

Physics A level: Bridging work

Congratulations on your decision to study physics at A level. Physics is one of the most challenging and important areas of science. You will be studying the universe on every scale from the tiniest quantum phenomena to stars and galaxies, and lots in between.

This bridging work is designed to help you get ready for the course. You will need to sharpen up your maths skills, so please complete the attached work and bring it to your first lesson.

A level lessons will also involve a lot more discussion than at GCSE. To learn more about the subject you should have a look at these YouTube channels (and I'm sure you can find others)

Minute physics www.youtube.com/user/minutephysics

PhD comics www.youtube.com/user/phdcomics/videos

You should also join the **Institute of Physics** (www.iop.org) as a student member. This is free and gives you access to the digital version of their magazine, Physics World.

We look forward to seeing you in September

The Physics Department

Revision: Physics symbols, formulae and maths skills

1. What are the meanings for these symbols?
<i>a</i>
<i>v</i>
<i>F</i>
<i>t</i>
<i>I</i>
<i>V</i>

2. The wave equation is $c = f\lambda$. What do the symbols refer to?
<i>c</i>
<i>f</i>
λ

Prefix	Symbol	Meaning	Example
pico	p	$\times 10^{-12}$	1 pF
nano	n	$\times 10^{-9}$	1 nF
micro	μ	$\times 10^{-6}$	1 μ g
milli	m	$\times 10^{-3}$	1 mm
centi	c	$\times 10^{-2}$	1 cm
kilo	k	$\times 10^3$	1 km
Mega	M	$\times 10^6$	1 M Ω
Giga	G	$\times 10^9$	1 GWh

3. Convert the following quantities to SI units:

15 cm	
3 km	
35 mV	
220 nF	
1150 $\mu\Omega$	

4. Convert the following:

1 m ² =	mm ²
45 000 mm ² =	m ²
6 000 000 cm ³ =	m ³

5. Convert these numbers to standard form:

86
381
45300
1 500 000 000
0.03
0.00045
0.0000000782

6. Use your calculator to do the following calculations. Write your answers to three significant figures.

	ANSWER
(a) $\frac{3.40 \times 10^{-3} \times 6.02 \times 10^{23}}{235}$	
(b) $\frac{27.3^2 - 24.8^2}{\sqrt{38}}$	
(c) 1.4509^3	
(d) $\sin 56.4^\circ$	
(e) Reciprocal of 2.34×10^5	
(f) $45 \sin 10^\circ$	

7. Rearrange these equations:

Equation	Subject	Answer
$V = IR$	R	
$p = mv$	v	
$\rho = \frac{m}{V}$	m	
$Q = CV$	C	

Formulae with Four Terms

8. Rearrange these equations:		
Equation	Subject	Answer
$pV = nRT$	V	
$E_p = mg\Delta h$	Δh (Δh is a single term)	
$V = \frac{-Gm}{r}$	G	
$\lambda = \frac{ws}{D}$	D	

9. Rearrange these equations:		
Equation	Subject	Answer
$v = u + at$	t	
$E = V + Ir$	r	

Edexcel GCSE

Mathematics (Linear) – 1MA0

TRIGONOMETRY

Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers

Nil



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 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 – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

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.

1.

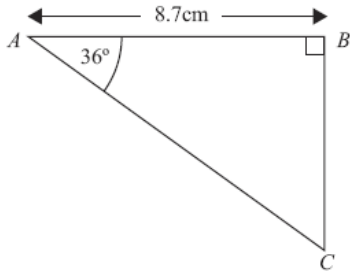


Diagram NOT accurately drawn

ABC is a right-angled triangle.

Angle $B = 90^\circ$.

Angle $A = 36^\circ$.

$AB = 8.7$ cm.

Work out the length of BC .

Give your answer correct to 3 significant figures.

..... cm
(3 marks)

2.

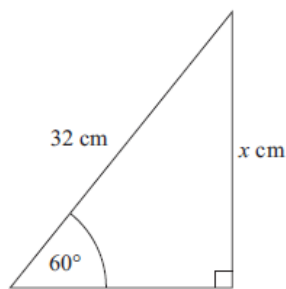


Diagram NOT accurately drawn

Calculate the value of x .

Give your answer correct to 3 significant figures.

.....
(3 marks)

3.

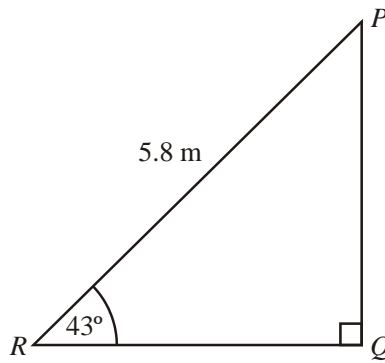


Diagram **NOT** accurately drawn

PQR is a triangle.
Angle $Q = 90^\circ$.
Angle $R = 43^\circ$.
 $PR = 5.8 \text{ m}$.

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

..... m

(3 marks)

4.

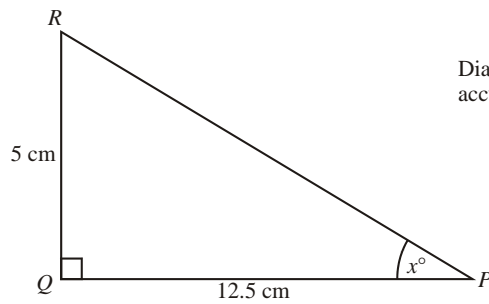


Diagram **NOT** accurately drawn

PQR is a triangle.
Angle $PQR = 90^\circ$.
 $PQ = 12.5 \text{ cm}$.
 $QR = 5 \text{ cm}$.

Calculate the value of x .
Give your answer correct to 1 decimal place.

.....

(3 marks)

5.

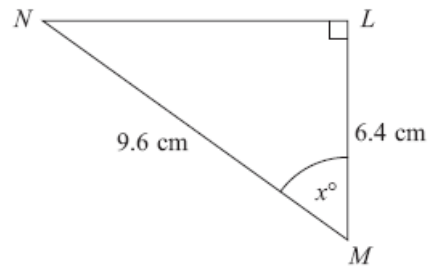


Diagram **NOT** accurately drawn

LMN is a right-angled triangle.

$MN = 9.6 \text{ cm}$.

$LM = 6.4 \text{ cm}$.

Calculate the size of the angle marked x° .

Give your answer correct to 1 decimal place.

.....^o

(3 marks)

6.

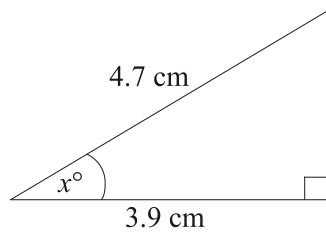


Diagram **NOT** accurately drawn

Work out the value of x .

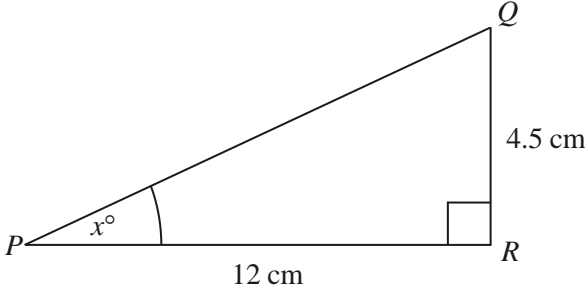
Give your answer correct to 1 decimal place.

$x = \dots\dots\dots$

(3 marks)

7.

Diagram **NOT**
accurately drawn



PQR is a right-angled triangle.
 $PR = 12$ cm.
 $QR = 4.5$ cm.
Angle $PRQ = 90^\circ$.

Work out the value of x .
Give your answer correct to one decimal place.

$x = \dots\dots\dots$

(3 marks)

8. Calculate the size of angle a in this right-angled triangle.
Give your answer correct to 3 significant figures.

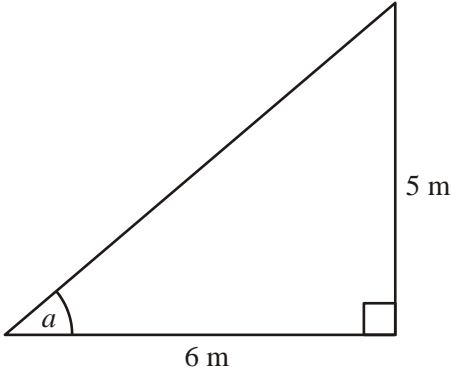


Diagram **NOT**
accurately drawn

$\dots\dots\dots$

(3 marks)

9. PQR is a right-angled triangle.

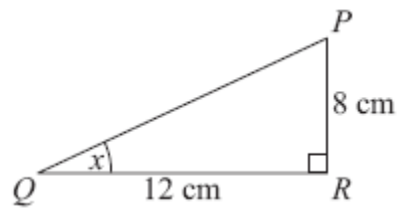


Diagram **NOT** accurately drawn

$PR = 8\text{ cm}$.
 $QR = 12\text{ cm}$.

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

.....^o
(3)

XYZ is a different right-angled triangle.

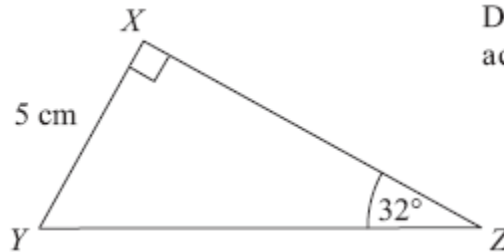


Diagram **NOT** accurately drawn

$XY = 5\text{ cm}$.
Angle $Z = 32^\circ$.

- (b) Calculate the length YZ .
Give your answer correct to 3 significant figures.

..... cm
(3)

(6 marks)

10. The diagram shows a quadrilateral $ABCD$.

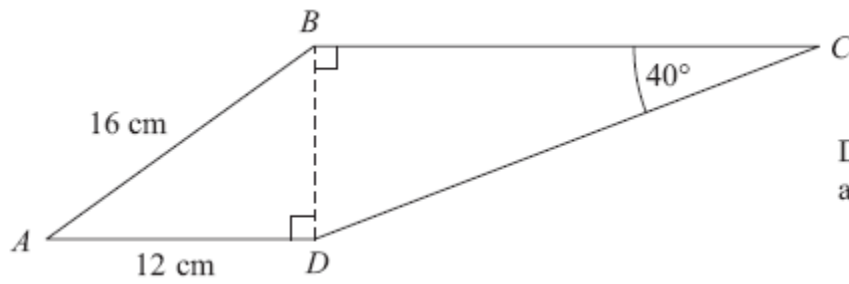


Diagram **NOT** accurately drawn

$AB = 16$ cm.

$AD = 12$ cm.

Angle $BCD = 40^\circ$.

Angle $ADB = \text{angle } CBD = 90^\circ$.

Calculate the length of CD .

Give your answer correct to 3 significant figures.

..... cm

(5 marks)

11.

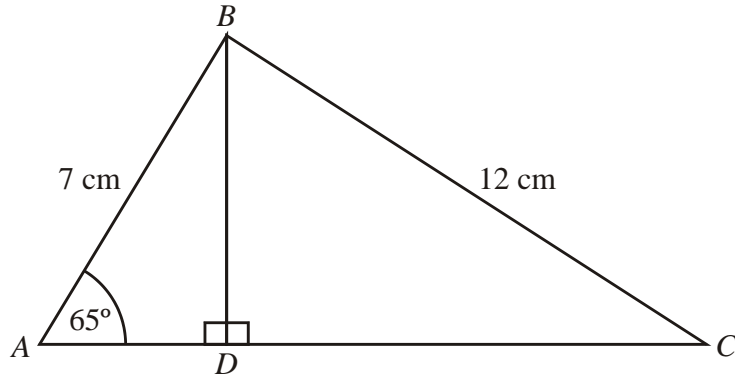


Diagram **NOT**
accurately drawn

ABC is a triangle.

ADC is a straight line with BD perpendicular to AC .

$AB = 7$ cm.

$BC = 12$ cm.

Angle $BAD = 65^\circ$.

Calculate the length of AC .

Give your answer correct to 3 significant figures.

..... cm

(6 marks)