Write your name here

Surname	Other names

In the style of:

Edexcel GCSE

Centre Number	Candidate Number

Mathematics A

Trigonometry

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference
1MA0/2H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**

Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

1. ABC is a right-angled triangle. $AB = 18$ cm and $BC = 6$ cm.
The line BD bisects the angle ABC.

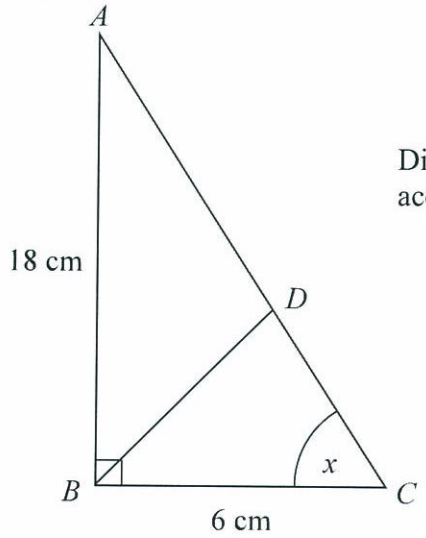


Diagram **NOT** accurately drawn

(a) Write down the value of tan x.

$\tan x = \frac{O}{A} = \frac{18}{6} = 3$

3

(1)

(b) Calculate the length BD.

$x = \tan^{-1} 3$ and $C\hat{B}D = 45°$

From the sine rule, $\frac{BD}{\sin x} = \frac{6}{\sin(B\hat{D}C)}$

and $B\hat{D}C = 180 - 45 - \tan^{-1} 3 = 135 - \tan^{-1} 3 = 63.4°$ (3s.f.)

So $\frac{BD}{\sin(\tan^{-1} 3)} = \frac{6}{\sin(135 - \tan^{-1} 3)}$

$\Rightarrow BD = \frac{6 \sin(\tan^{-1} 3)}{\sin(135 - \tan^{-1} 3)}$

$= 6.36$ cm (3s.f.).

6.36 cm (3s.f.).

(5)

(Total 6 marks)

2. Here is a right-angled triangle.

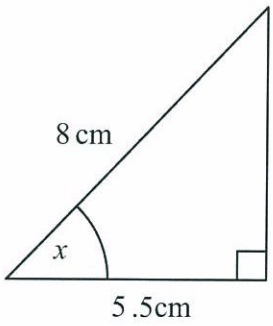


Diagram **NOT** accurately drawn

(a) Calculate the size of the angle marked x.
Give your answer correct to 1 decimal place.

$x = \cos^{-1}\left(\frac{5.5}{8}\right) = 46.6°$ (1d.p.).

$x =$ 46.6 °

(3)

Here is another right-angled triangle.

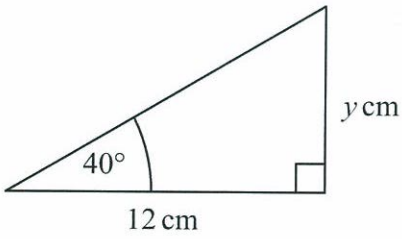


Diagram **NOT** accurately drawn

(b) Calculate the value of y.
Give your answer correct to 1 decimal place.

$\tan 40° = \frac{y}{12}$

$y = 12 \tan 40° = 10.1$ cm (1d.p.).

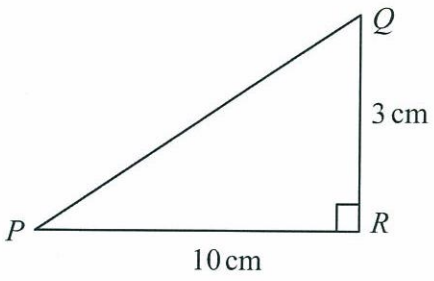
$y =$ 10.1 cm

(3)

(Total 6 marks)

3.

Diagram **NOT** accurately drawn



PQR is a right-angled triangle.

QR = 3 cm
PR = 10 cm

Work out the size of angle *RPQ*.
Give your answer correct to 3 significant figures.

$\tan(R\hat{P}Q) = \frac{3}{10}$

$\Rightarrow R\hat{P}Q = \tan^{-1} 0.3 = 16.7^\circ$ (3s.f.).

16.7 °

(Total 3 marks)

4.

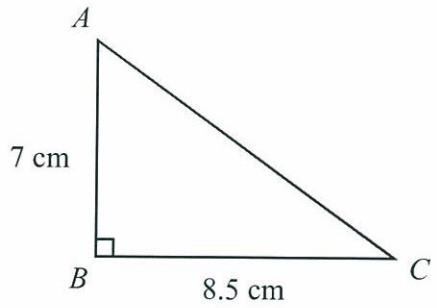


Diagram **NOT** accurately drawn

ABC is a right-angled triangle.
AB = 7 cm,
BC = 8.5 cm.

(a) Work out the area of the triangle.

Area of triangle = $\frac{1}{2}$ x Base x Height

$= \frac{7 \times 8.5}{2} = 29.75 \text{ cm}^2$

29.75 ..... cm^2

(2)

(b) Work out the length of *AC*.
Give your answer correct to 2 decimal places.

$AC = \sqrt{8.5^2 + 7^2}$

$= 11.01 \text{ cm}$ (2 d.p.).

11.01 ..... cm

(3)

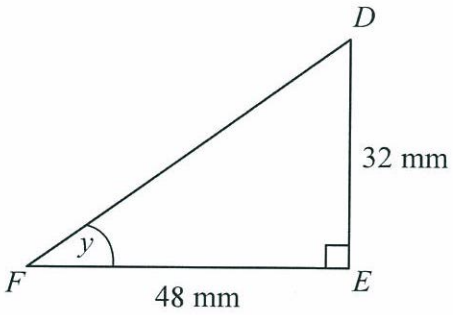


Diagram **NOT** accurately drawn

DEF is another right-angled triangle.
DE = 32 mm,
FE = 48 mm.

(c) Calculate the size of angle *y*.
Give your answer correct to 1 decimal place.

$y = \tan^{-1}\left(\frac{32}{48}\right) = 33.7°$ (1 d.p.).

33.7 °

(3)

(Total 8 marks)

5.

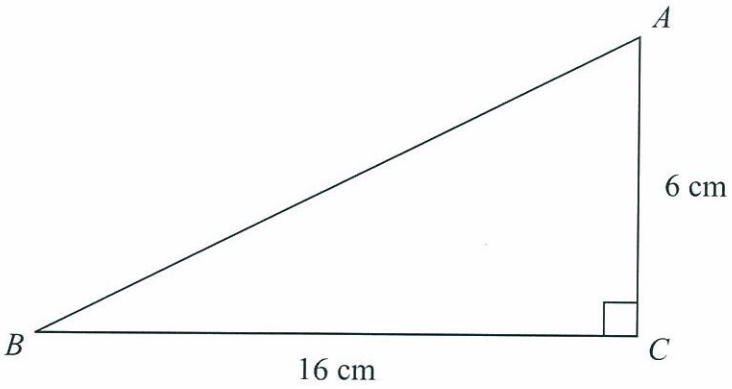


Diagram **NOT** accurately drawn

ABC is a right-angled triangle.
AC = 6 cm.
BC = 16 cm.

(a) Work out the area of triangle *ABC*.

Area $= \frac{1}{2}(16)(6) = 48\ cm^2$

48 ..... cm^2
(2)

(b) Calculate the length of *AB*.
Give your answer correct to 2 decimal places.

$AB = \sqrt{16^2 + 6^2}$

$= 17.09$ cm (2d.p.).

17.09 ..... cm
(3)

(Total 5 marks)

6.

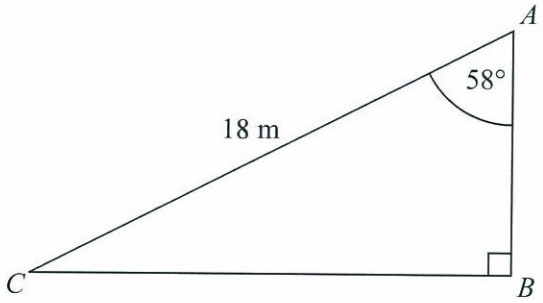


Diagram **NOT** accurately drawn

ABC is a right-angled triangle.
AC = 18 m.
Angle *CAB* = 58°

Calculate the length of *AB*.
Give your answer correct to 3 significant figures.

$AB = 18 \cos 58°$

$= 9.54 \text{ m}$ (3 s.f.).

9.54 ..... m

(Total 3 marks)

7.

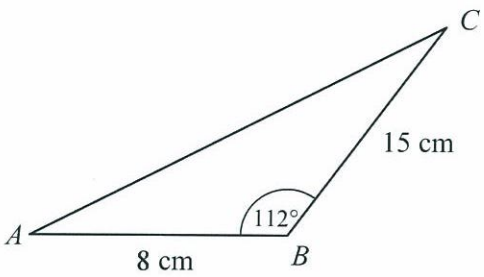


Diagram **NOT** accurately drawn

ABC is a triangle.
AB = 8 cm
BC = 15 cm
Angle *ABC* = 112°

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

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

$= \frac{1}{2}(8)(15)\sin 112°$

$= 55.6\ cm^2$ (3 s.f.).

55.6 ..... cm^2

(Total 3 marks)

8. Town B is 4.6 km due West of town C.
Town A is 2.3 km due North of town B.

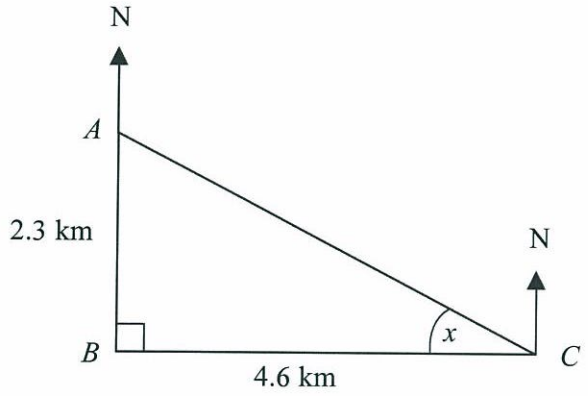


Diagram **NOT** accurately drawn

(a) Calculate the size of the angle marked x.
Give your answer correct to 3 significant figures.

$x = \tan^{-1}\left(\frac{2.3}{4.6}\right) = 26.6°$ (3 s.f.).

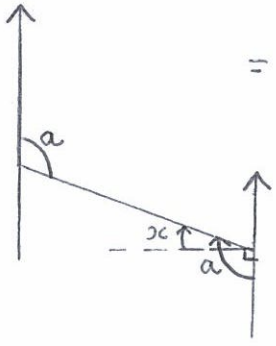
$x =$ 26.6 °

(3)

(b) Find the bearing of town C from town A.
Give your answer correct to 3 significant figures.

$x + 90 = \tan^{-1}\left(\frac{2.3}{4.6}\right) + 90$

$= 117°$ (3 s.f.).



117 °

(1)

(Total 4 marks)

N.B: Alternate angles between parallel lines are equal.

9.

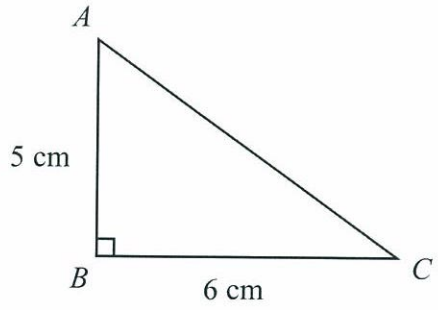


Diagram **NOT** accurately drawn

ABC is a right-angled triangle.
AB = 5 cm,
BC = 6 cm.

(a) Work out the area of the triangle.

Area = $\frac{5(6)}{2} = 15\ cm^2$

15 ..... cm^2

(2)

(b) Work out the length of *AC*.
Give your answer correct to 2 decimal places.

$AC = \sqrt{5^2 + 6^2}$

$= 7.81$ cm (2d.p.)

7.81 ..... cm

(3)

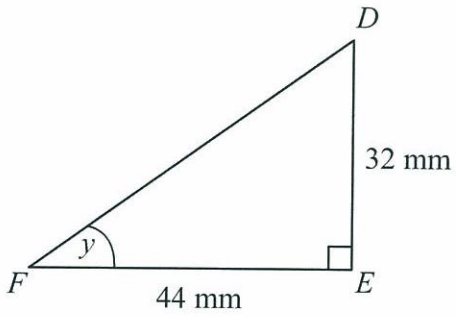


Diagram **NOT** accurately drawn

DEF is another right-angled triangle.
DE = 32 mm,
FE = 44 mm.

(c) Calculate the size of angle *y*.
Give your answer correct to 1 decimal place.

$y = \tan^{-1}\left(\frac{32}{44}\right)$

$= 36.0°$ (1 d.p.).

36.0 °

(3)

(Total 8 marks)

10.

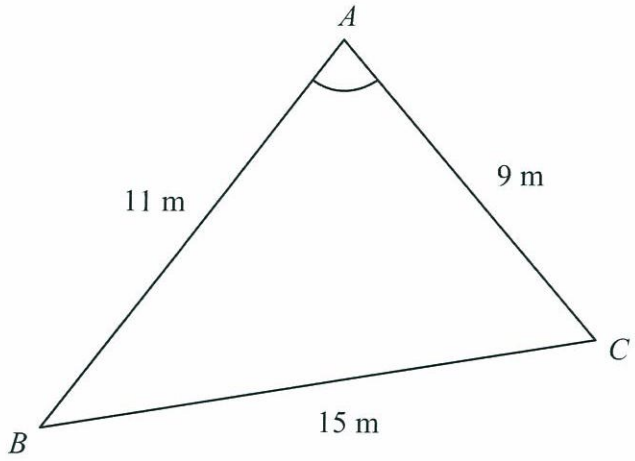
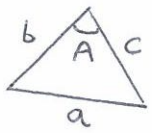


Diagram **NOT** accurately drawn

ABC is a triangle.
AB = 11 m.
AC = 9 m.
BC = 15 m.

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

Cosine Rule:



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

$\Rightarrow A = \cos^{-1}\left(\frac{b^2+c^2-a^2}{2bc}\right)$

$\hat{BAC} = \cos^{-1}\left(\frac{11^2+9^2-15^2}{2(11)(9)}\right)$

$= \cos^{-1}\left(\frac{-23}{198}\right)$

$= 96.7°$ (1 d.p.).

96.7 °

(Total 3 marks)

11.

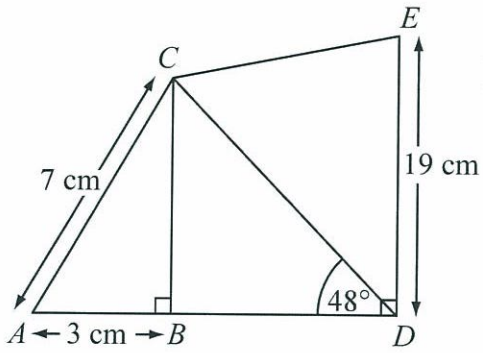


Diagram **NOT** accurately drawn

$AC = 7$ cm.
$AB = 3$ cm.
$DE = 19$ cm.
Angle ABC = angle CBD = angle $BDE = 90°$.
Angle $BDC = 48°$.

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

$\sin 48° = \frac{BC}{CD}$

$\Rightarrow CD = \frac{BC}{\sin 48°}$ where $BC = \sqrt{7^2 - 3^2} = \sqrt{40}$

$\Rightarrow CD = \frac{\sqrt{40}}{\sin 48°} = 8.51$ cm (3 s.f.).

8.51 ..... cm

(4)

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

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

$\Rightarrow CE = \sqrt{\left(\frac{\sqrt{40}}{\sin 48°}\right)^2 + 19^2 - 2\left(\frac{\sqrt{40}}{\sin 48°}\right)(19)\cos(90-48)}$

$= 13.9$ cm (3 s.f.).

13.9 ..... cm

(3)

(Total 7 marks)

12

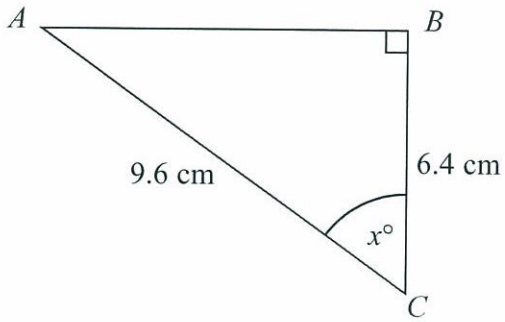


Diagram **NOT** accurately drawn

ABC is a right-angled triangle.
AC = 9.6 cm.
BC = 6.4 cm.

Calculate the size of the angle marked $x°$.
Give your answer correct to 1 decimal place.

$\cos x = \frac{6.4}{9.6}$

$\Rightarrow x = \cos^{-1}\left(\frac{6.4}{9.6}\right)$

$= 48.2°$ (1d.p.).

48.2 °

(Total 3 marks)

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