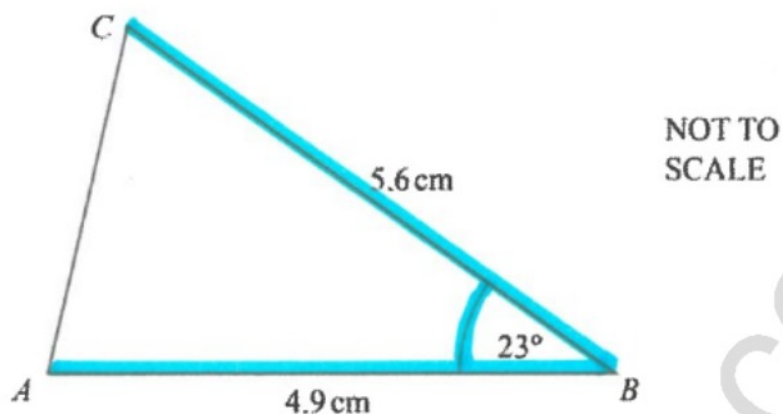


20



Calculate the area of triangle  $ABC$ .

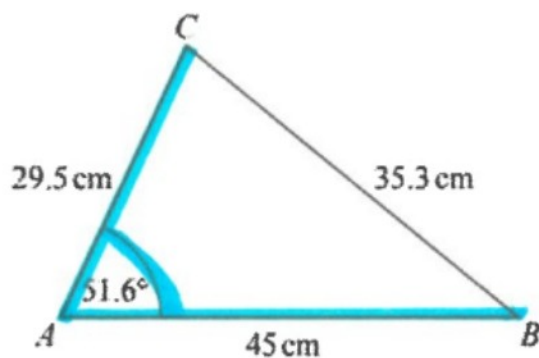
$$\text{Area} = \frac{1}{2} ab \sin C$$

$$= \frac{1}{2} \times 4.9 \times 5.6 \times \sin 23$$

$$= 5.36$$

$$\dots\dots\dots 5.36 \dots\dots \text{cm}^2 [2]$$

4 (a)



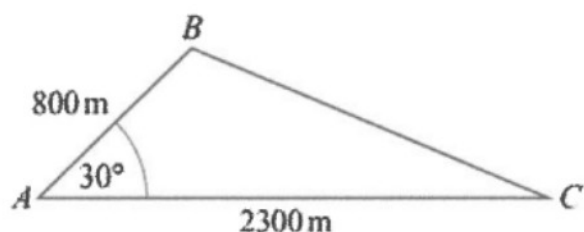
NOT TO  
SCALE

In triangle  $ABC$ ,  $AB = 45$  cm,  $AC = 29.5$  cm,  $BC = 35.3$  cm and angle  $CAB = 51.6^\circ$ .

(ii) Calculate the area of triangle  $ABC$ .

$$\begin{aligned} \text{Area} &= \frac{1}{2} ab \sin C \\ &= \frac{1}{2} \times 45 \times 29.5 \times \sin 51.6 \\ &= 520 \end{aligned}$$

..... 520 .....  $\text{cm}^2$  [2]



NOT TO  
SCALE

The diagram shows some land in the shape of a triangle  $ABC$ .

Houses are built on this land.

Each house requires  $400\text{ m}^2$  of land.

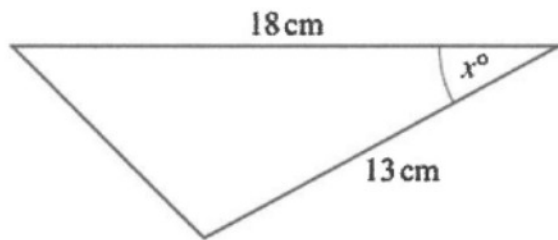
Find the greatest number of houses that can be built on this land.

$$\begin{aligned} \text{Area} &= \frac{1}{2} ab \sin C \\ &= \frac{1}{2} \times 800 \times 2300 \times \sin 30 \\ &= 460\,000\text{ m}^2 \end{aligned}$$

$$\begin{aligned} 460\,000 &\div 400 \\ &= 1150 \end{aligned}$$

1150

[3]



NOT TO  
SCALE

The area of the triangle is  $50 \text{ cm}^2$ .

Calculate the value of  $\sin x$ .

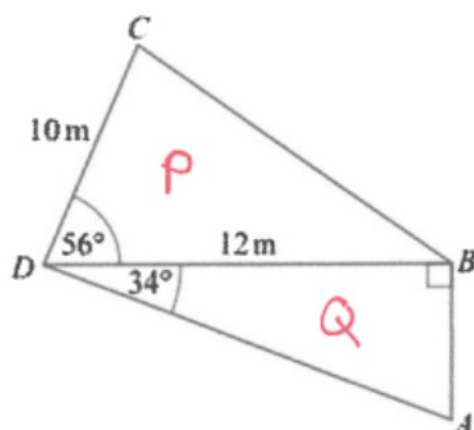
$$\text{Area} = \frac{1}{2} ab \sin C$$

$$50 = \frac{1}{2} \times 18 \times 13 \times \sin C$$

$$50 = 117 \sin C$$

$$\sin C = \frac{50}{117}$$

$$\sin x = \frac{50}{117} \dots\dots\dots [2]$$



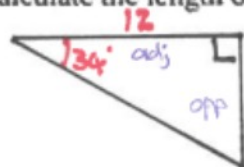
NOT TO  
SCALE

The diagram shows a quadrilateral  $ABCD$ .

$CD = 10\text{ m}$  and  $DB = 12\text{ m}$ .

Angle  $DBA = 90^\circ$ , angle  $CDB = 56^\circ$  and angle  $ADB = 34^\circ$ .

- (a) Calculate the length of  $AB$ .



$$\tan 34 = \frac{AB}{12}$$

$$AB = 12 \tan 34$$

$$AB = 8.09 \text{ m [2]}$$

STORE unrounded  
answer

- (b) Calculate the area of the quadrilateral  $ABCD$ .

Area of Q:

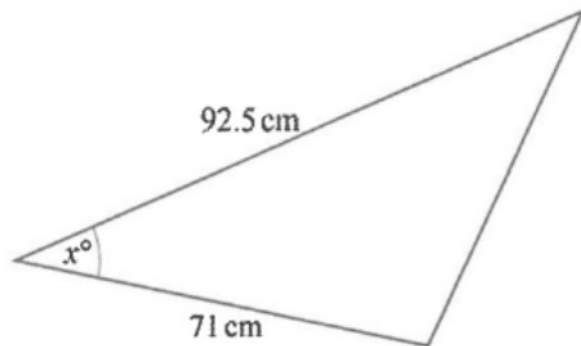
$$\begin{aligned} \text{Area} &= \frac{1}{2} \times b \times h \\ &= \frac{1}{2} \times 12 \times 8.09 \dots \\ &= 48.56 \end{aligned}$$

Area of P:

$$\begin{aligned} \text{Area} &= \frac{1}{2} ab \sin C \\ &= \frac{1}{2} \times 10 \times 12 \times \sin 56 \\ &= 49.74 \end{aligned}$$

Total:

$$48.56 + 49.74 = 98.3 \text{ m}^2 \text{ [3]}$$



NOT TO  
SCALE

The diagram shows a triangle with an acute angle marked  $x^\circ$ .  
The area of the triangle is  $2143 \text{ cm}^2$ .

Work out the value of  $x$ .

$$\text{Area} = \frac{1}{2} ab \sin C$$

$$2143 = \frac{1}{2} \times 71 \times 92.5 \sin C$$

$$2143 = 3283.75 \sin C$$

$\div 3283.75$        $\div 3283.75$

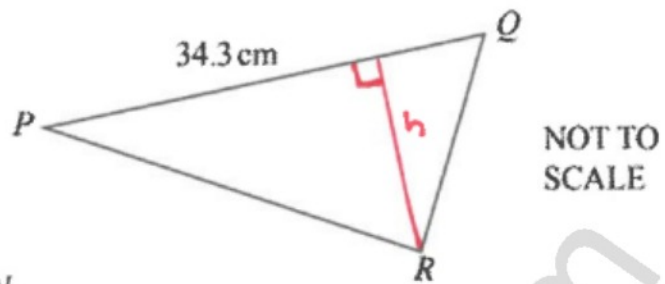
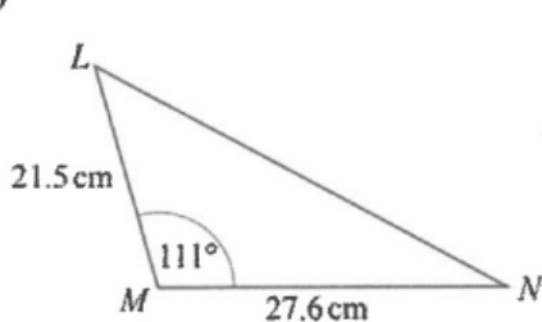
$$\sin C = \frac{2143}{3283.75}$$

$$C = \sin^{-1} \left( \frac{2143}{3283.75} \right)$$

$$= 40.7^\circ$$

$$x = 40.7^\circ \quad [2]$$

(b)



Triangle PQR has the same area as triangle LMN.

Calculate the shortest distance from R to the line PQ.

LMN:

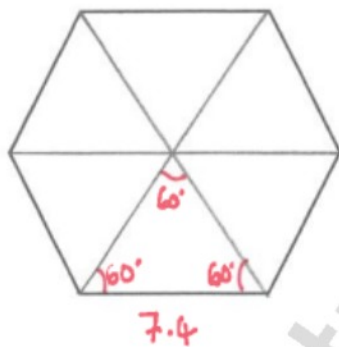
$$\begin{aligned}\text{Area} &= \frac{1}{2} ab \sin C \\ &= \frac{1}{2} \times 27.6 \times 21.5 \times \sin 111 \\ &= \underline{276.99}\end{aligned}$$

PQR:

$$\begin{aligned}\text{Area} &= \frac{1}{2} \times b \times h \\ 276.99 &= \frac{1}{2} \times 34.3 \times h \\ 276.99 &= 17.15h \\ &\quad \div 17.15 \quad \div 17.15\end{aligned}$$

$$h = \underline{16.2} \text{ cm [3]}$$

22 Find the area of a regular hexagon with side length 7.4 cm.



Each triangle:



$$\begin{aligned}\text{Area} &= \frac{1}{2} ab \sin C \\ &= \frac{1}{2} \times 7.4 \times 7.4 \times \sin 60 \\ &= 27.38 \sin 60\end{aligned}$$

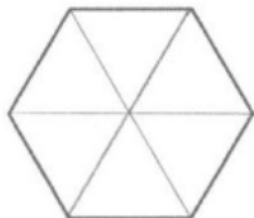
6 triangles:

$$\begin{aligned}6 \times 27.38 \sin 60 \\ = 147.3\end{aligned}$$

$$\underline{147} \text{ cm}^2 \text{ [3]}$$

(3sf)

(b)



NOT TO  
SCALE

The diagram shows a regular hexagon.  
The area of the hexagon is  $127.3 \text{ cm}^2$ .

(i) Show that the length of one side of the hexagon is  $7.0 \text{ cm}$ , correct to 1 decimal place.

one  
triangle:



Area of one triangle:

$$127.3 \div 6 = 21.2167$$

$$\text{Area} = \frac{1}{2} ab \sin C$$

$$21.2167 = \frac{1}{2} \times x \times x \times \sin 60$$

$$21.2167 = \frac{1}{2} x^2 \sin 60$$

$$42.433 = x^2 \sin 60$$

$$x^2 = \frac{42.433}{\sin 60}$$

$$x = \sqrt{\frac{42.433}{\sin 60}} \quad [4]$$

$$x = \underline{\underline{7.0 \text{ cm}}}$$