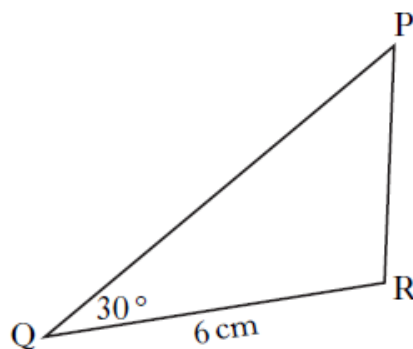


TRIGONOMETRY HW

1) In triangle PQR:

- QR = 6 centimetres
- angle PQR = 30°
- area of triangle PQR = 15 square centimetres.



FORMULAE LIST

Calculate the length of PQ.

Area of a triangle:

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

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

$$15 = \frac{1}{2} \times 6 \times PQ \times \sin 30^\circ \quad \checkmark$$

$$15 = 1.5 \times PQ \quad \checkmark$$

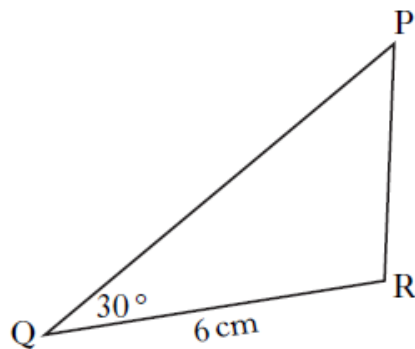
$$\div 1.5 \quad \div 1.5$$

$$PQ = 10 \text{ cm} \quad \checkmark$$

TRIGONOMETRY HW

1) In triangle PQR:

- QR = 6 centimetres
- angle PQR = 30°
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FORMULAE LIST

Calculate the length of PQ.

Area of a triangle:	$A = \frac{1}{2}ab \sin C$
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NON-CALCULATOR

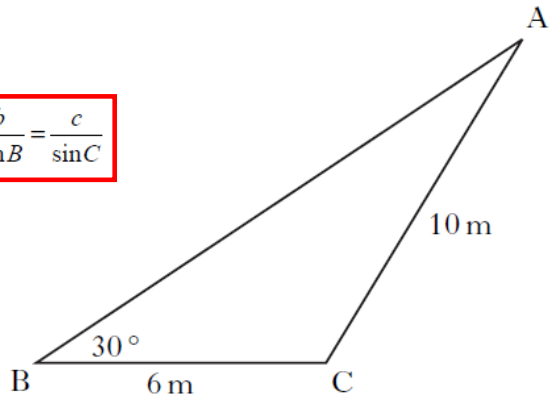
2) In triangle ABC:

- BC = 6 metres
- AC = 10 metres
- angle ABC = 30° .

FORMULAE LIST

Sine rule:

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$



Given that $\sin 30^\circ = 0.5$, show that $\sin A = 0.3$.

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

$$\frac{\sin A}{6} = \frac{\sin 30^\circ}{10} \quad \checkmark$$

$$\sin A = \frac{6 \times \sin 30^\circ}{10}$$

$$\sin A = \frac{6 \times 0.5}{10} \quad \checkmark$$

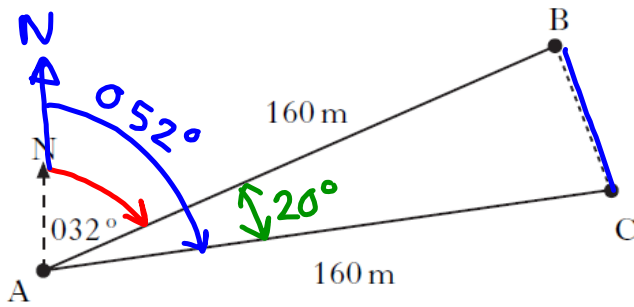
$$\sin 30^\circ = 0.5$$

$$\sin A = \frac{3}{10}$$

$$= \underline{\underline{0.3}} \quad \checkmark$$

3)

Jane is taking part in an orienteering competition.



She should have run 160 metres from A to B on a bearing of 032°.

However, she actually ran 160 metres from A to C on a bearing of 052°.

(a) Write down the size of angle BAC.

$$52^\circ - 32^\circ = 20^\circ \quad \checkmark$$

1

(b) Calculate the length of BC.

3

(c) What is the bearing from C to B?

2

FORMULAE LIST

<p>Cosine rule: $a^2 = b^2 + c^2 - 2bc \cos A$ or $\cos A = \frac{b^2 + c^2 - a^2}{2bc}$</p>
--

b) $BC^2 = 160^2 + 160^2 - 2 \times 160 \times 160 \times \cos 20^\circ \quad \checkmark$

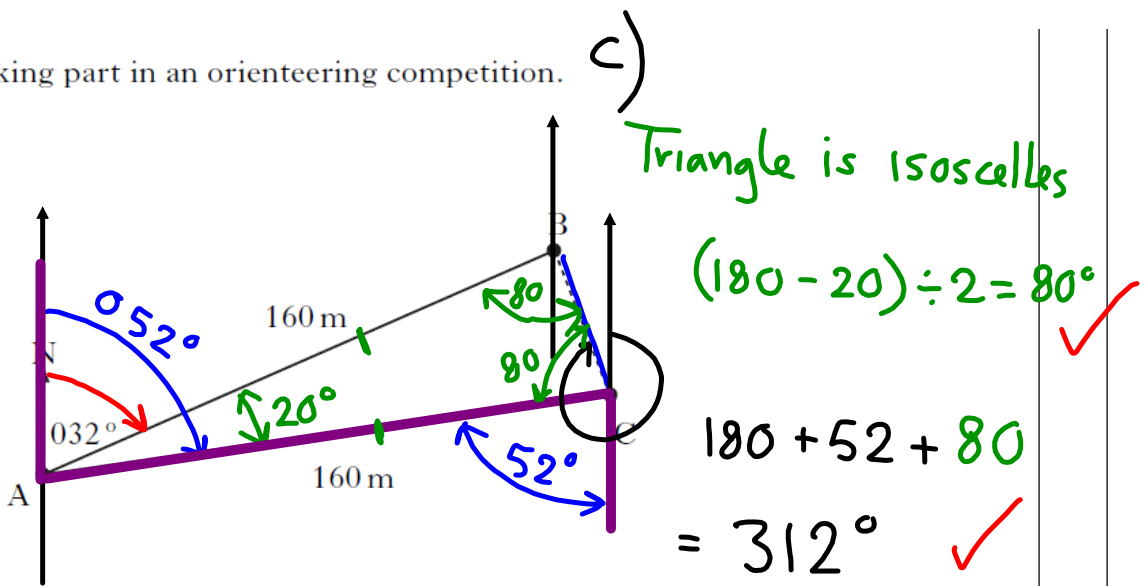
$= 3087.737... \quad \checkmark$

$BC = \sqrt{3087.737...}$

$= 55.6m \quad \checkmark$

3)

Jane is taking part in an orienteering competition.



She should have run 160 metres from A to B on a bearing of 032° .

However, she actually ran 160 metres from A to C on a bearing of 052° .

(a) Write down the size of angle BAC.

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(b) Calculate the length of BC.

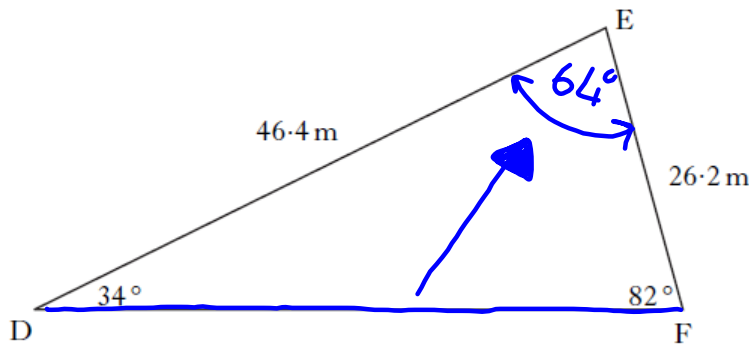
3

(c) What is the bearing from C to B?

2

4)

As part of their training, footballers run around a triangular circuit DEF.



$$180 - 34 - 82 = 64^\circ$$

- $\angle EDF = 34^\circ$
- $\angle DFE = 82^\circ$
- DE = 46.4 metres
- EF = 26.2 metres

FORMULAE LIST

Cosine rule:	$a^2 = b^2 + c^2 - 2bc \cos A$ or $\cos A = \frac{b^2 + c^2 - a^2}{2bc}$
--------------	--

How many **complete** circuits must they run to cover at least 1000 metres?

4

$$DF^2 = 46.4^2 + 26.2^2 - 2 \times 46.4 \times 26.2 \times \cos 64^\circ$$

$$= 1773.5619 \dots$$

$$DF = \sqrt{1773.5619 \dots}$$

$$= 42.1 \text{ m}$$

1 circuit $42.1 + 46.4 + 26.2 = 114.7 \text{ m}$

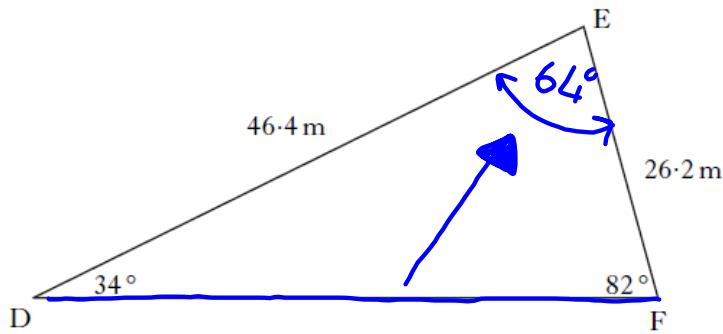
$$1000 \div 114.7$$

$$= 8.71 \dots$$

So 9 complete circuits.

4)

As part of their training, footballers run around a triangular circuit DEF.



$$180 - 34 - 82 = 64^\circ$$

- $\angle EDF = 34^\circ$
- $\angle DFE = 82^\circ$
- DE = 46.4 metres
- EF = 26.2 metres

FORMULAE LIST

Sine rule:	$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
------------	--

How many **complete** circuits must they run to cover at least 1000 metres?

$$\frac{DF}{\sin 64^\circ} = \frac{46.4}{\sin 82^\circ} \quad \checkmark$$

$$DF = \frac{46.4 \times \sin 64^\circ}{\sin 82^\circ} \quad \checkmark$$

$$= 42.1 \text{ m} \quad \checkmark$$

1 circuit $42.1 + 46.4 + 26.2 = 114.7 \text{ m}$

$$1000 \div 114.7$$

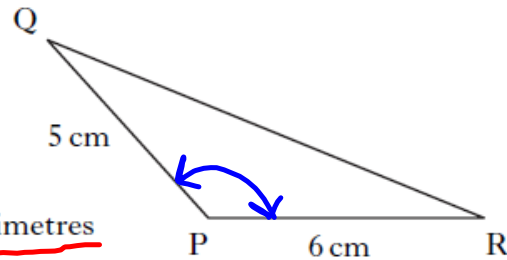
$$= 8.71 \dots$$

So 9 complete circuits. \checkmark

5)

In triangle PQR:

- $PQ = 5$ centimetres
- $PR = 6$ centimetres
- area of triangle PQR = 12 square centimetres
- angle QPR is obtuse.



Calculate the size of angle QPR.

FORMULAE LIST

Area of a triangle:

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

$$12 = \frac{1}{2} \times 6 \times 5 \times \sin P \quad \checkmark$$

$$12 = 15 \times \sin P$$

$$\begin{array}{c} \div 15 \\ \div 15 \end{array} \quad \sin P = \frac{12}{15} \quad \checkmark$$

$$P = \sin^{-1}\left(\frac{12}{15}\right)$$

$$= 53.1^\circ \quad \checkmark$$

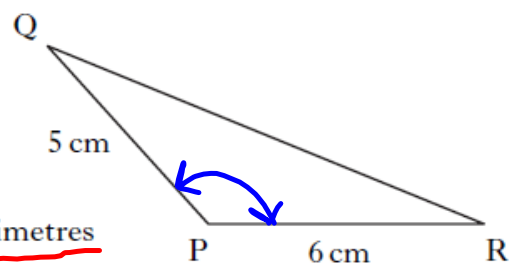
$$\begin{aligned} \text{So obtuse angle } QPR &= 180^\circ - 53.1^\circ \\ &= 126.9^\circ \quad \checkmark \end{aligned}$$

NO	RE
	4

5)

In triangle PQR:

- PQ = 5 centimetres
- PR = 6 centimetres
- area of triangle PQR = 12 square centimetres
- angle QPR is **obtuse**.



Calculate the size of angle QPR.

FORMULAE LIST

Area of a triangle:

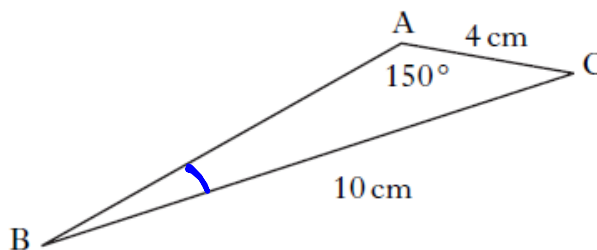
$$A = \frac{1}{2} ab \sin C$$

NO	AREA
	4

6) NON-CALCULATOR

In triangle ABC

- AC = 4 centimetres
- BC = 10 centimetres
- angle BAC = 150°



KU	RE
	4

Given that $\sin 30^\circ = \frac{1}{2}$, show that $\sin B = \frac{1}{5}$.

FORMULAE LIST

Sine rule:	$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
------------	--

$$\frac{\sin B}{4} = \frac{\sin 150}{10} \quad \checkmark$$

OBTUSE

$$\frac{\sin B}{4} = \frac{\frac{1}{2}}{10} \quad \checkmark$$

$$\sin 150^\circ = \frac{1}{2}$$

$$\sin 30^\circ = \frac{1}{2}$$

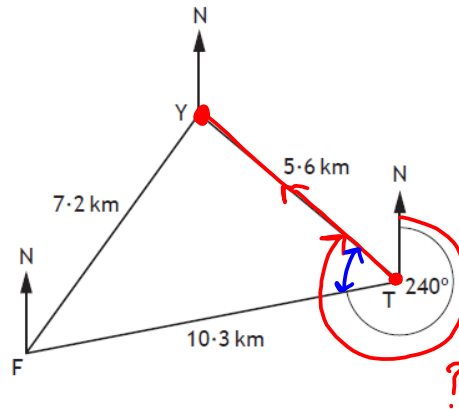
$$\sin B = \frac{4 \times \frac{1}{2}}{10} \quad \checkmark$$

ACUTE

$$= \frac{2}{10} \quad \checkmark$$

$$= \frac{1}{5}$$

- 7) A ferry and a trawler receive a request for help from a stranded yacht.
On the diagram the points F, T and Y show the positions of the ferry, the trawler and the yacht respectively.



- FY is 7.2 kilometres.
- TY is 5.6 kilometres.
- FT is 10.3 kilometres.
- F is on a bearing of 240° from T.

$$\text{Bearing} = 240 + \angle FTY$$

Calculate the bearing of the yacht from the trawler.

4

FORMULAE LIST

Cosine rule:	$a^2 = b^2 + c^2 - 2bc \cos A$ or $\cos A = \frac{b^2 + c^2 - a^2}{2bc}$
--------------	--

Need to find $\angle FTY$

$$\cos T = \frac{10.3^2 + 5.6^2 - 7.2^2}{2 \times 10.3 \times 5.6} \checkmark$$

$$= \frac{85.61}{115.36} \checkmark$$

$$T = \cos^{-1}\left(\frac{85.61}{115.36}\right)$$

$$= 42.1^\circ \checkmark$$

Bearing of the yacht from the trailer

$$\text{is } 240 + 42.1$$

$$= 282.1^\circ \checkmark$$