Write your name here

Surname	Other names

Pearson
Edexcel GCSE

Centre Number ☐☐☐☐☐

Candidate Number ☐☐☐☐

Applications of Mathematics

Unit 1: Applications 1

For Approved Pilot Centres ONLY

Higher Tier

Wednesday 6 November 2013 – Morning
Time: 1 hour 45 minutes

Paper Reference
5AM1H/01

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.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

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 ▶

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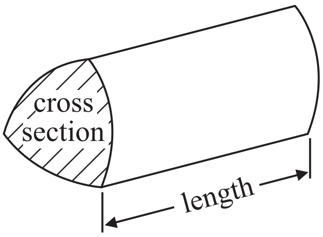
PEARSON

GCSE Mathematics 2AM01

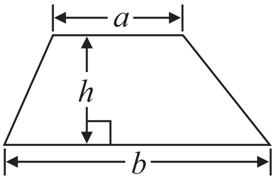
Formulae: Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of prism = area of cross section × length

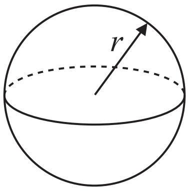


Area of trapezium = $\frac{1}{2}(a+b)h$



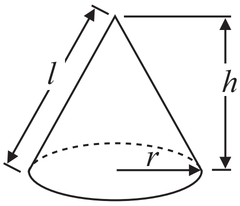
Volume of sphere = $\frac{4}{3}\pi r^3$

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

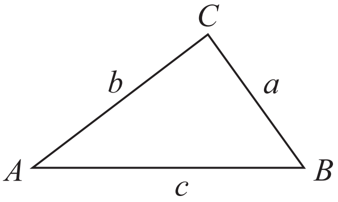


Volume of cone = $\frac{1}{3}\pi r^2 h$

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



In any triangle *ABC*



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

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

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

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Radios are made in a factory.

On Monday 10 000 radios are made.

$\frac{1}{20}$ of these radios are faulty.

(a) Work out the number of radios that are faulty.

....

(2)

5 compact radios have a total weight of 4000 grams.

(b) Work out the total weight of 8 compact radios.

.... grams

(2)

(Total for Question 1 is 4 marks)

***2** The table gives information about the length of a lap at two motor racing tracks.

Motor racing track	**Length of a lap**
Brands Hatch	4048 yards
Silverstone	3.67 miles

At Brands Hatch, there are 85 laps in a race.
At Silverstone, there are 60 laps in a race.

1 mile = 1760 yards

Which race is the longer length?

(Total for Question 2 is 4 marks)

3 Pete uses a 3-D grid to design a shed.

The diagram shows his design.

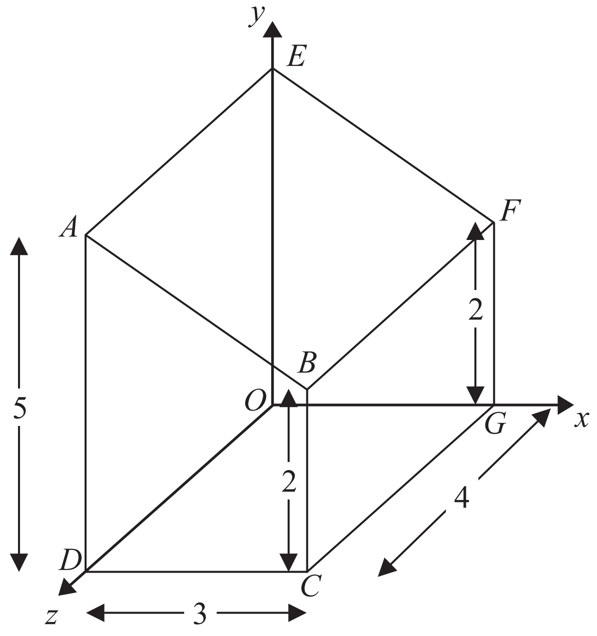


Diagram **NOT** accurately drawn

Point A is a corner of the shed.

(a) Write down the coordinates of point A.

(.............................. , ... ,..............................)

(1)

Pete has to mark the midpoint of the line CG on his design.

(b) Write down the coordinates of the midpoint of the line CG.

(.............................. , ... ,..............................)

(1)

In the diagram, all the measurements are in metres.

The wall $ABCD$ of the shed is a trapezium.

(c) Work out the area of the wall $ABCD$.

.... m^2

(2)

(Total for Question 3 is 4 marks)

4 Nails of length 35 millimetres are sold in three sizes of packets.

There are 20 nails in a small packet, costing £1.36
There are 50 nails in a medium packet, costing £3.30
There are 90 nails in a large packet, costing £6.03

Small
£1.36
20 nails
Medium
£3.30
50 nails
Large
£6.03
90 nails

*(a) Which size of packet is the best value for money?
You must show clearly how you got your answer.

(4)

Nails of different lengths are sold in mixed packets.

Here are the lengths, in millimetres, of the nails in a mixed packet.

20 35 49 30 45
40 50 25 39 30
30 37 47 55 28

(b) Draw an ordered stem and leaf diagram for this information.

(3)

(c) Find the median length.

.... mm

(1)

(Total for Question 4 is 8 marks)

5 (a) A shop has a sale.

Sale

Normal prices reduced by 15%

The normal price of a jumper is £54

Work out the sale price of the jumper.

£ ....

(3)

(b) A different shop has a sale.

Sale

Normal prices reduced by 35%

The sale price of a coat is £113.75

Work out the normal price of the coat.

£ ....

(3)

(Total for Question 5 is 6 marks)

***6** The diagram shows the plan of a floor.

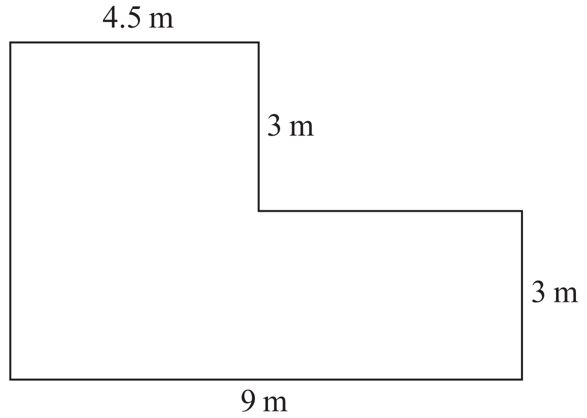


Diagram **NOT** accurately drawn

All the corners of the floor are right angles.

Jason wants to cover the floor completely with underlay.

Underlay is sold in rolls.
Each roll of underlay has a length of 5 m and a width of 1.5 m.
Each roll of underlay costs £59.99

Jason has £400 to spend.

Does Jason have enough money to buy the underlay he needs?

(Total for Question 6 is 4 marks)

7 On Saturday 75 people phoned a helpline.

The table gives information about the lengths, in minutes, of the phone calls.

Length of phone call (x minutes)	**Frequency**
$0 < x \leqslant 5$	35
$5 < x \leqslant 10$	20
$10 < x \leqslant 15$	12
$15 < x \leqslant 20$	8

(a) Find the modal class interval.

....

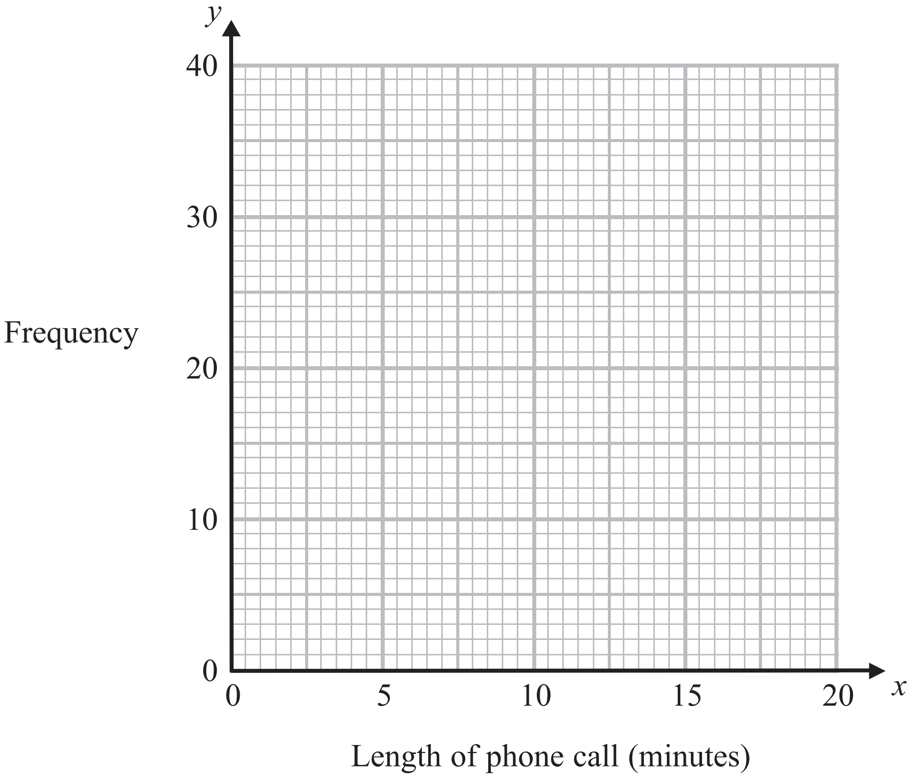
(1)

(b) Work out an estimate for the mean length of call.

.... minutes

(4)

(c) On the grid, draw a frequency polygon to show the information in the table.



(2)

(Total for Question 7 is 7 marks)

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8 Kim works for a company.

She is paid 40p per mile for each mile she has to drive.

Here is the spreadsheet Kim uses to calculate how much she will be paid for the distances she drove last week.

	A	B	C	D
1	**day**	**distance (miles)**	**pounds per mile**	**amount paid (£)**
2	Monday	80	0.4	32.00
3	Tuesday		0.4	
4	Wednesday		0.4	
5	Thursday		0.4	
6	Friday		0.4	
7	**total**			

Write down the formula to go

(i) in cell D3

....

(ii) in cell B7.

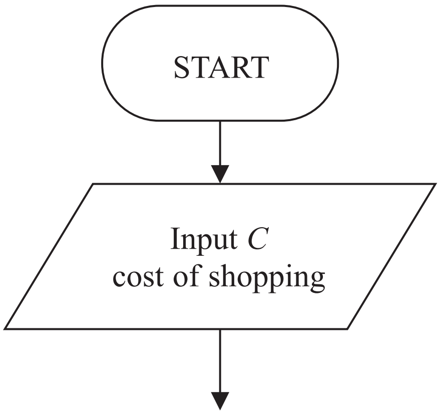
....

(Total for Question 8 is 3 marks)

9 At Pete’s Store you get £8 off the cost of your shopping when the cost of your shopping comes to more than £100

You can use a flow chart to work out the amount a customer pays at Pete’s Store.

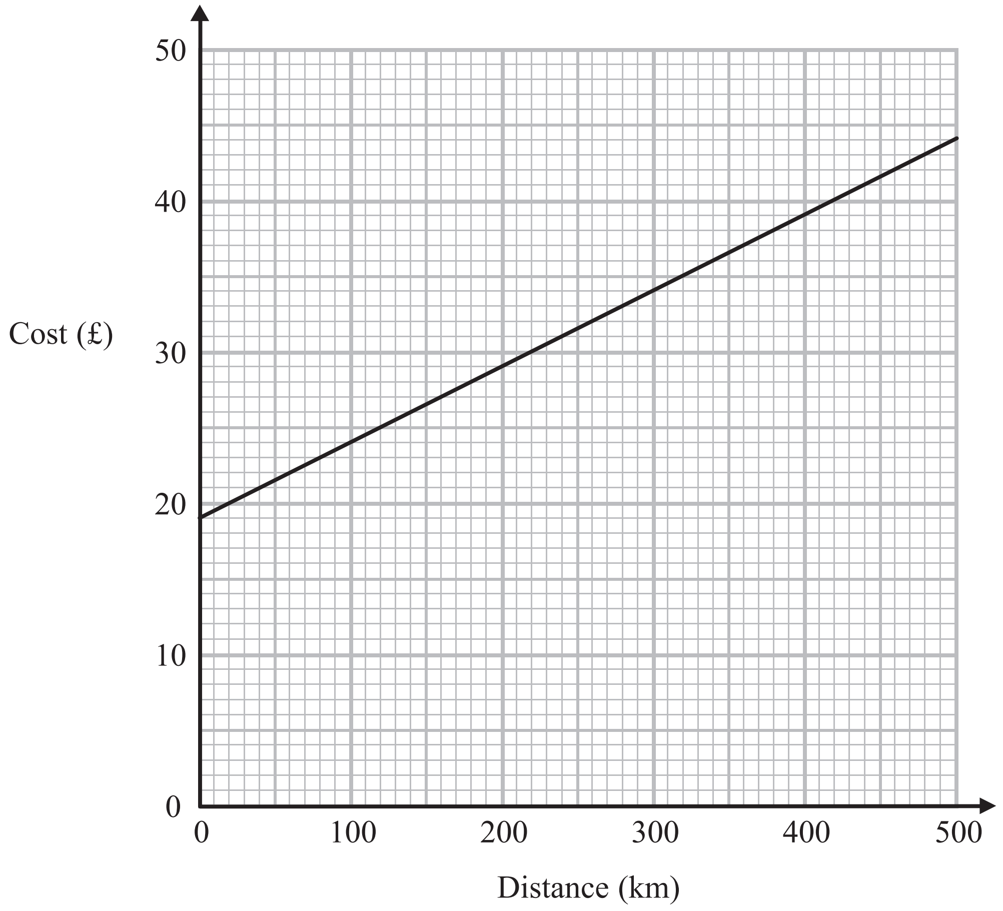
Complete the flow chart.
You must include an output box.



(Total for Question 9 is 5 marks)

10 Isha hires a motorbike.

You can use the graph to work out the cost of hiring the motorbike for different distances travelled.



(a) Work out the gradient of the line on the graph.

....

(2)

Isha used the motorbike to visit a friend.
She estimated the cost of hiring the motorbike.
She travelled 50 km more than she estimated.

Isha paid more than she estimated.

(b) How much more?

....

(2)

(Total for Question 10 is 4 marks)

11 The diagram shows two digital photo frames.

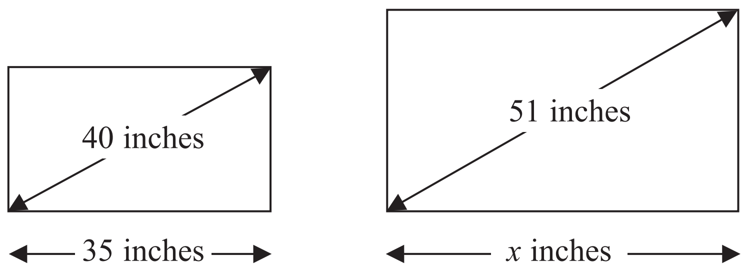

40 inches
35 inches
51 inches
x inches

Diagram **NOT** accurately drawn

The frames are mathematically similar.

Work out the value of x.

.... inches

(Total for Question 11 is 3 marks)

12 The diagram gives information about a room.

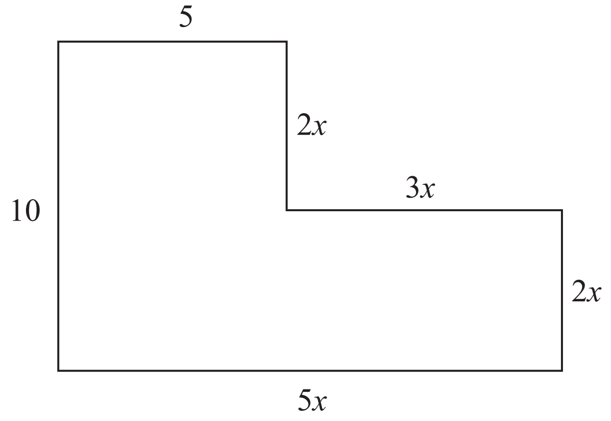


Diagram **NOT** accurately drawn

All the lengths are in metres.
All the corners are right angles.

Find the perimeter of the room.

.... m

(Total for Question 12 is 3 marks)

13 Martha invests £1500 for 2 years in a savings account.
She is paid 5% per annum compound interest.

(a) How much money is in Martha's savings account at the end of 2 years?

£ ....

(3)

Hussein invests £2000 at 0.25% per month compound interest.

(b) Work out the annual equivalent rate (AER).
Give your answer correct to 2 decimal places.
You must show your working.

....%

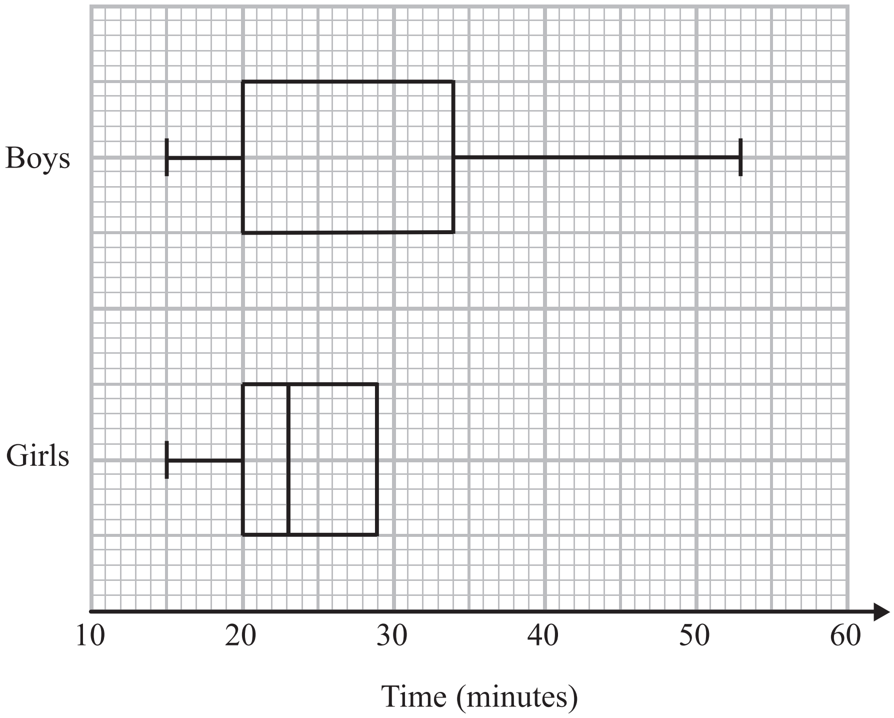
(3)

(Total for Question 13 is 6 marks)

P 4 3 6 0 2 A 0 1 7 2 8

14 The incomplete table and box plots give some information about the times taken, in minutes, by some students to type a letter.

	Boys	**Girls**
Median	26	
Range	38	30
Interquartile range		9



(a) Use the box plots to complete the table.

(2)

(b) Use the table to complete the box plots.

(2)

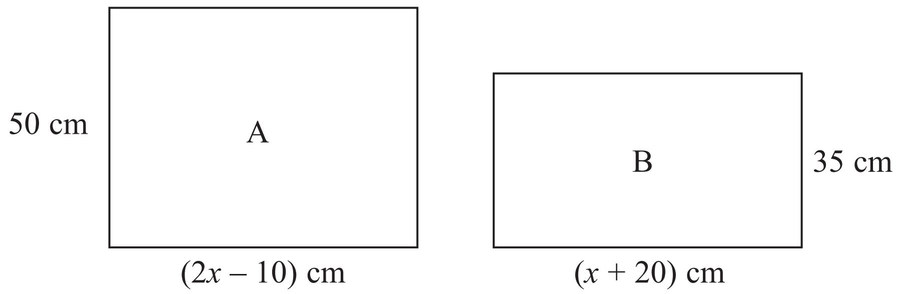
(c) Make two comparisons between the distribution of the times taken by the boys and the distribution of the times taken by the girls.

(2)

(Total for Question 14 is 6 marks)

15 The diagram gives information about two paintings, A and B.
Each painting is in the shape of a rectangle.

Diagram **NOT** accurately drawn



Painting A has an area 1725 cm^2 bigger than the area of painting B.

Work out the area of painting A.

....cm^2

(Total for Question 15 is 4 marks)

16 A human hair has a width of 1.25×10^{-4} m.

(a) Write 1.25×10^{-4} as an ordinary number.

....

(1)

A cat hair has a width of 9×10^{-5} m.

A dog hair has a width 1.25 times greater than the width of a cat hair.

(b) Work out the width of a dog hair.
Give your answer in standard form.

.... m

(2)

(Total for Question 16 is 3 marks)

17 A company sells kites on the internet.
It sells Acrobat kites and Dragon kites.

2 Acrobat kites and 3 Dragon kites have a total weight of 575 g.

3 Acrobat kites and 1 Dragon kite have a total weight of 390 g.

Work out the weight of an Acrobat kite and the weight of a Dragon kite.

Acrobat kite .... g

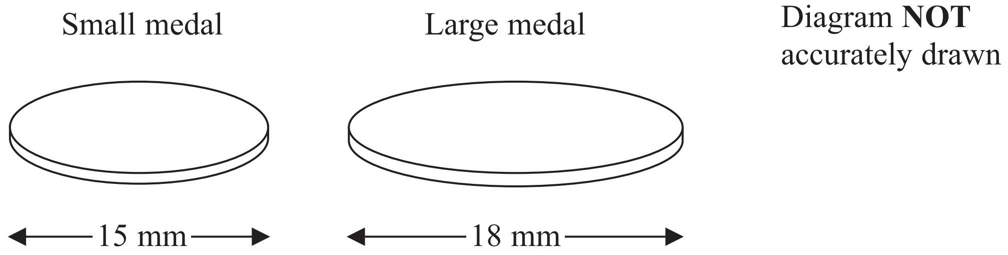
Dragon kite .... g

(Total for Question 17 is 4 marks)

---

18 Fritz makes medals.
He makes small medals and he makes large medals.

The diagram shows a small medal and a large medal.


Small medal
Large medal
Diagram **NOT** accurately drawn
15 mm
18 mm

The medals are mathematically similar.

A small medal has a length of 15 mm.
A large medal has a length of 18 mm.

Each medal is made from silver.
The mass of a small medal is 25 g.

Fritz has 420 g of silver.

Fritz wants to make the same number of small medals as large medals.

(a) Work out the greatest number of medals Fritz can make.

....

(4)

Fritz covers the medals with varnish.

One tin of varnish covers exactly 100 large medals.

(b) Work out the number of small medals one tin of varnish can cover.

.... small medals

(2)

(Total for Question 18 is 6 marks)

---

19 The table shows the number of people who work in each of three factories.

Factory A	**Factory B**	**Factory C**
235	148	309

Kim takes a sample of the people in the three factories.

She takes the same number of people from each of the three factories.

(a) This is **not** a good sample.

Explain why.

....

....

(1)

Vince wants to take a sample of the people in the three factories stratified by factory.

He takes a sample of 20 people from factory A.

(b) Work out the number of people from factory B there should be in the sample.

....

(3)

(Total for Question 19 is 4 marks)

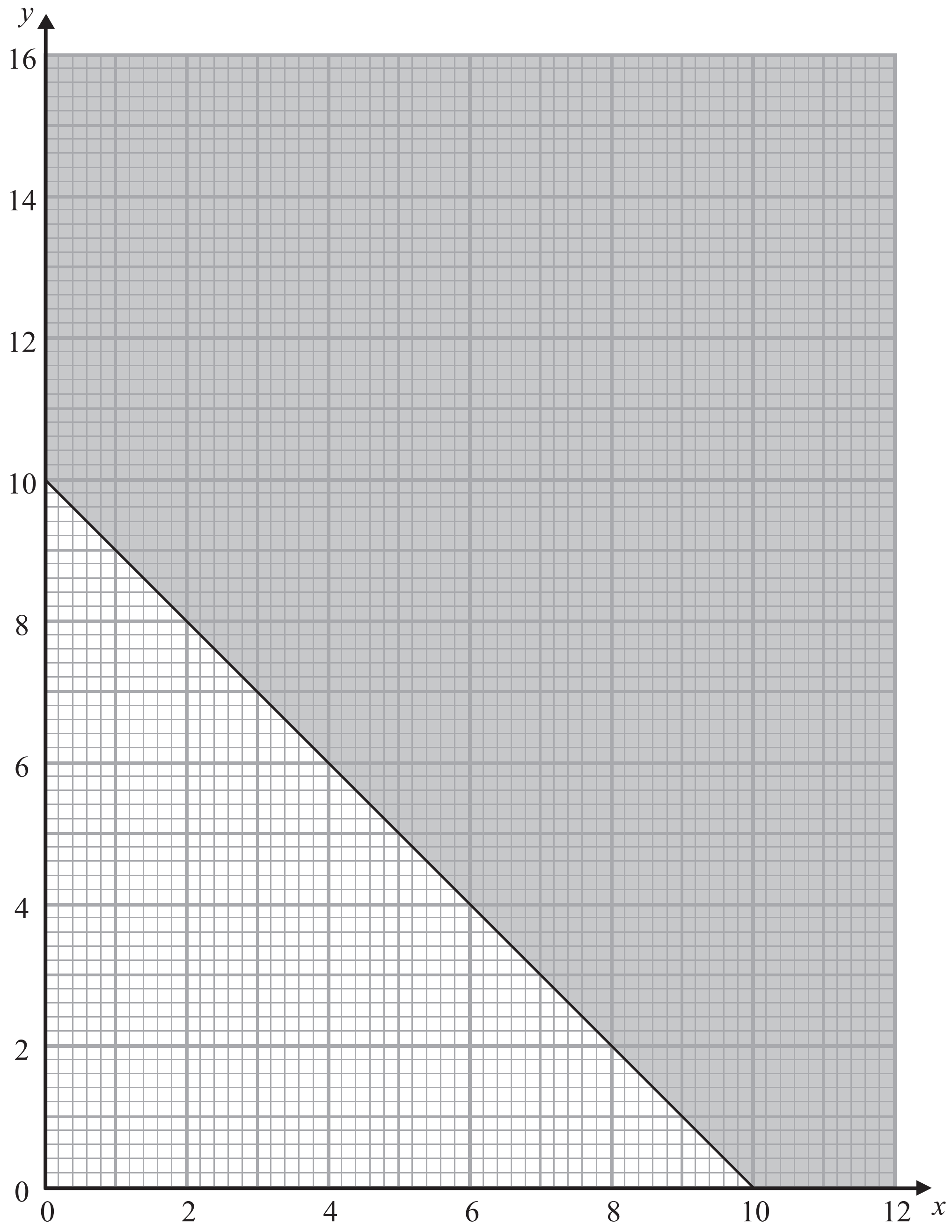
20 Jenna wants to buy some machines for her factory.

She is going to buy

x type A machines

y type B machines.

The unshaded region on the grid gives information about the total number of machines that she can buy.



(a) Write down, in terms of x and y, the inequalities represented by the unshaded region on the grid.

....

(1)

Jenna has a maximum of 192 m^2 of floor space for the machines.

Each type A machine needs 24 m^2 of floor space.
Each type B machine needs 16 m^2 of floor space.

(b) (i) Show that $3x + 2y \leqslant 24$

(ii) Show the region $3x + 2y \leqslant 24$ on the grid.

(4)

Each type A machine makes a profit of £1000 per day.
Each type B machine makes a profit of £750 per day.

Jenna will buy some type A machines and some type B machines.
She wants to make the largest possible profit.

(c) (i) Write down the objective function.

....

(ii) Work out how many of each type of machine Jenna should buy.

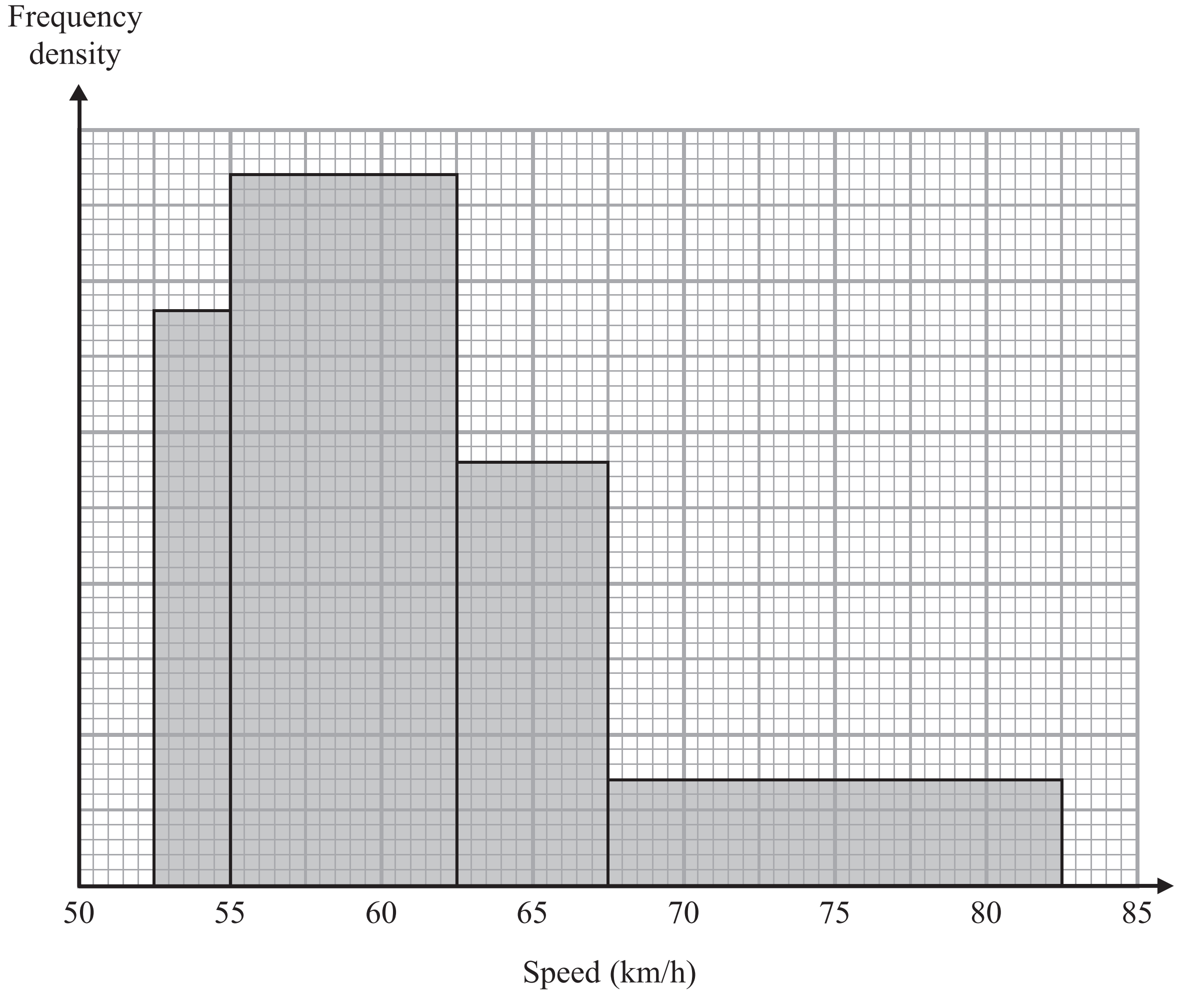
Type A ....

Type B ....

(3)

(Total for Question 20 is 8 marks)

21 The histogram gives information about the speeds, in km/h, of some cars on a road.



Work out an estimate for the median speed.

Give your answer correct to 1 decimal place.

You must show your working.

.... km/h

(Total for Question 21 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

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