SQA Past paper questions

There are four main ways that this topic could be assessed in the final exam.

1. "Easy paper 2" question using area of triangle, sine or cosine rule
2. Non-calculator question using area of triangle, sine or cosine rule
3. Problems involving bearings
4. Tricky problems in context

FORMULAE LIST

Sine rule:

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

Cosine rule:

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

or

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

Area of a triangle:

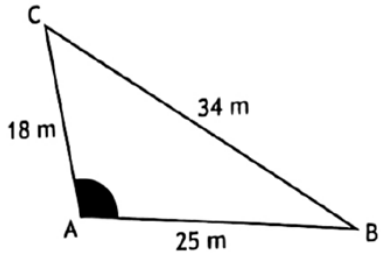
$$A=\frac{1}{2}ab\sin C$$

1. "Easy paper 2" question using area of triangle, sine or cosine rule

2024 - Paper 2 - Question 3

In triangle ABC:

- AB = 25 metres
- AC = 18 metres
- BC = 34 metres.



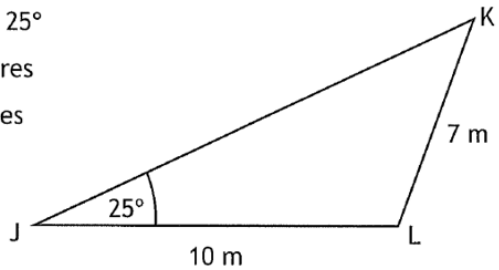
Calculate the size of the shaded angle at A. 3

Click here for video solution.

2023 - Paper 2 - Question 4

The diagram shows triangle JKL.

- Angle KJL = 25°
- JL = 10 metres
- KL = 7 metres



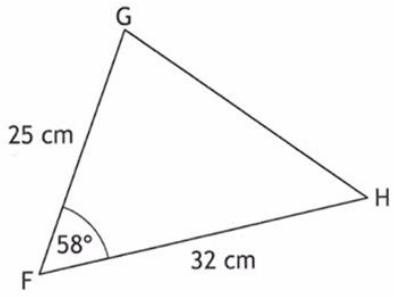
Calculate the size of angle JKL. 3

Click here for video solution.

2022 - Paper 2 - Question 6

The diagram shows triangle FGH.

- FG = 25 centimetres
- FH = 32 centimetres
- Angle GFH = 58°



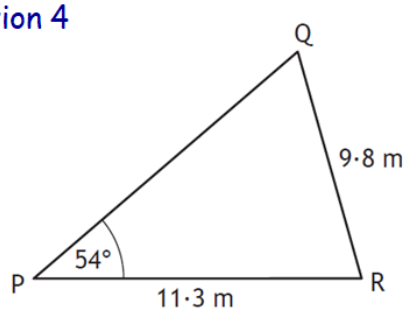
Calculate the area of triangle FGH. 2

Click here for video solution.

2021 - Paper 2 - Question 4

In triangle PQR

- PR = 11·3 metres
- QR = 9·8 metres
- angle QPR = 54°.

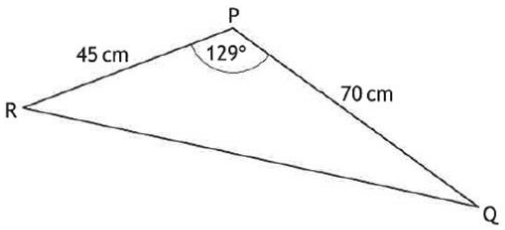


Calculate the size of acute angle PQR. 3

Click here for video solution.

2019 - Paper 2 - Question 3

The diagram shows triangle PQR.



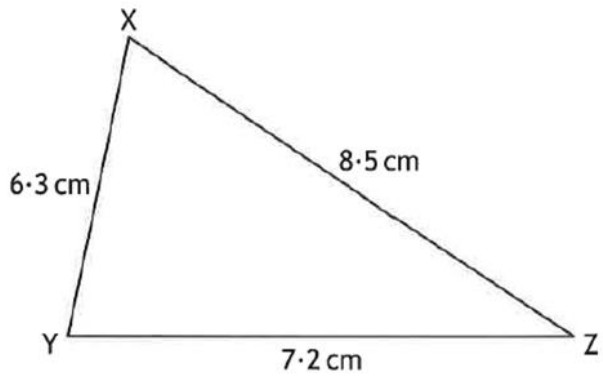
- PR = 45 centimetres
- PQ = 70 centimetres
- Angle QPR = 129°

Calculate the area of triangle PQR. 2

Click here for video solution.

2019 - Paper 2 - Question 7

Triangle XYZ is shown below.

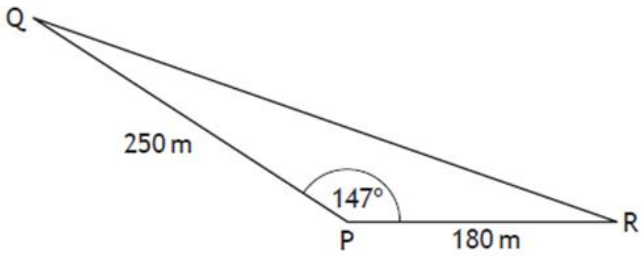


Calculate the size of the smallest angle in triangle XYZ. **3**

Click here for video solution.

2017 - Paper 2 - Question 3

A piece of land is in the shape of a triangle as shown.



- PQ = 250 metres
- PR = 180 metres
- angle QPR = 147°

The owner wishes to build a fence along the side QR.

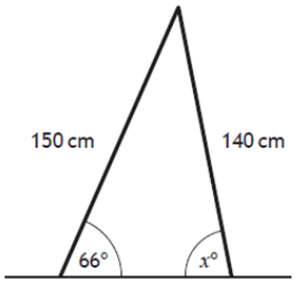
Calculate the length of the fence. **3**

Click here for video solution.

2016 - Paper 2 - Question 8

A set of stepladders has legs 150 centimetres and 140 centimetres long.

When the stepladder is fully open, the angle between the longer leg and the ground is 66°.

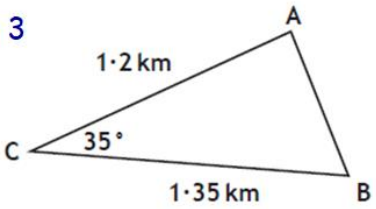


Calculate $x°$, the size of the angle between the shorter leg and the ground. 3

Click here for video solution.

2015 - Paper 2 - Question 3

Triangle ABC is shown below.

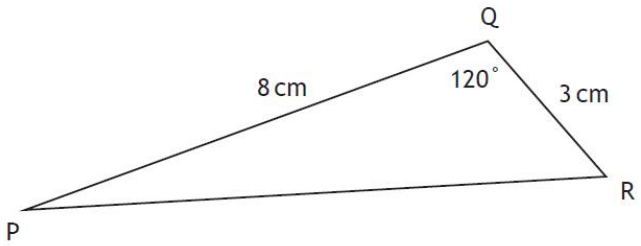


Calculate the length of AB. 3

Click here for video solution.

Specimen - Paper 1 - Question 5

In triangle PQR, PQ = 8 centimetres, QR = 3 centimetres and angle PQR = 120°.



Calculate the length of PR. 3

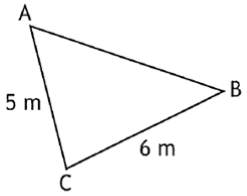
Click here for video solution.

2. Non-calculator question using area of triangle, sine or cosine rule

2023 - Paper 1 - Question 6

In triangle ABC:

- AC = 5 metres
- BC = 6 metres
- $\cos C = \frac{1}{5}$.

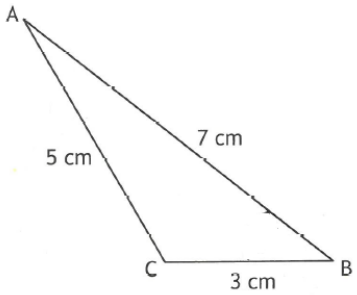


Calculate the length of AB. 3

Click here for video solution.

2022 - Paper 1 - Question 9

The diagram shows triangle ABC.



- AB = 7 centimetres
- BC = 3 centimetres
- AC = 5 centimetres

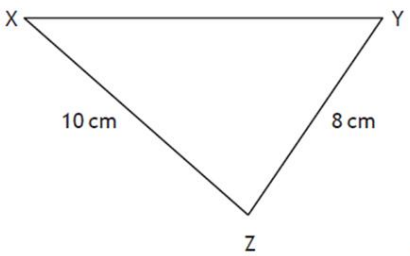
Calculate the value of cos B.
Give your answer in its simplest form. 2

Click here for video solution.

2018 - Paper 1 - Question 10

In triangle XYZ:

- XZ = 10 centimetres
- YZ = 8 centimetres
- $\cos Z = \frac{1}{8}$.



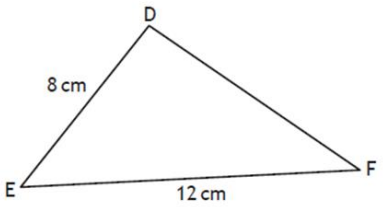
Calculate the length of XY. 3

Click here for video solution.

2017 - Paper 1 - Question 7

In triangle DEF:

- DE = 8 centimetres
- EF = 12 centimetres
- $\sin E = \frac{2}{3}$



Calculate the area of triangle DEF. 2

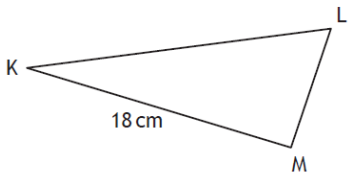
Click here for video solution.

2014 - Paper 1 - Question 5

In triangle KLM

- KM = 18 centimetres
- sin K = 0·4
- sin L = 0·9

Calculate the length of LM.



3

Click here for video solution.

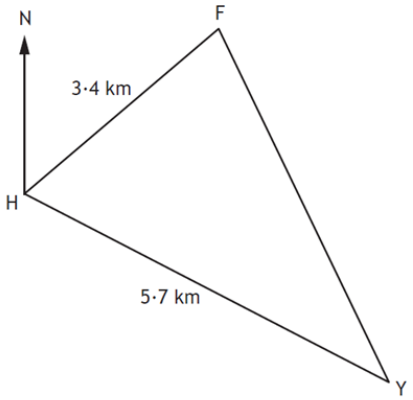
3. Problems involving bearings

2021 - Paper 2 - Question 7

A fishing boat and a yacht left a harbour at the point H.

The fishing boat travelled 3·4 kilometres on a bearing of 047° to the point F.

The yacht travelled 5·7 kilometres on a bearing of 115° to the point Y.



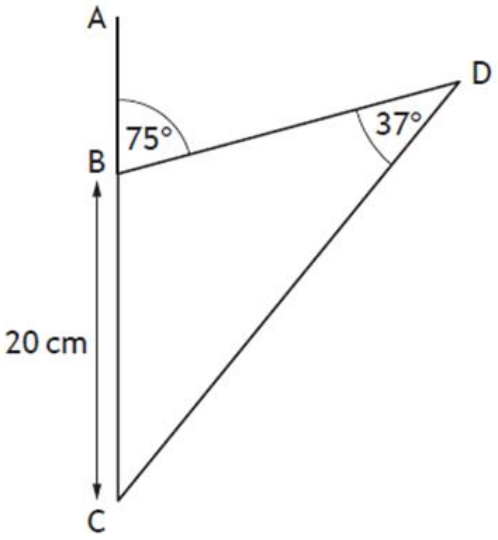
Calculate the distance between the fishing boat at F and the yacht at Y. 4

Click here for video solution.

2018 - Paper 2 - Question 9

In this diagram:

- angle ABD = 75°
- angle BDC = 37°
- BC = 20 centimetres.



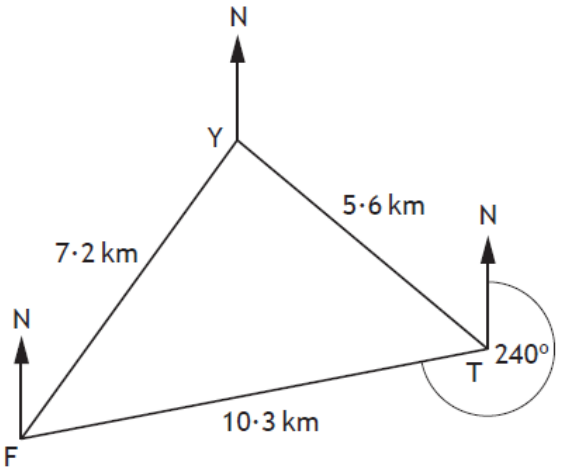
Calculate the length of DC. 3

Click here for video solution.

2018 - Paper 2 - Question 13

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.



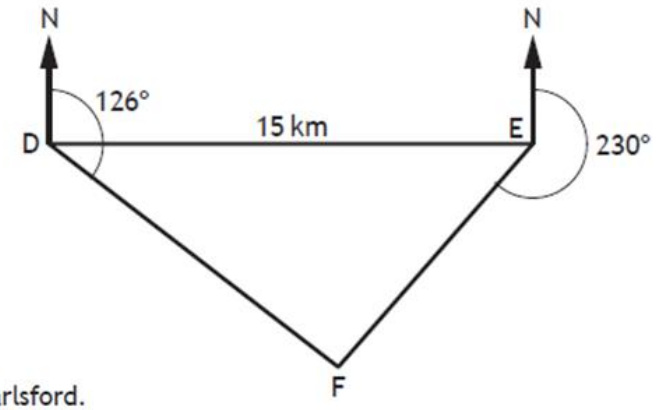
- FY is 7·2 kilometres.
- TY is 5·6 kilometres.
- FT is 10·3 kilometres.
- F is on a bearing of 240° from T.

Calculate the bearing of the yacht from the trawler. 4

Click here for video solution.

2017 - Paper 2 - Question 10

In the diagram below D, E and F represent the positions of Dunbridge, Earlsford and Fairtown respectively.



Dunbridge is 15 kilometres west of Earlsford.
From Dunbridge, the bearing of Fairtown is 126°.
From Earlsford the bearing of Fairtown is 230°.

Calculate the distance between Dunbridge and Fairtown.
Do not use a scale drawing. **4**

Click here for video solution.

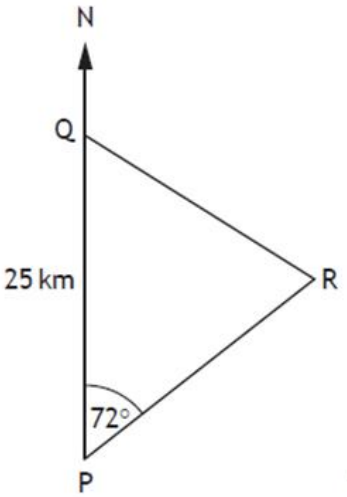
2015 - Paper 2 - Question 13

In the diagram below P, Q and R represent the positions of Portlee, Queenstown and Rushton respectively.

Portlee is 25 kilometres due South of Queenstown.
From Portlee, the bearing of Rushton is 072°.
From Queenstown, the bearing of Rushton is 128°.

Calculate the distance between Portlee and Rushton.

Do not use a scale drawing.

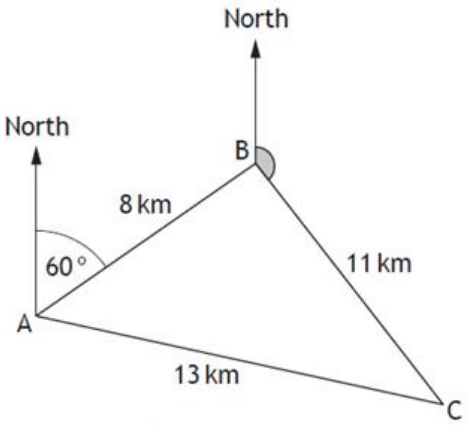


4

Click here for video solution.

2014 - Paper 2 - Question 10

In a race, boats sail round three buoys represented by A, B, and C in the diagram below.



B is 8 kilometres from A on a bearing of 060°.

C is 11 kilometres from B.

A is 13 kilometres from C.

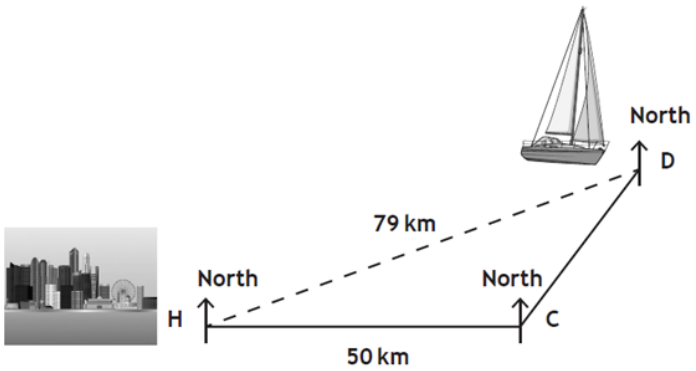
(a) Calculate the size of angle ABC. 3

(b) Hence find the size of the shaded angle. 2

Click here for video solution.

Specimen - Paper 2 - Question 13

A yacht sails from a harbour H to a point C, then to a point D as shown below.



C is 50 kilometres due east of H.

D is on a bearing of 040° from C and is 79 kilometres from H.

(a) Calculate the size of angle CDH. 4

(b) Hence, calculate the bearing on which the yacht must sail to return directly to the harbour. 2

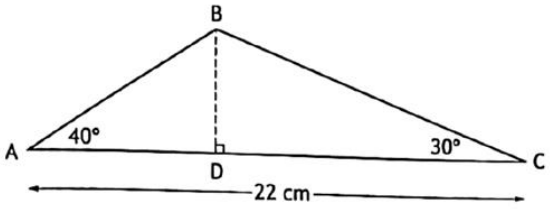
Click here for video solution.

4. Tricky problems in context

2024 - Paper 2 - Question 13

In triangle ABC:

- AC = 22 centimetres
- angle BAC = 40°
- angle BCA = 30°
- BD is perpendicular to AC.



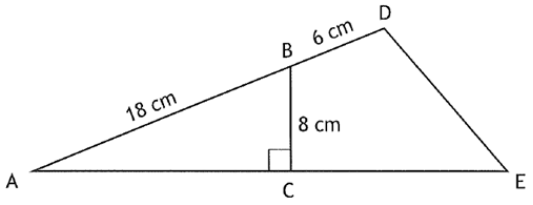
Calculate the length of BD. 5

Click here for video solution.

2023 - Paper 2 - Question 15

In the diagram:

- AC is perpendicular to BC
- AB = 18 centimetres
- BD = 6 centimetres
- BC = 8 centimetres.

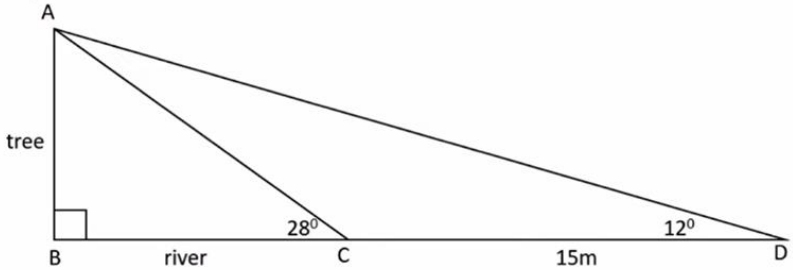


The **area** of triangle ADE is 160 square centimetres.
Calculate the length of AE.

Click here for video solution.

2022 - Paper 2 - Question 14

The width of a river is represented by BC in the diagram below.
AB represents a tree on the river bank.



- From C, the angle of elevation to A is 28°.
- From D, the angle of elevation to A is 12°.
- The distance from C to D is 15 metres.
- BCD is a straight line.

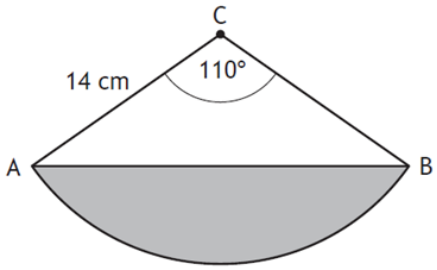
Calculate BC, the width of the river. 5

Click here for video solution.

2021 - Paper 2 - Question 8

The diagram shows a sector of a circle, with centre C and radius 14 centimetres.

Angle ACB is 110°.



AB splits the sector into the shaded segment and triangle ABC.

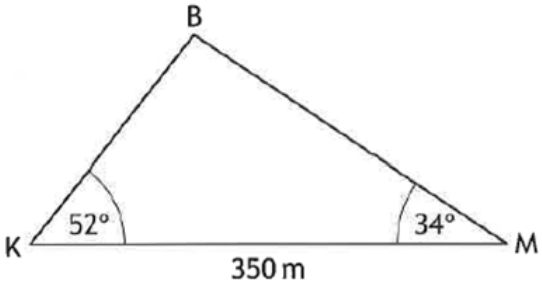
Find the area of the shaded segment. **5**

Click here for video solution.

2019 - Paper 2 - Question 19

Katy and Mona are looking up at a hot-air balloon.

In the diagram below, K, M and B represent the positions of Katy, Mona and the balloon respectively.



- The angle of elevation of the balloon from Katy is 52°
- The angle of elevation of the balloon from Mona is 34°
- Katy and Mona are 350 metres apart on level ground

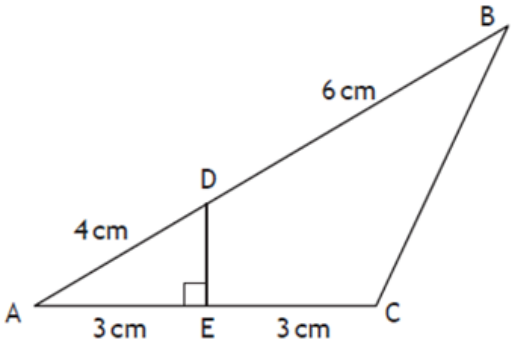
Calculate the height of the hot-air balloon above the ground. **5**

Click here for video solution.

2016 - Paper 2 - Question 16

In the diagram below:

- DE is perpendicular to AC.
- AD = 4 centimetres.
- DB = 6 centimetres.
- AE = EC = 3 centimetres.



Calculate the length of BC.

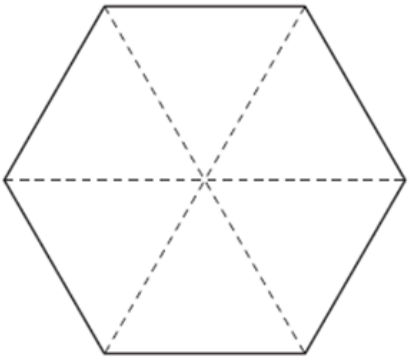
Give your answer correct to one decimal place. 4

Click here for video solution.

2015 - Paper 2 - Question 11

The top of a table is in the shape of a regular hexagon.

The three diagonals of the hexagon which are shown as dotted lines in the diagram below each have length 40 centimetres.



Calculate the area of the top of the table. 4

Click here for video solution.