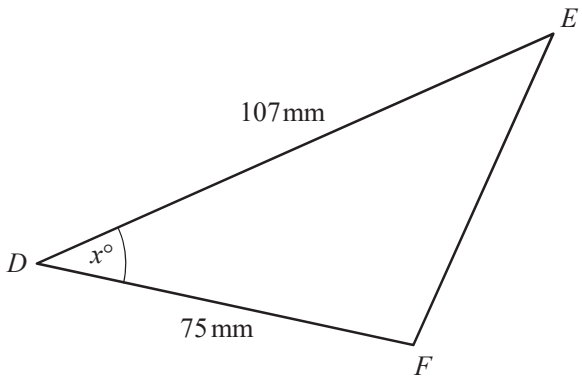
So

$$S_{\triangle ABC} = \frac{1}{2} \times \sin 82° \times 6.2 \times 4.7$$
$$= \frac{1}{2} \times 0.199 \times 6.2 \times 4.7 \{\sin 82° = \sin(90° - 8°) = \cos 8°,$$
and $\sin 8° = 0.13917$, so $\cos 8° = \sqrt{1 - \sin 8°} \approx \frac{3\sqrt{11}}{10} \approx 0.990\}$

So

$$S_{\triangle ABC} = 0.495 \times 6.2 \times 4.7$$
$$= 14.4243$$
$$\approx 14 \text{ cm}^2$$

(b)



NOT TO SCALE

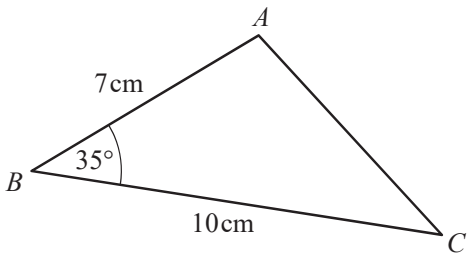
The area of triangle DEF is 2050mm^2. Work out the value of x.

[2]

Area $= \frac{1}{2} \times 107 \times 75 \times \sin x° = 2050$ $\sin x° \approx 0.51x = 30.7$ or $x = 149.3$ (wrong)

so $x = 30.7$

$\{S = \frac{1}{2}ab\sin C\}$



NOT TO SCALE

(a) Calculate the area of triangle ABC.

[2]

Because $\angle B = 35°$ $AB = 7$ cm

$BC = 10$ cm

$$S = \frac{1}{2} \times 7 \times 10 \times \sin 35°$$

$$\approx 20 \text{ cm}^2$$

[4]

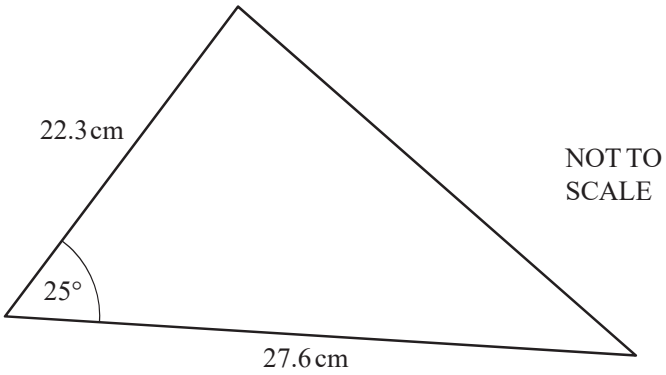
(b) Calculate the length of AC.

$$AC^2 = AB^2 + CB^2 - 2 \times AB \times CB$$

$$AC^2 = 49 + 100 - 2 \times 7 \times 10 \times \cos 35°$$

$$\approx 34.32$$

$$AC \approx 5.86 \text{ cm}$$



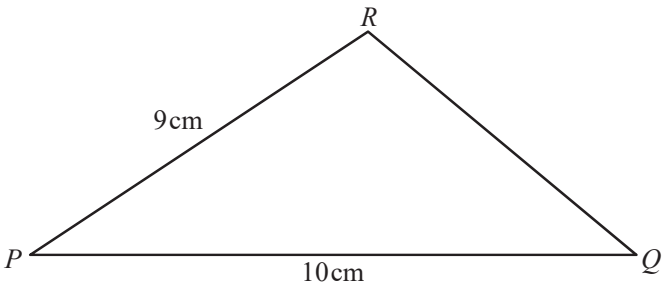
Calculate the area of this triangle.

$$S(\triangle ACB) = 130.057 \text{ cm}^2$$

$$S(\triangle ACB) = \frac{\overline{AB} \times \overline{AC} \times \sin(\angle BAC)}{2}$$

$$S(\triangle ACB) = \frac{22.3 \times 27.6 \times \sin(25°)}{2} \text{ cm}^2$$

[2]



NOT TO SCALE

The area of triangle PQR is $38.5\,\text{cm}^2$.

Calculate the length QR.

$$\tfrac{1}{2} \times 9 \times 10 \times \sin p = 38.5$$
$$\sin p = \tfrac{77}{90}$$
$$\cos p = \sqrt{1 - \sin^2 p} = \tfrac{\sqrt{471}}{90}$$
$$QR^2 = 9^2 + 10^2 - 2 \times 9 \times 10 \times \cos p$$
$$QR \approx 9.37 \text{ cm}$$

[6]