Write your name here

Surname	Other names

Pearson Edexcel International GCSE

Centre Number	Candidate Number

Mathematics A

Practice paper 6H



Higher Tier

Time: 2 hours

Paper Reference **4MA1/PP6H**

You must have:
Ruler graduated in centimetres and millimetres, protractor, 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.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – *there may be more space than you need*.
- **Calculators may be used.**
- You must **NOT** write anything on the formula page.
  Anything you write on the formulae page will gain no credit.

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*.

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

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Arithmetic series

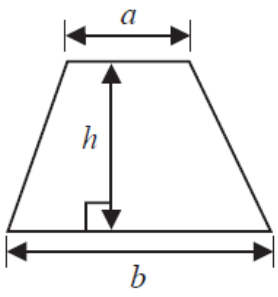
Sum to n terms, $S_n = \frac{n}{2}[2a + (n-1)d]$

The quadratic equation

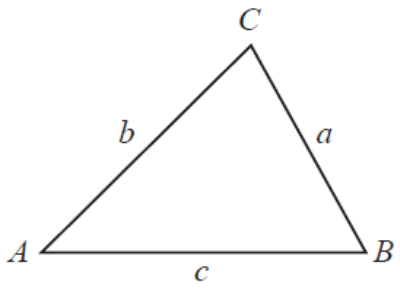
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Area of trapezium $= \frac{1}{2}(a+b)h$



Trigonometry



In any triangle ABC

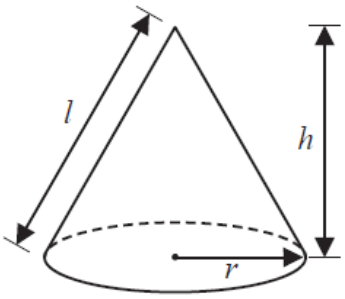
Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

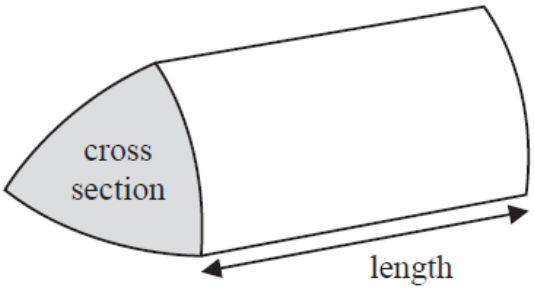
Area of triangle $= \frac{1}{2}ab\sin C$

Volume of cone $= \frac{1}{3}\pi r^2 h$

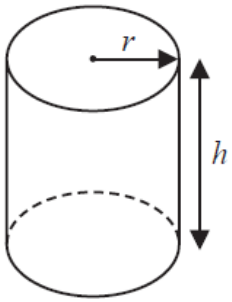
Curved surface area of cone $= \pi r l$



Volume of prism
= area of cross section × length

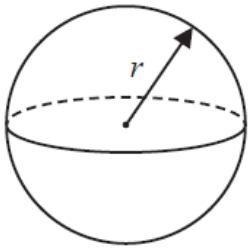


Volume of cylinder $= \pi r^2 h$
Curved surface area of cylinder $= 2\pi r h$



Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$



Answer ALL TWENTY FOUR questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 $\text{pressure} = \dfrac{\text{force}}{\text{area}}$

Find the pressure exerted by a force of 810 newtons on an area of 120 cm^2
Give your answer in newtons/m^2

..... newtons/m^2

(Total for Question 1 is 3 marks)

---

2 Show that $5\frac{2}{3} - 3\frac{4}{5} = 1\frac{13}{15}$

(Total for Question 2 is 3 marks)

---

3 The frequency table shows information about the distances 60 office workers travel to work each day.

Distance travelled (d km)	**Frequency**
$0 < d \leqslant 10$	5
$10 < d \leqslant 20$	12
$20 < d \leqslant 30$	17
$30 < d \leqslant 40$	20
$40 < d \leqslant 50$	6

(a) Write down the modal class.

.....

(1)

(b) Work out an estimate for the mean distance travelled to work by these office workers. Give your answer correct to 1 decimal place.

..... km

(4)

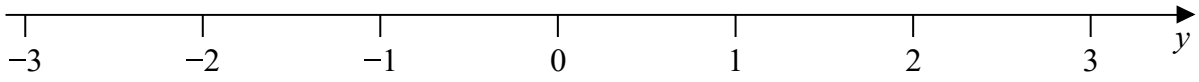
(Total for Question 3 is 5 marks)

4 (*a*) Solve the inequality $4x + 13 \geqslant 27$

.....

(2)

(*b*) On the number line, represent the inequality $y \geqslant -1$



(1)

n is an integer.

(*c*) Write down all the values of n that satisfy $-3 < n \leqslant 2$

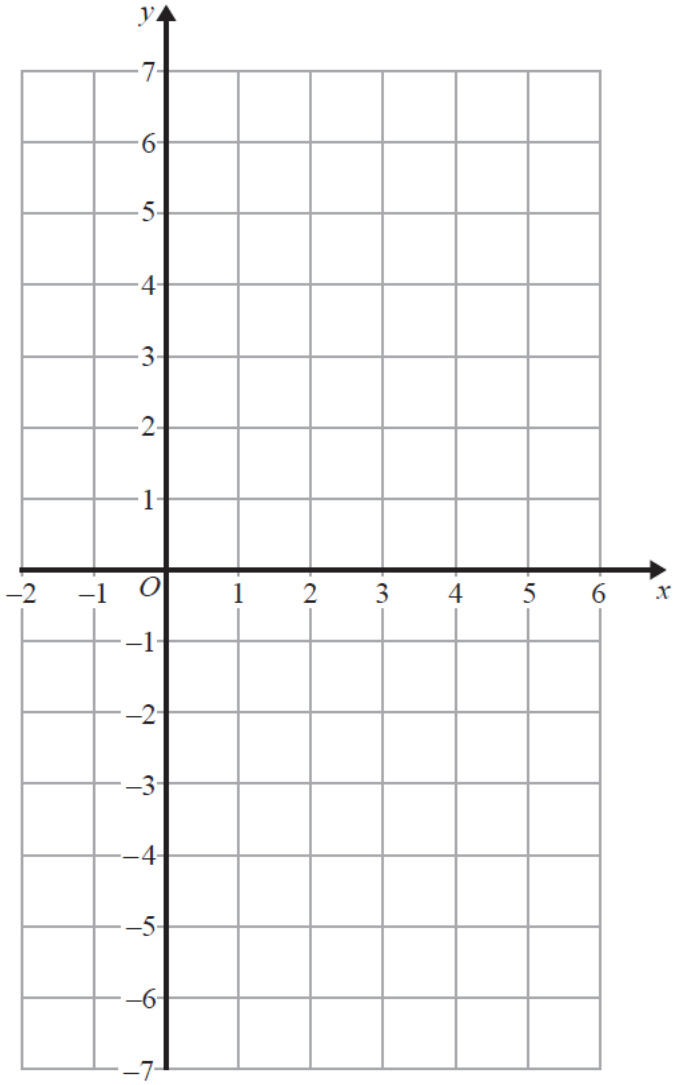
.....

(2)

(Total for Question 4 is 5 marks)

---

5 (*a*) On the grid, draw the graph of $y- = -2x + 4$ for values of x from -1 to 5.



(4)

(*b*) Show by shading on the grid, the region defined by all three of the inequalities

$$y \leq -2x + 4$$
$$y \geq -4$$
$$x \geq 1$$

Label your region **R**.

(3)

(Total for Question 5 is 7 marks)

6 Solve the simultaneous equations.

$$5x - 2y = 9.5$$
$$4x + 2y = 13$$

Show clear algebraic working.

$x =$ .....

$y =$ .....

(Total for Question 6 is 3 marks)

7 In 2001, the population of India was 1028 million.
Between 1971 and 2001, the population of India increased by 87.6%

Work out the population of India in 1971.
Give your answer correct to the nearest million.

..... million

(Total for Question 7 is 3 marks)

8 The cumulative frequency table shows information about the times, in minutes, 80 people waited at an airport.

Time (t minutes)	**Cumulative frequency**
$0 < t \leq 20$	5
$0 < t \leq 40$	18
$0 < t \leq 60$	42
$0 < t \leq 80$	66
$0 < t \leq 100$	78
$0 < t \leq 120$	80

(*a*) On the grid on the next page, draw a cumulative frequency graph for the table.

(2)

(*b*) Use your graph to find an estimate for the median time.

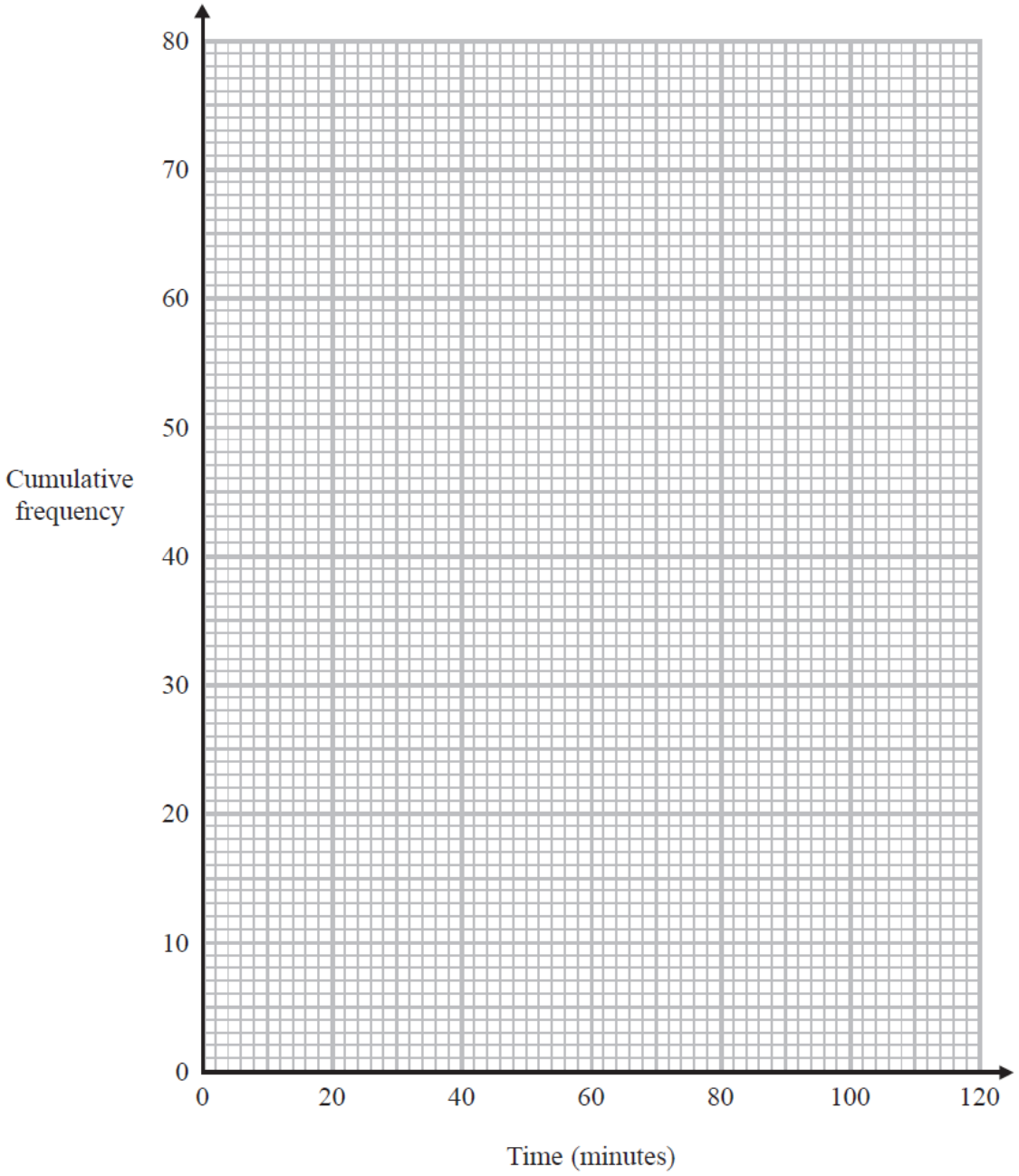
..... minutes

(2)

(*c*) Use your graph to find an estimate for the number of these people who waited more than $1\frac{1}{2}$ hours at the airport.

.....

(2)



(Total for Question 8 is 6 marks)

9 The value of a boat depreciates by 16% each year.
At the end of 2012, the value of the boat is £65000.

Work out the value of the boat at the end of 2015.

£ .....

(Total for Question 9 is 3 marks)

10

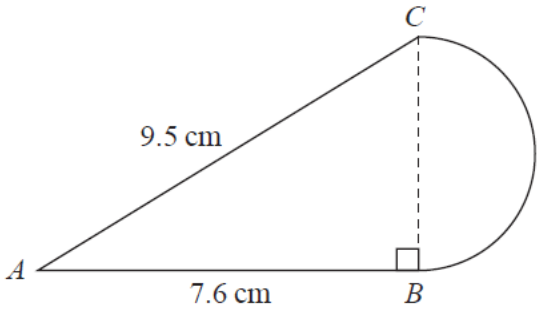


Diagram **NOT** accurately drawn

The diagram shows a shape made from triangle *ABC* and a semicircle with diameter *BC*.
Triangle *ABC* is right-angled at *B*.

AB = 7.6 cm and *AC* = 9.5 cm.

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

.....cm^2

(Total for Question 10 is 5 marks)

11

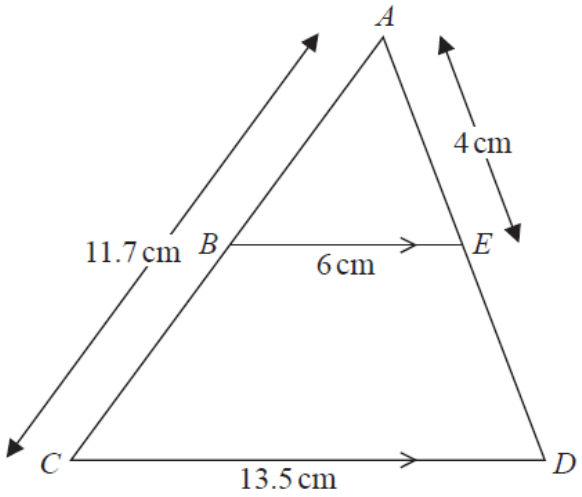


Diagram **NOT** accurately drawn

The diagram shows triangle ACD.
B is a point on AC and E is a point on AD so that BE is parallel to CD.

$AE = 4$ cm
$AC = 11.7$ cm
$BE = 6$ cm
$CD = 13.5$ cm

(a) Calculate the length of AB.

..... cm
(2)

(b) Calculate the length of ED.

..... cm
(2)

(Total for Question 11 is 4 marks)

12 Line **A** has equation $3x - 4y = 5$
Line **B** goes through the points (4, 7) and (–1, 3)

Are lines **A** and **B** parallel?
Show your working clearly.

(Total for Question 12 is 4 marks)

13 (*a*) Solve $\frac{3x+1}{5} - \frac{x-4}{3} = 2$

Show clear algebraic working.

$x =$ .....

(3)

(*b*) Make p the subject of the formula $t = \frac{7-2p}{3p+1}$

.....

(4)

(Total for Question 13 is 7 marks)

---

14 T is directly proportional to $\sqrt{x}$
$T = 400$ when $x = 625$

(a) Find a formula for T in terms of x.

.....

(3)

(b) Calculate the value of T when $x = 56.25$

.....

(1)

(Total for Question 14 is 4 marks)

15

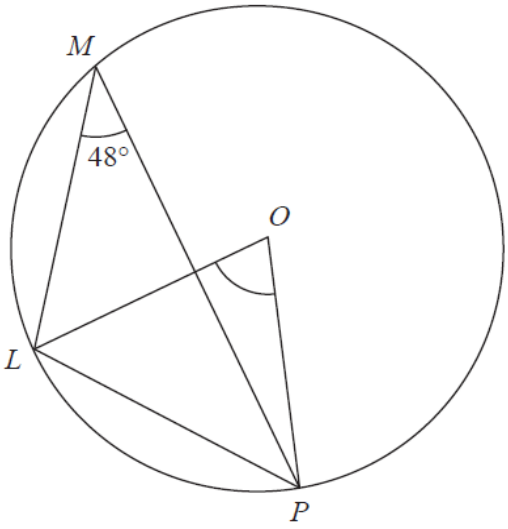


Diagram **NOT** accurately drawn

L, *M* and *P* are points on a circle, centre *O*
Angle *LMP* = 48°

(*a*) (i) Write down the size of angle *LOP*

.....°

(ii) Give a reason for your answer.

.....

.....

.....

(2)

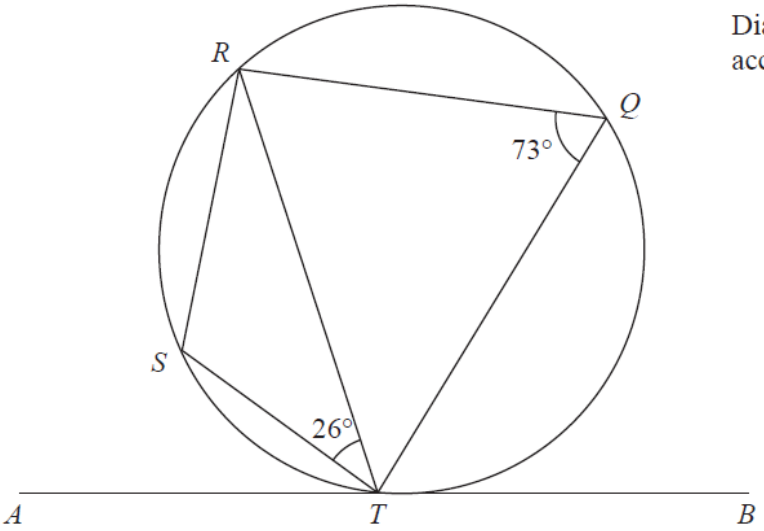


Diagram **NOT** accurately drawn

Q, R, S and T are points on a circle.
ATB is the tangent to the circle at T

Angle $STR = 26°$
Angle $RQT = 73°$

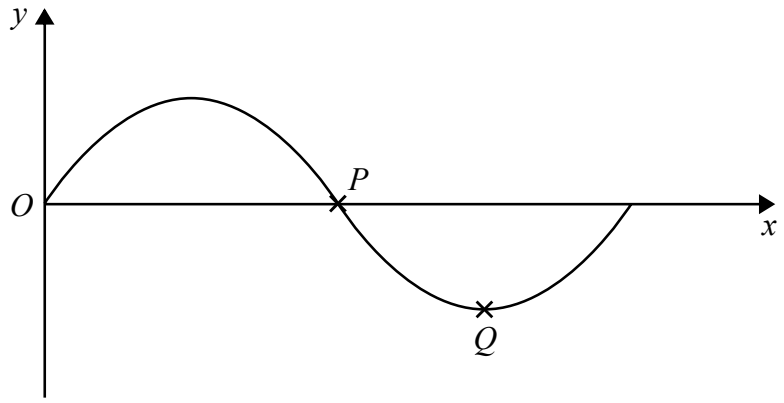
(*b*) Work out the size of angle STA
Give a reason for each stage in your working.

.....°

(3)

(Total for Question 15 is 5 marks)

16 The diagram shows part of a sketch of the curve $y = \sin x°$



(*a*) Write down the coordinates of

(i) the point P

(..... , ...)

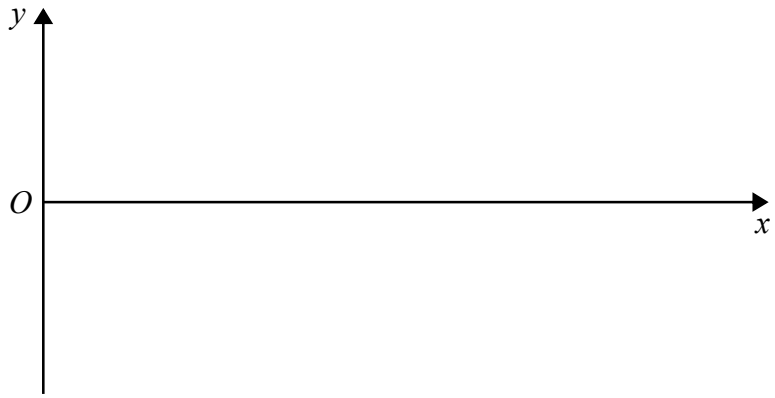
(ii) the point Q

(..... , ...)

(2)

(*b*) Sketch the graph of $y = \tan x$ for $0° \leqslant x \leqslant 360°$

Show the coordinates of any points of intersection with the coordinate axes.



(2)

(Total for Question 16 is 4 marks)

17 Simplify $\left(7+2\sqrt{50}\right)\left(5-2\sqrt{2}\right)$

Give your answer in the form $a + b\sqrt{18}$ where a and b are integers.
Show your working clearly.

.....

(Total for Question 17 is 3 marks)

18 The diagram shows part of the curve with equation $y = f(x)$

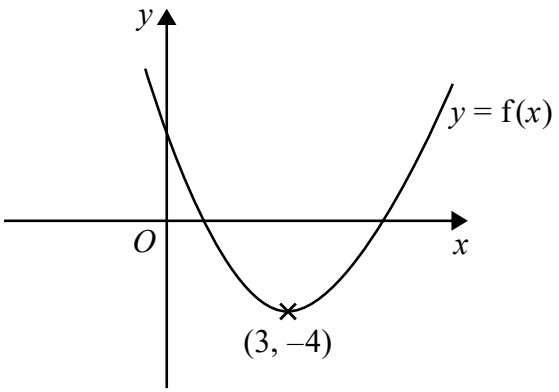


Diagram **NOT** accurately drawn

The coordinates of the minimum point on this curve are (3, –4)

(*a*) Write down the coordinates of the minimum point on the curve with equation

(i) $y = f(x - 4)$

(..... , ...)

(ii) $y = 3f(x)$

(..... , ...)

(iii) $y = f(\frac{1}{2}x)$

(..... , ...)

(3)

The curve with equation $y = f(x)$ is translated to give curve C.

C has a minimum at the point with coordinates (3, 5)
The equation of C is $y = f(x) + k$

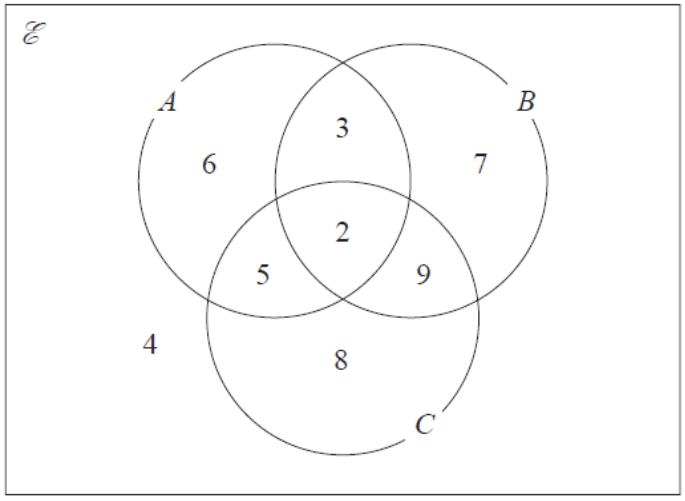
(*b*) Write down the value of k

$k =$ .....

(1)

(Total for Question 18 is 4 marks)

19 The Venn diagram shows a universal set $\mathscr{E}$ and sets A, B and C where 6, 3, 7, 5, 2, 9, 4 and 8 represent **numbers** of elements.



(*a*) Find $n(A \cup B)'$

.....

(1)

(*b*) Find $n((A \cup C)' \cap B)$

.....

(1)

(*c*) On the Venn diagram, shade the region that represents the set $(A \cup B) \cap C$

(1)

(Total for Question 19 is 3 marks)

20

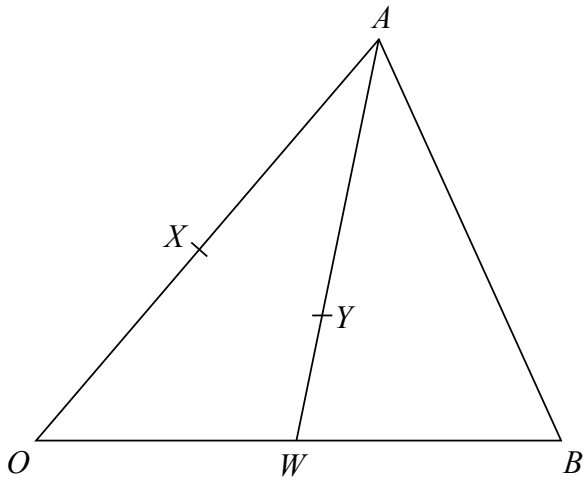


Diagram **NOT** accurately drawn

OAB is a triangle.

X is the midpoint of OA and W is the midpoint of OB.

Y is the point on AW such that $AY : YW = 2 : 1$

$\overrightarrow{OX} = 3\mathbf{a}$ and $\overrightarrow{OW} = 3\mathbf{b}$

(*a*) Express in terms of **a** and **b**

(i) $\overrightarrow{AW}$

.....

(ii) $\overrightarrow{AY}$

.....

(iii) $\overrightarrow{XB}$

.....

(3)

(*b*) Show by a vector method that XYB is a straight line.

(2)

(Total for Question 20 is 5 marks)

21 The shape *OABC* is made from a triangle and a sector of a circle.

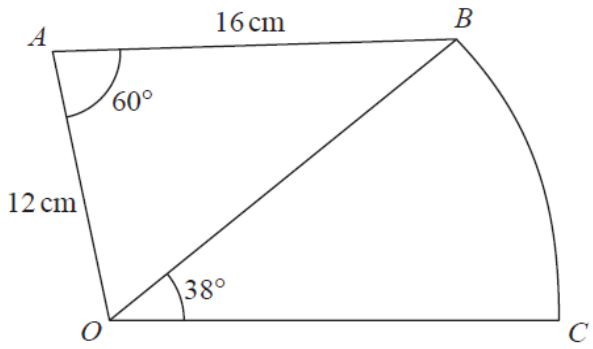


Diagram **NOT** accurately drawn

OAB is a triangle.
OBC is a sector of a circle, centre *O*.

OA = 12 cm
AB = 16 cm
Angle *OAB* = 60°
Angle *BOC* = 38°

Work out the area of *OABC*.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 21 is 5 marks)

22 Solve the inequality $3x^2 + 5 < 53$

.....

(Total for Question 22 is 3 marks)

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23 $t = \dfrac{v-u}{a}$

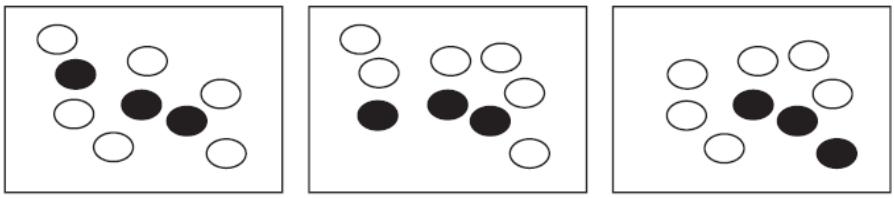
$v =$ 27.3 correct to 3 significant figures.
$u =$ 18 correct to 2 significant figures.
$a =$ 9.81 correct to 3 significant figures.

Work out the lower bound for the value of t.
Show your working clearly.
Give your answer correct to 3 significant figures.

.....

(Total for Question 22 is 3 marks)

24 The diagram shows three boxes containing beads.



Box **A** Box **B** Box **C**

Tim takes at random a bead from box **A** and puts it into box **B**.
He then takes at random a bead from box **B** and puts it into box **C**.
Finally, he takes at random a bead from box **C** and puts it into box **A**.

Calculate the probability that there are still 3 black beads and 6 white beads in each of the three boxes.

.....

(Total for Question 24 is 3 marks)

TOTAL FOR PAPER: 100 MARKS