4

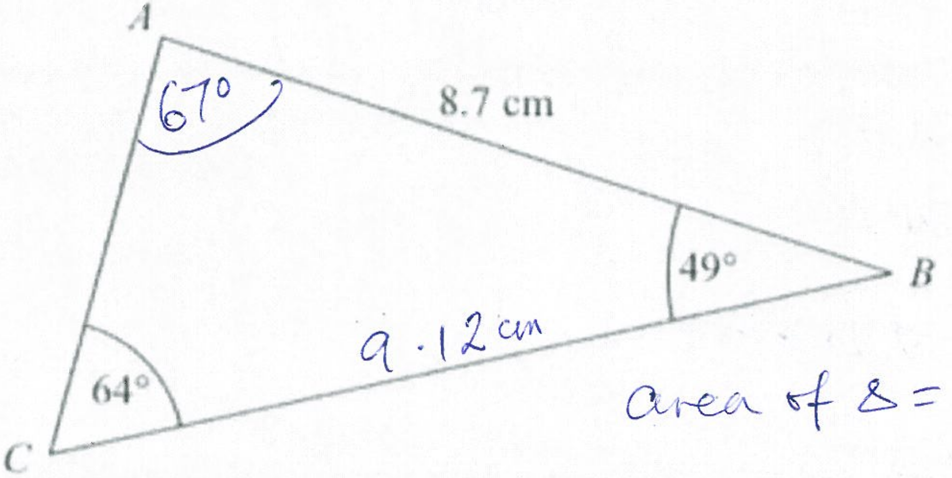



Diagram **NOT** accurately dra

side AB

side BC

area of $\Delta = \frac{1}{2} ab \sin \hat{C}$

2 sides and in-between angle

*ABC* is a triangle.

*AB* = 8.7 cm.
Angle *ABC* = 49°.
Angle *ACB* = 64°.

Calculate the area of triangle *ABC*.
Give your answer correct to 3 significant figures.

By Sine Rule

$\frac{BC}{67^\circ} = \frac{AB}{64^\circ}$

$BC = \frac{8.7}{64} \times 67^\circ = 9.107...$

Area of $\Delta = \frac{1}{2} \times 8.7 \times 9.12 \times \sin 49^\circ$

$= 29.9008...$

$= \underline{29.9 \text{ cm}^2}$

17

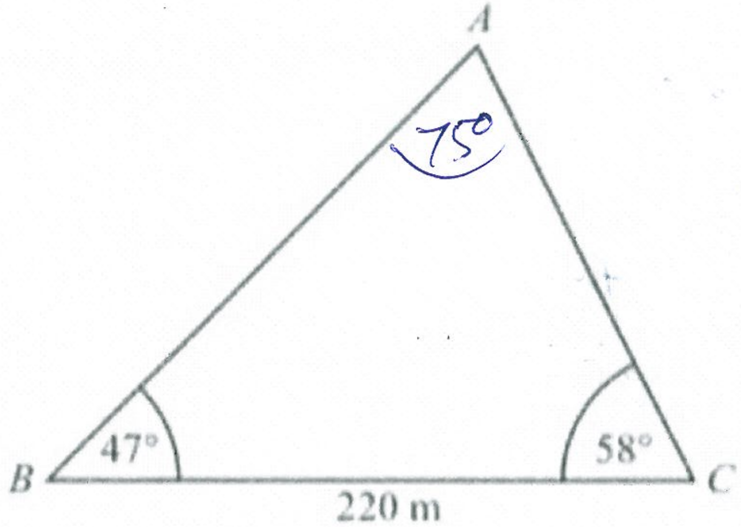



Diagram **NOT** accurately drawn

2sides and inbetween angle

area of $\Delta = \frac{1}{2}ab\sin C$

$\frac{AC}{47^\circ} = \frac{220}{75^\circ}$

$AC = \frac{220}{75} \times 47 = 137.86\dot{6}$

Area of $\Delta = \frac{1}{2} \times 220 \times 137.86\dot{6} \times \sin 58$

$= 12860.93$

$= 12900 \text{ cm}^2$

Angle $ABC = 47°$
Angle $ACB = 58°$
$BC = 220$ m

Calculate the area of triangle $ABC$.
Give your answer correct to 3 significant figures.

**23.**

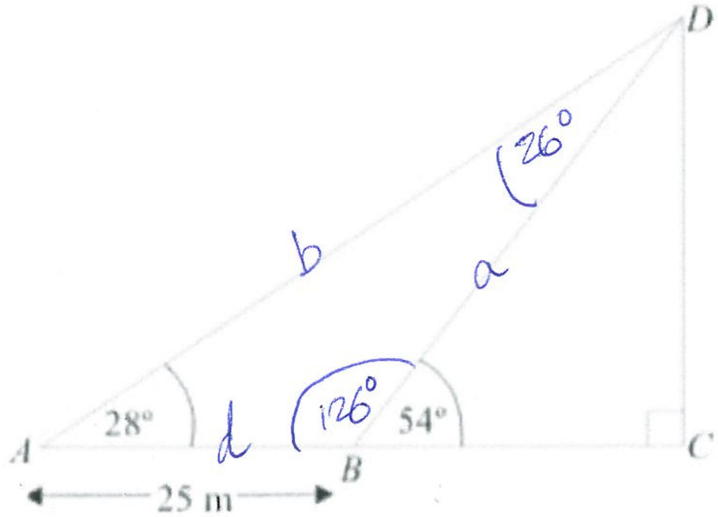



Diagram **NOT** accurately drawn

In $\triangle ABD$ Find BD first
Use Sine Rule to find BD

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{d}{\sin D}$$

$$\frac{a}{\sin 28^\circ} = \frac{25}{\sin 26^\circ}$$

$$a = \frac{25}{\sin 26} \times \sin 28^\circ = 26.773 \text{ cm}$$

BD = 26.773 cm

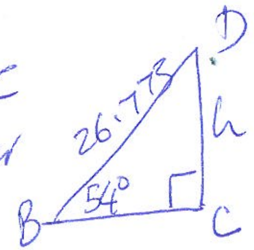
The diagram shows a vertical tower *DC* on horizontal ground *ABC*.
*ABC* is a straight line.

The angle of elevation of *D* from *A* is 28°.
The angle of elevation of *D* from *B* is 54°.

*AB* = 25 m.

Calculate the height of the tower.
Give your answer correct to 3 significant figures.

In $\triangle BDC$
DC = ht. of Tower




$$\sin 54^\circ = \frac{h}{26.773}$$

$$h = \sin 54 \times 26.773$$

$$h = 21.66\ldots$$

$$h = 21.6 \text{ cm (3 s.f.)}$$

**24.**

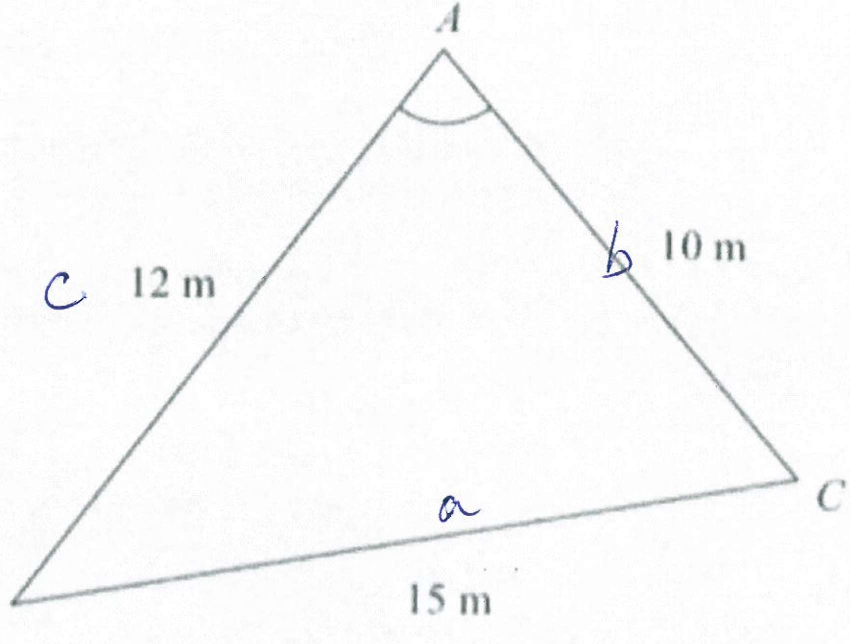



Diagram **NOT** accurately drawn

*ABC* is a triangle.
*AB* = 12 m.
*AC* = 10 m.
*BC* = 15 m.

Calculate the size of angle *BAC*.
Give your answer correct to one decimal place.

Using Cosine Rule

$a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 10^2 + 12^2 - 2(15)(12)\cos A$

$15^2 = 100 + 144 - 360\cos A$

$225 = 244 - 360\cos A$

$360\cos A = 244 - 225$

$\cos A = \frac{19}{360} = 0.0527\dot{7}$

$\cos^{-1} 0.05277... = 86.97$

$= 87.0^\circ$ (1d.p)

**25.**

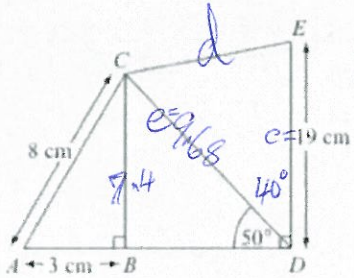



Diagram **NOT** accurately drawn

$AC = 8$ cm.
$AB = 3$ cm.
$DE = 19$ cm.
Angle $ABC$ = angle $CBD$ = angle $BDE = 90°$.
Angle $BDC = 50°$.

(a) Calculate the length of $CD$.
Give your answer correct to 3 significant figures.

In $\triangle ABC$, By Pythagoras Theorem

$CB^2 = AC^2 - AB^2$
$= 8^2 - 3^2$
$= 64 - 9$
$CB^2 = 55$
$CB = \sqrt{55} = 7.416\ldots$

In $\triangle BCD$

$\sin 50° = \dfrac{BC}{CD}$

$\sin 50 = \dfrac{7.416\ldots}{CD}$

$CD = \dfrac{7.416\ldots}{\sin 50°} = 9.6811\ldots$

9.68 (3s.f) cm
**(4)**

(b) Calculate the length of $CE$.
Give your answer correct to 3 significant figures.

Using Cosine Rule in $\triangle CED$ ← (Because you know 2 sides and the in between angle)

$d^2 = c^2 + e^2 - 2ce\cos 40°$

$d^2 = 19^2 + 9.68^2 - 2(19)(9.68)\cos 40°$

$= (19^2 + 9.68^2) - (2 \times 19 \times 9.68 \times \cos 40)$

Use Calc Brackets correctly

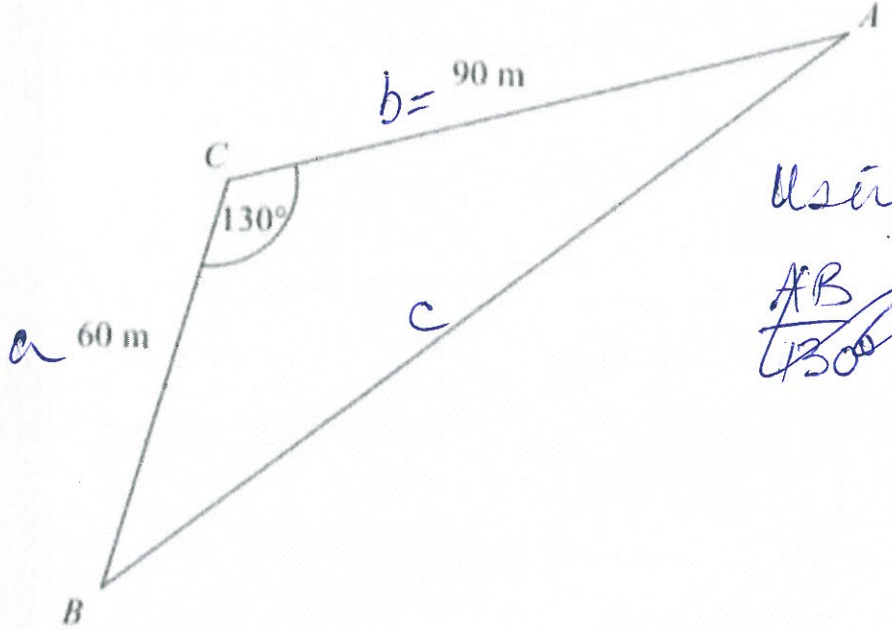
$d^2 = 172.920612$

$d = \sqrt{172.920612} = 13.149\ldots$

$CE = 13.1$ cm (3s.f)

**20.** Here is a triangle *ABC*.

Diagram **NOT** accurately drawn




To find c

Cosine

Using ~~Sine~~ Rule $c^2 = a^2 + b^2 - 2ab\cos\hat{C}$

$\cancel{\frac{AB}{\angle 130^\circ} = 90}$

$c^2 = 60^2 + 90^2 - 2(60)(90)\cos C$

$c^2 = 3600 + 8100 - 10800\cos 130^\circ$

$c^2 = 11700 - 10800(-0.6427\ldots)$

$c^2 = 11700 + 6942.106185$

$c^2 = 18642.10618$

$c = \sqrt{18642.10618}$

$c = 136.5360985$

$AC = 90$ m.
$BC = 60$ m.
Angle $ACB = 130°$.

Calculate the perimeter of the triangle.
Give your answer correct to one decimal place.

$\therefore$ Perimeter $= 60 + 90 + 136.5360985$

$= 286.536\ldots$

$= \underline{286.5 \text{ cm}}$

**26.**

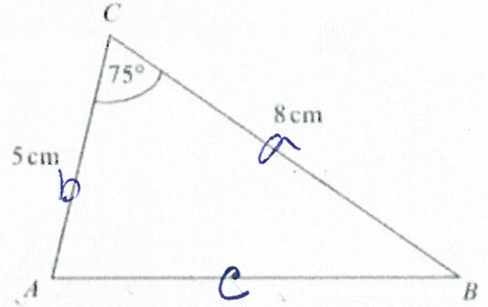



Diagram **NOT** accurately drawn

In triangle $ABC$,

$AC = 5$ cm.
$BC = 8$ cm.
Angle $ACB = 75°$.

(a) Calculate the area of triangle $ABC$.
Give your answer correct to 3 significant figures.

$$\text{Area} = \tfrac{1}{2}ab\sin c$$
$$= \tfrac{1}{2} \times 5 \times 8 \times \sin 75°$$
$$= 19.318..$$

19.3 (3sf) ............ cm²
**(2)**

(b) Calculate the length of $AB$.
Give your answer correct to 3 significant figures.

Using Cosine Rule

(Because you know 2sides and the in-between angle)

$$c^2 = a^2 + b^2 - 2ab\cos \hat{C}$$
$$= 5^2 + 8^2 - 2(5)(8)\cos 75°$$
$$= 89 - 80\cos 75$$
$$= 89 - 20.7055..$$
$$c^2 = 68.2944..$$
$$c = \sqrt{68.2944} = 8.264..$$

(3sf) 8.26 cm

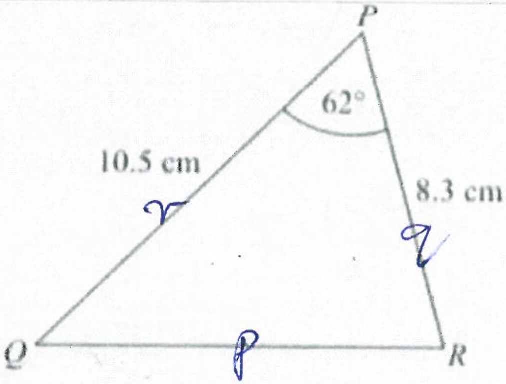



Diagram **NOT** accurately drawn

In triangle *PQR*,

$PQ = 10.5$ cm,
$PR = 8.3$ cm.
angle $QPR = 62°$.

(a) Calculate the area of triangle *PQR*.
Give your answer correct to 3 significant figures.

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

$= \frac{1}{2} \times 10.5 \times 8.3 \times \sin 62° = 38.4744\ldots$

38.5 (3sf) ..............................cm²

**(2)**

(b) Calculate the length of *QR*. $= p$
Give your answer correct to 3 significant figures.

By Cosine Rule $p^2 = q^2 + r^2 - 2qr\cos\hat{P}$

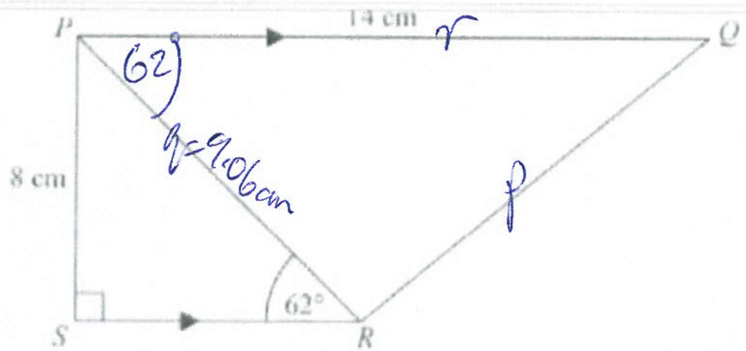
$= 8.3^2 + 10.5^2 - 2(8.3)(10.5)\cos 62°$

$p^2 = 179.\ldots - 81.8288\ldots = 97.312$

$p = \sqrt{97.312} = 9.864\ldots$

$p = 9.86$ (3sf) cm

OR use Brackets on Calc correctly




*PQRS* is a trapezium.
*PQ* is parallel to *SR*.
Angle *PSR* = 90°.
Angle *PRS* = 62°.
*PQ* = 14 cm.
*PS* = 8 cm.

(a) Work out the length of *PR*.
Give your answer correct to 3 significant figures.

$\sin 62^0 = \frac{opp}{hyp}$

$\sin 62^0 = \frac{8}{PR}$

$PR = \frac{8}{\sin 62} = 9.0605...$

9.06 cm (3s.f)

(b) Work out the length of *QR*.
Give your answer correct to 3 significant figures.

$\angle Q\hat{P}R = 62^0$ alternate angles in parallel lines

Use cosine Rule = $p^2 = q^2 + r^2 - 2qr \cos 62^0$

$= 9.06^2 + 14^2 - 2(9.06)(14)\cos 62^0$

$= 158.988...$

$p = \sqrt{158.988...} = 12.609...$

$= 12.6$ cm (3s.f