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MATHEMATICS**0580/42**

Paper 4 Calculator (Extended)

October/November 2025**2 hours**

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a scientific calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π , use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 100.
- The number of marks for each question or part question is shown in brackets [].

This document has **16** pages. Any blank pages are indicated.

List of formulas

Area, A , of triangle, base b , height h .

$$A = \frac{1}{2}bh$$

Area, A , of circle of radius r .

$$A = \pi r^2$$

Circumference, C , of circle of radius r .

$$C = 2\pi r$$

Curved surface area, A , of cylinder of radius r , height h .

$$A = 2\pi rh$$

Curved surface area, A , of cone of radius r , sloping edge l .

$$A = \pi rl$$

Surface area, A , of sphere of radius r .

$$A = 4\pi r^2$$

Volume, V , of prism, cross-sectional area A , length l .

$$V = Al$$

Volume, V , of pyramid, base area A , height h .

$$V = \frac{1}{3}Ah$$

Volume, V , of cylinder of radius r , height h .

$$V = \pi r^2 h$$

Volume, V , of cone of radius r , height h .

$$V = \frac{1}{3}\pi r^2 h$$

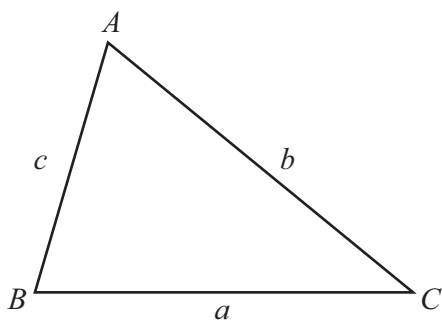
Volume, V , of sphere of radius r .

$$V = \frac{4}{3}\pi r^3$$

For the equation $ax^2 + bx + c = 0$, where $a \neq 0$,

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

For the triangle shown,



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

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

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

- 1 Write the ratio 60 grams : 3 kilograms in the form $1 : n$.

1 : [2]

- 2 Solve.

$$8x - 17 = 27$$

$x =$ [2]

- 3 Write down the order of rotational symmetry of a regular decagon.

..... [1]

- 4 Pedro makes cards.

- (a) He makes cards at a rate of 9 cards every 20 minutes.

Work out the number of cards he makes in 8 hours.

..... [2]

- (b) Each card costs 12 cents to make.
Pedro sells each card for 50 cents.

Work out his percentage profit on each card.

..... % [2]



- 5 Nuwa is buying a phone.
One website sells the phone for 953 Yuan.
A different website sells the same phone for \$141.
The exchange rate is 1 Yuan = \$0.152 .

Calculate the difference between these phone prices.
Give your answer in dollars, correct to the nearest cent.

\$ [2]

- 6 One morning, a dentist has appointments for 10 patients.
The stem-and-leaf diagram shows the waiting time for 8 of these patients.

0	1	4
1	0	2 9
2	1	5 5

Key: 1 | 0 represents 10 minutes

The times for the two other patients, P and Q , are not shown in the stem-and-leaf diagram.

The mean waiting time of all 10 patients that morning is 16 minutes.

The range of waiting times is 26 minutes.

Patient P waits longer than patient Q .

Find the waiting time for each of patient P and patient Q .

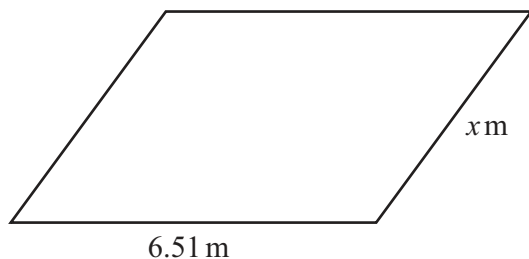
Patient P min

Patient Q min

[4]



- 7 The diagram shows a parallelogram.



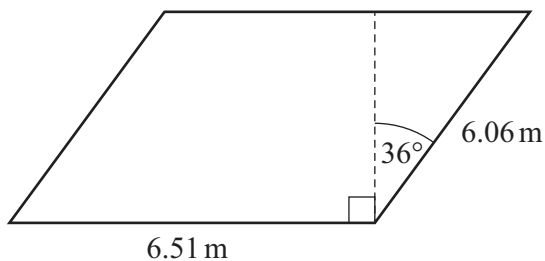
NOT TO
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The parallelogram has the same perimeter as a circle with radius 4 m.

- (a) Show that $x = 6.06$ m, correct to 2 decimal places.

[4]

- (b)



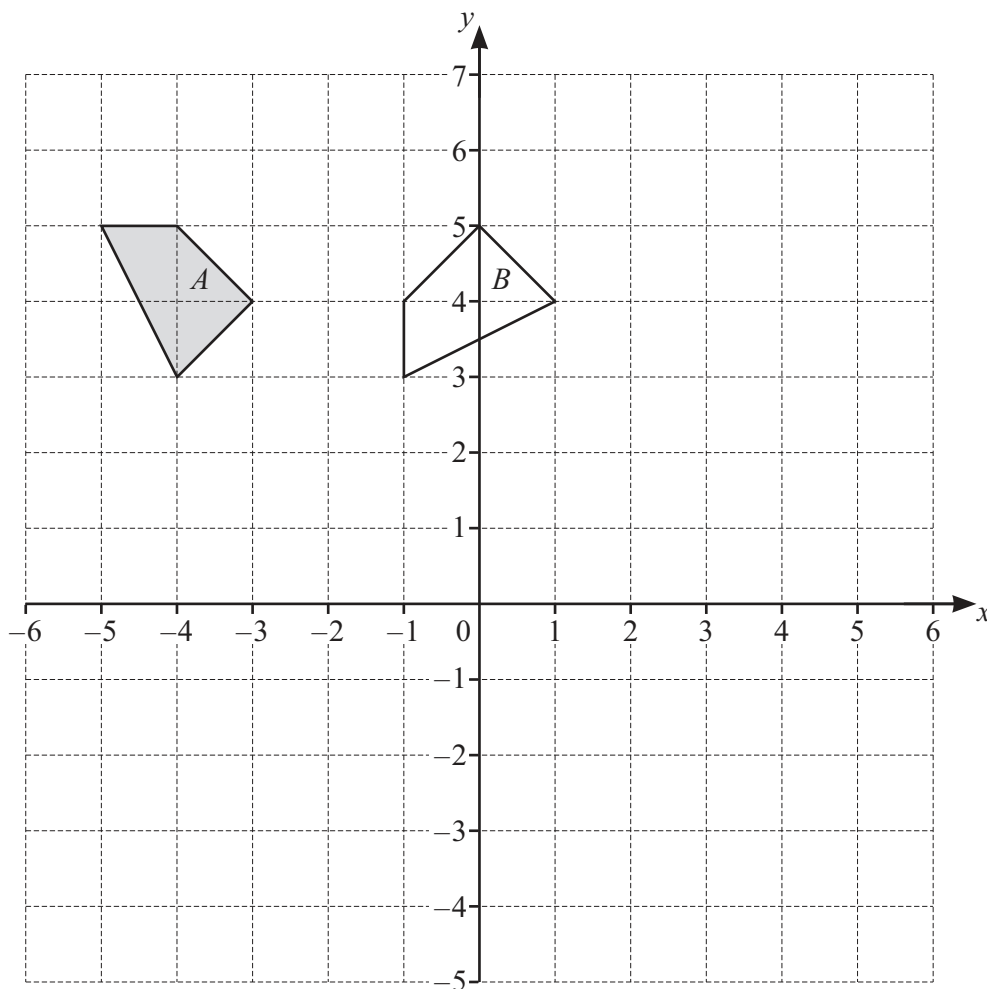
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The floor of a room is in the shape of this parallelogram.
It costs \$18 per square metre to tile the floor.

Calculate the total cost of tiling the floor.

\$ [4]





(a) On the diagram, draw the image of

(i) shape A after a translation by the vector $\begin{pmatrix} 1 \\ -7 \end{pmatrix}$ [2]

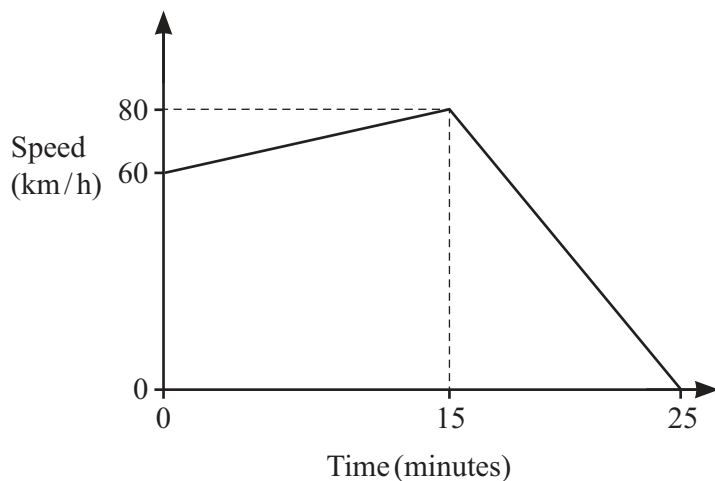
(ii) shape A after a reflection in the line $y = x + 1$. [3]

(b) Describe fully the **single** transformation that maps shape A onto shape B .

..... [3]



- 9 The diagram shows the speed–time graph for part of a car journey.



NOT TO
SCALE

Find the total distance travelled in the 25 minutes.

..... km [3]

- 10 Find the n th term of each sequence.

(a) 17, 9, 1, -7 , -15 , ...

..... [2]

(b) 3, 12, 27, 48, 75, ...

..... [2]



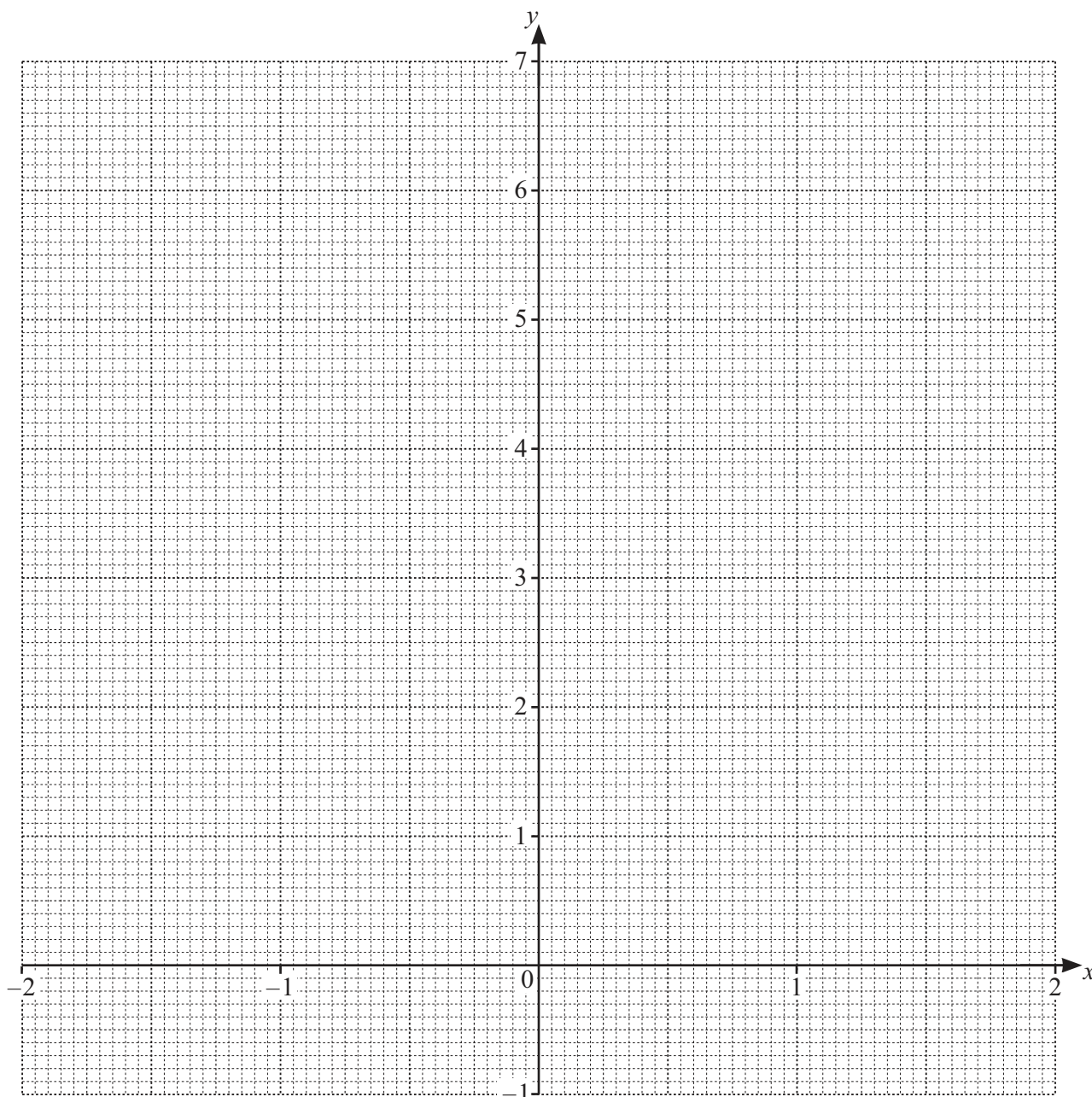
- 11 The table shows some values for $y = x^3 - 2x + 3$.
Where appropriate, values of y are given correct to 2 decimal places.

x	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2
y	-1		4	3.88	3	2.13	2		7

(a) Complete the table.

[2]

(b) Draw the graph of $y = x^3 - 2x + 3$ for $-2 \leq x \leq 2$.



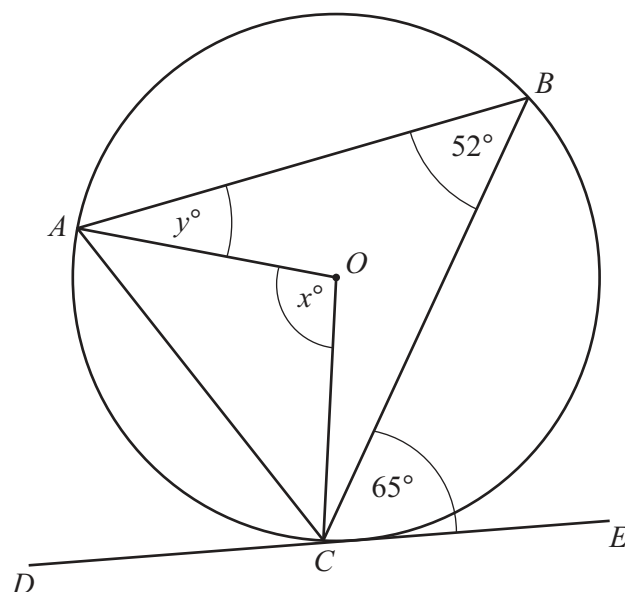
[4]



(c) By drawing a suitable straight line on the grid, solve the equation $x^3 - 2.5x + 1 = 0$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ or $x = \dots\dots\dots$ [4]

12



NOT TO
SCALE

A , B and C lie on a circle centre O .
 DE is a tangent to the circle at C .
 Angle $ABC = 52^\circ$ and angle $BCE = 65^\circ$.

- (a) Find the value of x .
 Give a geometrical reason for your answer.

$x = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$ [2]

- (b) Find the value of y .

$y = \dots\dots\dots$ [2]



13 Simplify.

$$\frac{7}{2m} + \frac{3}{8m}$$

..... [2]

14 (a) Carlos invests \$24 000 at a rate of 3.2% per year compound interest.

Calculate the value of his investment at the end of 4 years.

\$ [2]

(b) Carlos buys a painting for \$ x .
He sells the painting for \$40 870.
He makes a profit of 34%.

Calculate the value of his profit.

\$ [3]

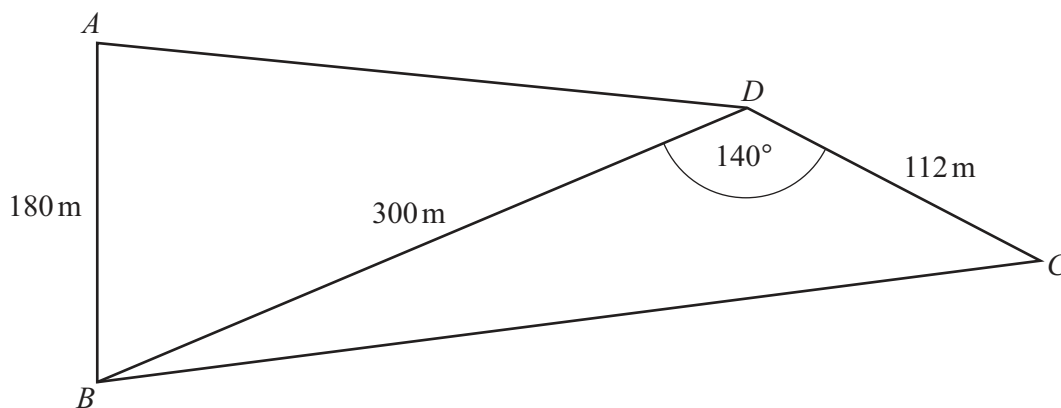
(c) Carlos also buys a car with a value of \$32 500.
The value of the car decreases exponentially by 23% each year.

Find a formula for the value, \$ V , of the car at the end of n years.

..... [3]



15

NOT TO
SCALE

The diagram shows a field, $ABCD$, in the shape of a quadrilateral.
 BD is a straight path across the field.

(a) Calculate BC .

$BC = \dots\dots\dots$ m [3]

(b) Calculate angle DBC .

Angle $DBC = \dots\dots\dots$ [3]

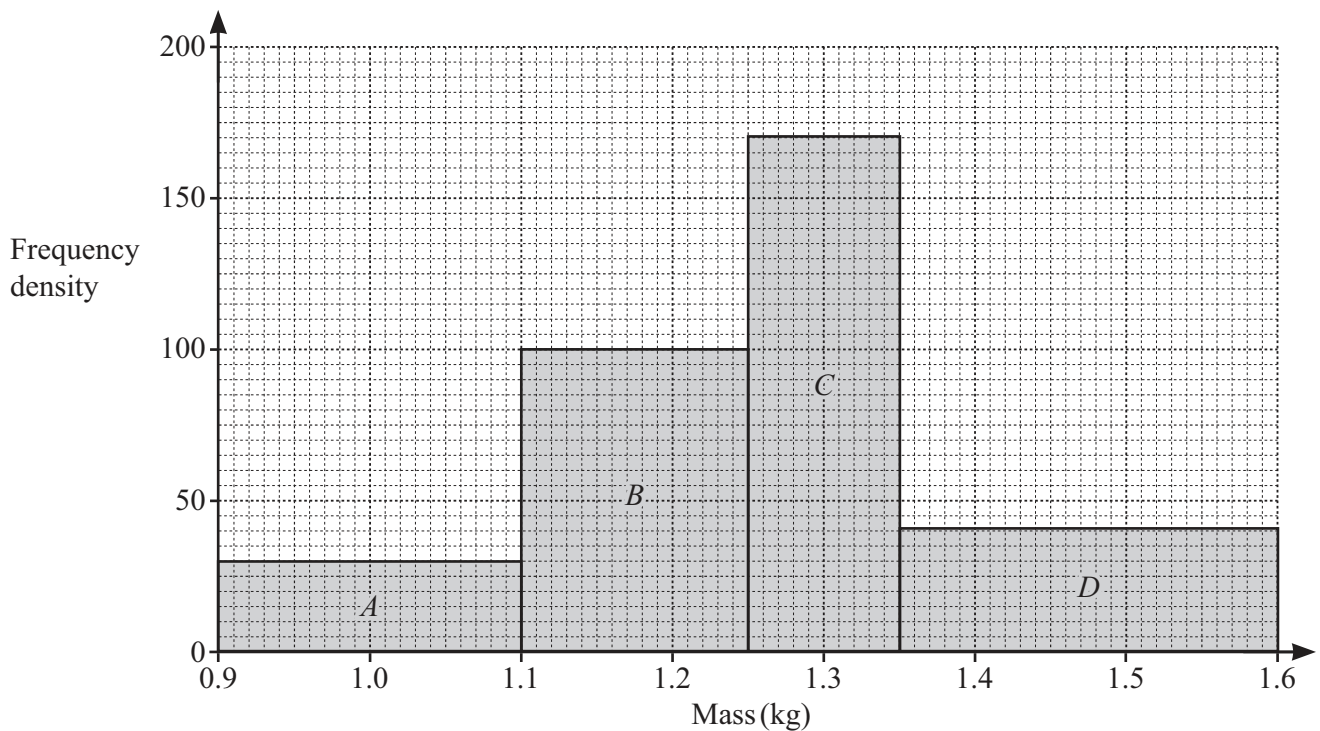
(c) The total area of the field, $ABCD$, is $35\,900\text{ m}^2$.

Work out the length of the shortest distance from D to AB .

$\dots\dots\dots$ m [4]



- 16 The histogram shows information about the masses of some coconuts. The masses are classified into four categories A , B , C and D .



- (a) Show that there are 10 coconuts in category D .

[1]

- (b) Two of the coconuts from those in category C and category D are chosen at random.

Find the probability that both are from category D .

..... [3]

- (c) Calculate an estimate of the mean mass of the coconuts.

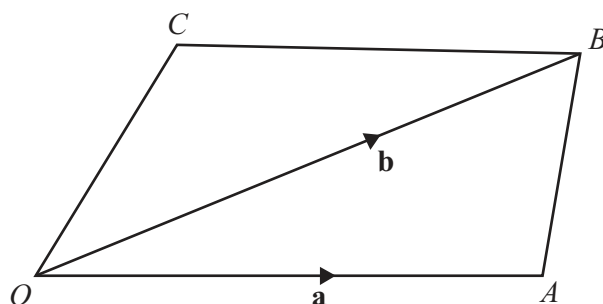
..... kg [4]



17 Expand and simplify.

$$(x-2)(2x+3)(x+4)$$

18



NOT TO
SCALE

In the diagram, OA is parallel to CB .

$$OA : CB = 4 : 3$$

$$\overrightarrow{OA} = \mathbf{a} \text{ and } \overrightarrow{OB} = \mathbf{b}.$$

(a) Find $\overrightarrow{AB}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

$$\overrightarrow{AB} = \dots\dots\dots [1]$$

(b) M is the midpoint of OC .

Find $\overrightarrow{AM}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

Give your answer in its simplest form.

$$\overrightarrow{AM} = \dots\dots\dots [3]$$

- 19 Solve the simultaneous equations.
You must show all your working and give your answers correct to 2 decimal places.

$$y = 5 - 2x$$

$$y = 3x^2 - 7x - 6$$

$$x = \dots\dots\dots y = \dots\dots\dots$$

$$x = \dots\dots\dots y = \dots\dots\dots$$

[6]



- 20 A solid metal prism has a mass of 4810 g, correct to the nearest 10 g.
The density of the metal is 7.7 g/cm^3 , correct to 1 decimal place.

Calculate the lower bound for the volume of the prism.
[Density = mass $\div$ volume]

..... cm^3 [3]

- 21 y is inversely proportional to $(x+2)^2$.
 w is proportional to x .

When $y = 8$, $x = 3.5$.

When $w = 15$, $x = 90$.

Find y in terms of w .

$y =$ [4]





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