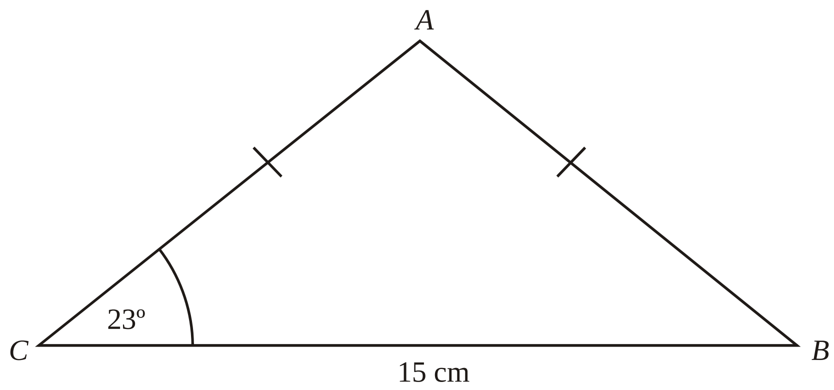
1. In the diagram, triangle *ABC* is isosceles. *AB* = *AC*, *CB* = 15 cm and angle *ACB* is 23°.

Diagram not to scale



Find

(a) the size of angle *CAB*;

(b) the length of *AB*.

Working:

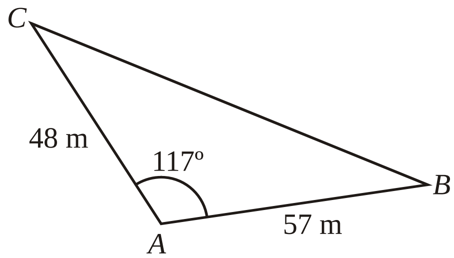
Answers:

(a) ……………………………………………..

(b) ……………………………………………..

(Total 4 marks)

2. The diagram shows the plan of a playground with dimensions as shown.



Calculate

(a) the length *BC*;

(b) the area of triangle *ABC*.

Working:

Answers:

(a) …………………………………………..

(b) …………………………………………..

(Total 4 marks)

3. The diagram below shows an equilateral triangle ABC, with each side 3 cm long. The side [BC] is extended to D so that CD = 4 cm.

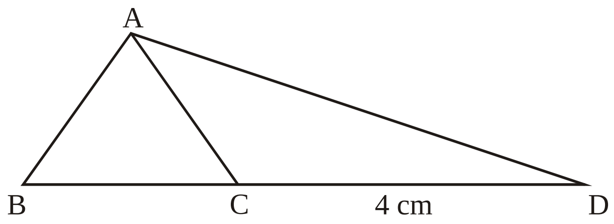


Diagram not to scale

Calculate, **correct to two decimal places**, the length of [AD].

Working:

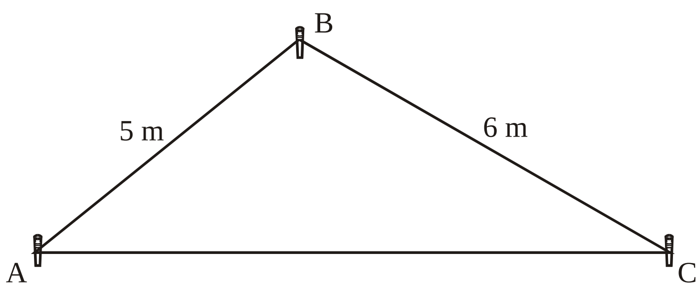
Answer:

....

(Total 4 marks)

4. A gardener pegs out a rope, 19 metres long, to form a triangular flower bed as shown in this diagram.

Diagram not to scale



Calculate

(a) the size of the angle BAC;

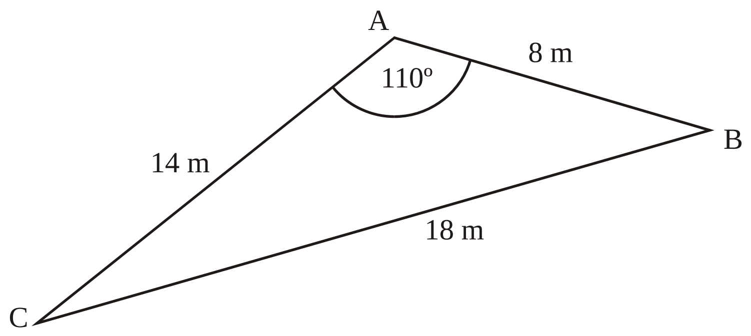
(3)

(b) the area of the flower bed.

(2)
(Total 5 marks)

5. The following diagram shows a triangle ABC. AB = 8 m, AC = 14 m, BC = 18 m, and $B\hat{A}C = 110°$.

Diagram not to scale



Calculate

(a) the area of triangle ABC;

(b) the size of angle $A\hat{C}B$.

Working:

Answers:

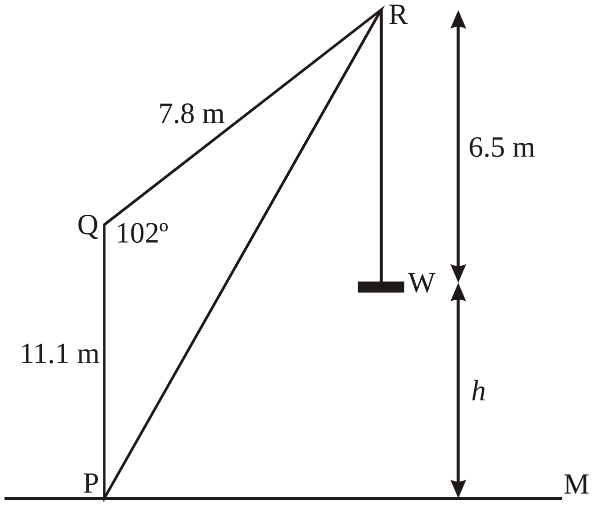
(a) ....

(b) ....

(Total 4 marks)

6. The diagram below shows a crane PQR that carries a flat box W. (PQ) is vertical, and the floor (PM) is horizontal.

Diagram not to scale



Given that PQ = 11.1m, QR = 7.8 m, $P\hat{Q}R$ =102° and RW = 6.5 m, calculate

(a) PR;

(2)

(b) angle $P\hat{R}Q$;

(2)

(c) the height, *h*, of W above (PM).

(3)
(Total 7 marks)

1. (a) $C\hat{A}B = 180 - 2\times23°$ (M1)
$= 134°$ (A1) (C2)

(b) $\dfrac{AB}{\sin 23°} = \dfrac{15}{\sin 134°}$ (M1)

Note: *Follow through with candidate's answer from (a)*

$AB = \dfrac{15\sin 23°}{\sin 134°}$

$AB = 8.147702831...$

$= 8.15$ (3 s.f.) (A1) (C2)

[4]

2. (a) $BC = \sqrt{48^2 + 57^2 - 2(48)(57)\cos 117°}$ (or equivalent) (M1)
≈ 89.7 m (3 s.f.) (A1)

(b) Area of $\Delta ABC = \frac{1}{2}ab\sin C = \frac{1}{2}(48)(57)\sin 117°$ (M1)
$= 1220$ m^2 (3 s.f.) (A1)
[4]

3. (a) $\text{A}\hat{\text{C}}\text{D} = 120°$ (M1)
$\text{AD}^2 = 3^2 + 4^2 - 2(3)(4)\cos 120°$ ***or*** $\text{AD}^2 = 3^2 + 7^2 - 2(3)(7)\cos 60°$ (M1)
Note: *Award (M1) for correct substitution only.*

$\text{AD} = \sqrt{37}$ (A1)
$= 6.08$ cm (2 d.p.) (A1)
[4]

4. (a) $\text{AC} = 19 - 11 = 8$ (M1)
$6^2 = 5^2 + 8^2 - 2(5)(8)\cos \text{B}\hat{\text{A}}\text{C}$ (M1)
$\Rightarrow \text{B}\hat{\text{A}}\text{C} = 48.5°$ (3 s.f.) (A1) 3

(b) Area $= \left(\frac{1}{2}\right)(5)(8)\sin \text{B}\hat{\text{A}}\text{C}$ (M1)
$= 15.0$ cm^2 (3 s.f.) (allow **ft** from part (a)) (A1) 2
[5]

5. (a) Area $= \frac{1}{2} \times 14 \times 8 \sin 110°$ (M1)
$= 52.62278676$ m^2
$= 52.6$ m^2 (3s.f) (A1)

(b) $\frac{\sin C}{8} = \frac{\sin 110°}{18}$ (or equivalent) (M1)
$\sin C = \frac{8 \times \sin 110°}{18}$
$C = 24.68575369$
$C = 24.7°$ (3s.f.) (A1)
Note: *Accept all answers obtained from all appropriate methods, given to the correct degree of accuracy.*

[4]

6. (a) $PR^2 = 7.8^2 + 11.1^2 - 2 \times 7.8 \times 11.1 \times \cos 102°$ (M1)

$= 60.84 + 123.21 - (-36.00)$

$= 220.05$

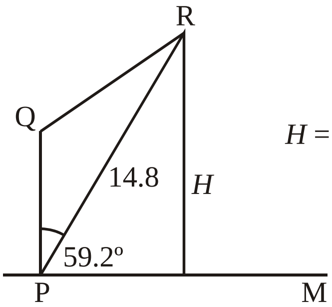
PR = 14.8 m (or $\sqrt{220.05}$) (A1) 2

(b) $\dfrac{11.1}{\sin \hat{R}} = \dfrac{14.8}{\sin 102°}$ (Follow through with candidate's answer to part (a))

$\Rightarrow \sin \hat{R} = \dfrac{11.1 \sin 102°}{14.8} = 0.7336$ (M1)

$\Rightarrow \hat{R} = 47.2°$ (or 47.0° from $\sqrt{220.05}$) (A1) 2

(c)



$H = h + 6.5$

Angle $Q\hat{P}R = 180° – (102° + 47.2°)$

$= 30.8°$ (or $31.0°$) (M1)

$\Rightarrow R\hat{P}M = 90° – 30.8° = 59.2°$ (or $59.0°$)

$\sin 59.2° = \dfrac{H}{14.8}$ (M1)

$\Rightarrow H = 14.8 \sin 59.2° = 12.7$ m

OR

$\cos 30.8° = \dfrac{H}{14.8}$ (M1)

$\Rightarrow H = 14.8 \cos 30.8° = 12.7$ m

Therefore, $h = 12.7 – 6.5$

$= 6.2$ m (A1) 3

[7]