

Write your name here

Surname

Other names

Centre Number

Candidate Number

Edexcel GCSE

Applications of Mathematics

Unit 1: Applications 1

For Approved Pilot Centres ONLY

Higher Tier

Tuesday 6 November 2012 – 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

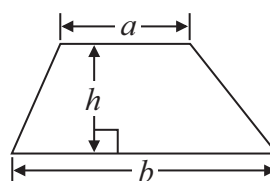
Formulae: Higher Tier

**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 \times length

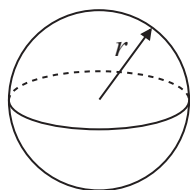


Area of trapezium = $\frac{1}{2} (a + b)h$



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

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

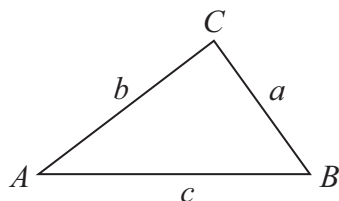


Volume of cone = $\frac{1}{3} \pi r^2 h$

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 Terry and June go on holiday to Norway.

Terry changes £375 into Kroner (Kr).

The exchange rate is £1 = 9.02 Kr.

(a) Work out how many Kroner (Kr) Terry gets for £375

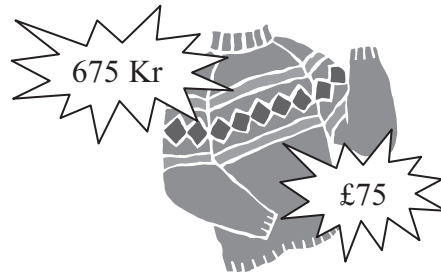
..... Kr

(2)

In Norway June sees a jumper costing 675 Kr.

In London the same type of jumper costs £75

The exchange rate is £1 = 9.02 Kr.



(b) Work out the difference between the cost of the jumper in Norway and the cost of the jumper in London.

.....

(3)

(Total for Question 1 is 5 marks)



2 The diagram shows the plan of a hall floor.

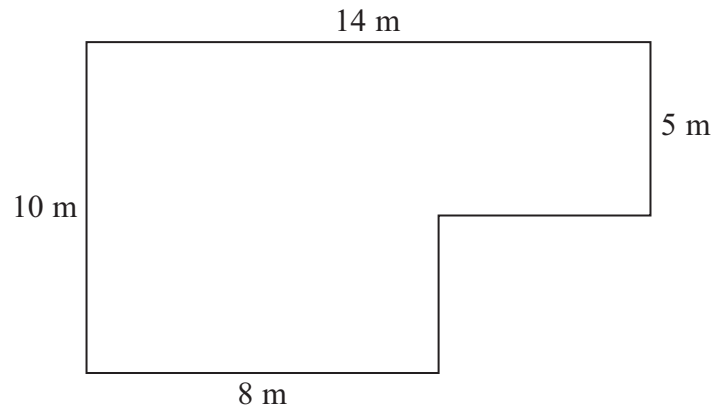


Diagram **NOT** accurately drawn

All the corners are right angles.

Jill is going to paint the hall floor.
It takes her 4 minutes to paint 1 m^2 .

Jill starts painting at 7 am.
She has a 30-minute break at 11 am.

Work out the time Jill should finish painting the hall floor.

.....
(Total for Question 2 is 6 marks)



3 Ben puts a cover over the sandpit in his garden.

The cover is in the shape of a trapezium.

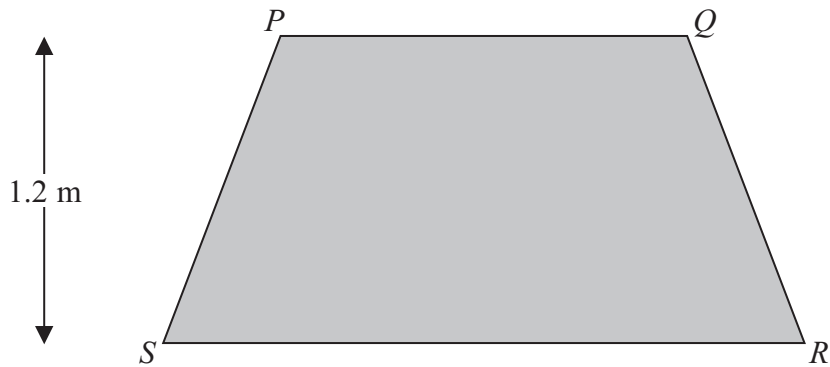


Diagram **NOT** accurately drawn

The cover has a height of 1.2 m.

The length of SR is 1.8 m longer than the length of PQ .

The cover has an area of 4.8 m^2 .

Work out the length of PQ .

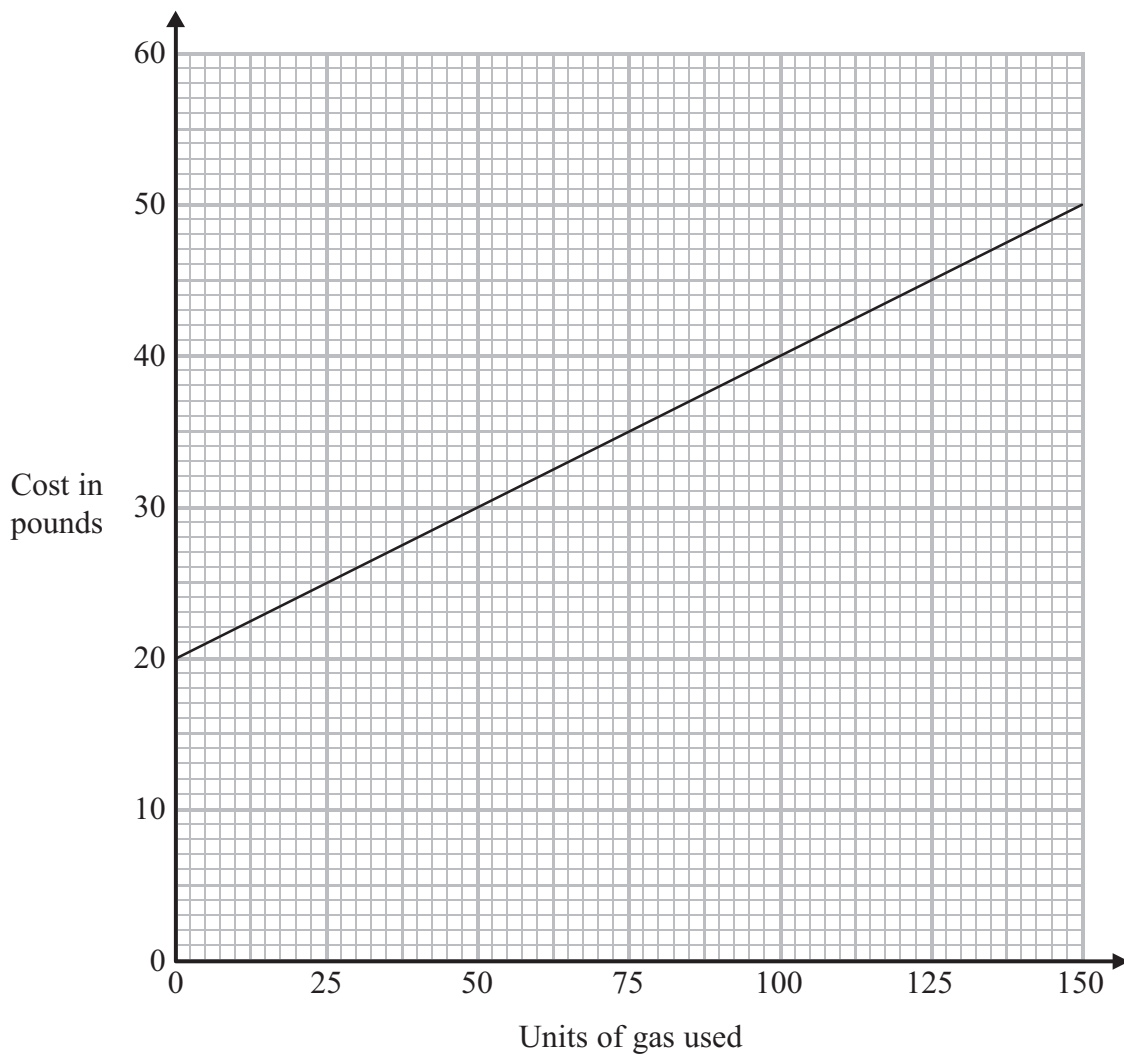
..... m

(Total for Question 3 is 5 marks)



- 4 Simon has gas central heating.
He buys his gas from the Seagas company.

Simon draws this graph to show how much the company charges him for gas each month.



- (a) Find the cost of using 75 units of gas.

£
(1)

- (b) (i) Find the gradient of the straight line graph.

.....

- (ii) What is the cost of each unit of gas?

.....

(3)



Simon wants to compare the cost of two other gas companies with what he pays to Seagas.

Here are their monthly charges.

Sandygas 50p per unit of gas used.

Gas&Air £30 monthly fee.

The first 25 units are free and each extra unit of gas costs 10p.

Simon uses between 75 and 100 units of gas each month.

- ***(c)** Which company gives Simon the best deal, Seagas, Sandygas or Gas&Air?
You must show your working and explain your answer.

(4)

(Total for Question 4 is 8 marks)

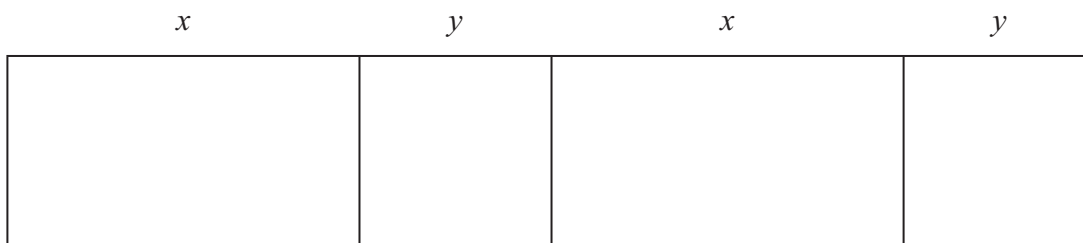


5 Bob owns a shop that sells wallpaper.

Bob sets up a spreadsheet to work out the number of rolls of wallpaper needed for rooms of different sizes.

He ignores the doors and the windows in his calculations.

The diagram shows the four walls of a room.



The length of each long wall is x metres.

The length of each short wall is y metres.

To work out the number of rolls of wallpaper needed Bob has to divide the total wall length by 2

	A	B	C	D
1	Length x	Length y	Total wall length	Rolls of wallpaper
2	5	3		
3				

(a) Write in the formulae that need to go into C2 and D2

C2 Total wall length

D2 Rolls of wallpaper

(4)

(b) Work out the number of rolls of wallpaper needed.

.....

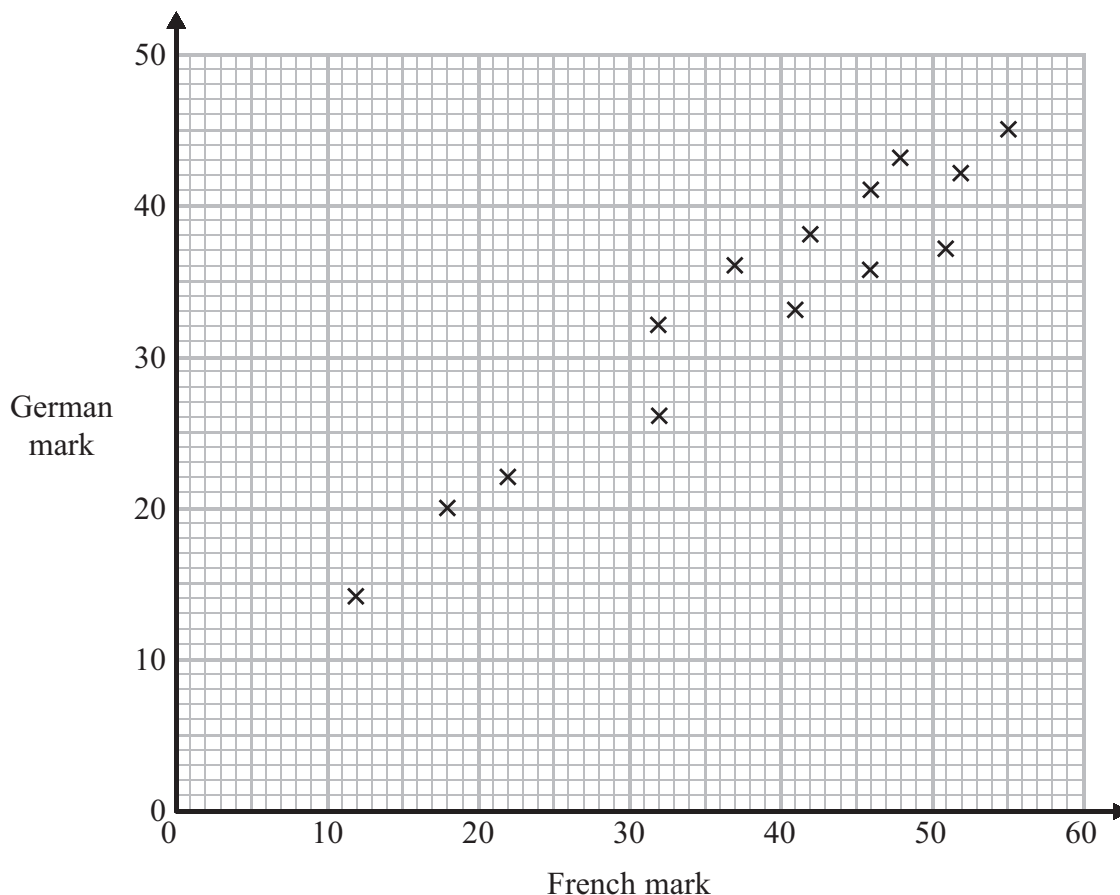
(1)

(Total for Question 5 is 5 marks)



6 Mr Schmit's class did a French test and a German test on Monday.

Mr Schmit drew a scatter graph to show the students' marks.



Two students did the French test and the German test on Wednesday. Here are their marks.

French mark	28	23
German mark	25	26

(a) Plot these marks on the scatter graph.

(1)

(b) What type of correlation does this scatter graph show?

.....
(1)

Nathalie got a mark of 35 in the French test.

She did **not** do the German test.

(c) Estimate the mark Nathalie may have got for the German test.

..... marks
(2)

(Total for Question 6 is 4 marks)



*7 Lisa wants to buy some cola for a party.
She is also going to buy some burgers and some buns.
Cola, burgers and buns are all sold in packs.

There are
8 cans of cola in a pack
12 burgers in a pack
10 buns in a pack

A pack of cola costs £3.95
A pack of burgers costs £4.95
A pack of buns costs £1.95

Lisa is going to buy the same number of cans of cola, and burgers, and buns.
Lisa sees this special offer for cola.

Cola Offer

Buy two packs of cola
Get one pack free



Buy these 2 packs Get this pack free

Work out the cheapest total price Lisa pays for the cola, the burgers, and the buns.
You must show all your working.



£

(Total for Question 7 is 6 marks)



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

8 Ali takes his car to a garage.

The car has a 5000 mile service.
It also has an MOT test.

(a) Work out Ali's total bill.

Costs	
5000 mile service	£79 plus VAT at 20%
10 000 mile service	£99 plus VAT at 20%
MOT test	£39 plus VAT at 20%

£

(3)

Ali bought his car for £20 000

The car depreciated by 20% the first year.
The car depreciated by 10% the second year.

(b) Work out the value of the car at the end of the second year.

£

(3)

(Total for Question 8 is 6 marks)



***9** Ann has some cards.
Beth has 4 cards more than Ann.
Cath has three times as many cards as Beth.

The total number of cards is 51

How many cards does each of the three people have?
You must show all your working.

(Total for Question 9 is 5 marks)



10 Neville saw this car for sale.

He got a discount of 25% off the price of the car.
He paid £7200 for the car.

Work out the price of the car before the discount.



25% off original price
Now £7200

£

(Total for Question 10 is 3 marks)



- 11 The table shows the number of 3D TVs sold by a shop from July 2010 to June 2012
The table also shows some of the 4-point moving averages.

Time period	Number sold	Moving average
Jul 2010 – Sep 2010	0	4.25 8.0 13.75 15.25
Oct 2010 – Dec 2010	1	
Jan 2011 – Mar 2011	6	
Apr 2011 – Jun 2011	10	
Jul 2011 – Sep 2011	15	
Oct 2011 – Dec 2011	24	
Jan 2012 – Mar 2012	12	
Apr 2012 – Jun 2012	36	

- (a) Work out the missing 4-point moving average.

.....
(2)

- (b) Explain what these moving averages show.

.....
(1)

(Total for Question 11 is 3 marks)



12 There are 80 singers in a choir.

The cumulative frequency table gives information about the ages of the 80 singers.

Age (A) in years	Cumulative frequency
$20 < A \leq 30$	2
$20 < A \leq 40$	15
$20 < A \leq 50$	30
$20 < A \leq 60$	52
$20 < A \leq 70$	80

(a) On the grid opposite, draw a cumulative frequency graph for this information.

(2)

(b) Use your cumulative frequency graph to find an estimate for

(i) the median age,

.....

(ii) the interquartile range.

.....

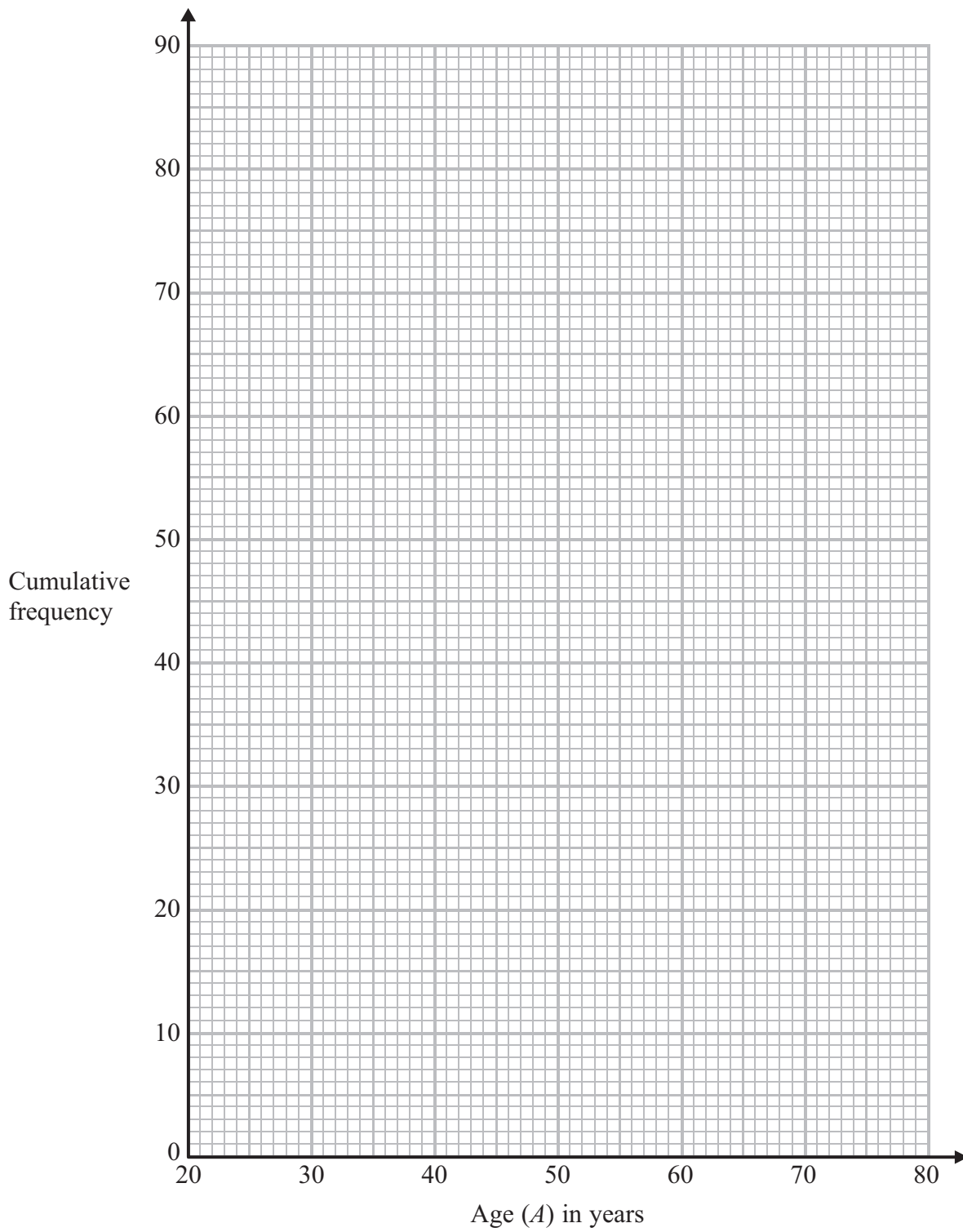
(3)

(c) Find an estimate for the number of singers over 63 years old.

.....

(2)





(Total for Question 12 is 7 marks)



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

13 Joe and Ann buy some fruit from the same shop.

Joe buys 4 apples and 3 bananas for £2.50

Ann buys 3 apples and 4 bananas for £2.40

Work out the cost of

- (i) one apple,
- (ii) one banana.

(i) one apple p

(ii) one banana p

(Total for Question 13 is 5 marks)



14 The distance of the Earth from the Sun is 93 million miles.

(a) Write 93 million in standard form.

.....
(1)

The distance of the Moon from the Earth is 2.49×10^5 miles.

(b) Write 2.49×10^5 as an ordinary number.

.....
(1)

Ångström units are used to measure the diameter of atoms.
One Ångström unit is 1×10^{-10} metres.

(c) How many Ångström units are there in 1 cm?

.....
(1)

(Total for Question 14 is 3 marks)



***15** Ade wants to compare the heights of the same type of plant in two different habitats.
All the measurements are in centimetres.

Here are the heights of 15 plants in a Marshland habitat.

87	95	98	102	102	105	107	107
110	112	115	119	120	125	135	

Here is some information about the heights of the plants in a Mountain habitat.

Smallest	25
Largest	103
Median	85
Lower quartile	65
Upper quartile	99

Compare the two distributions.

.....

.....

.....

.....

.....

.....

(Total for Question 15 is 3 marks)



16 Here is part of a structure for a building.

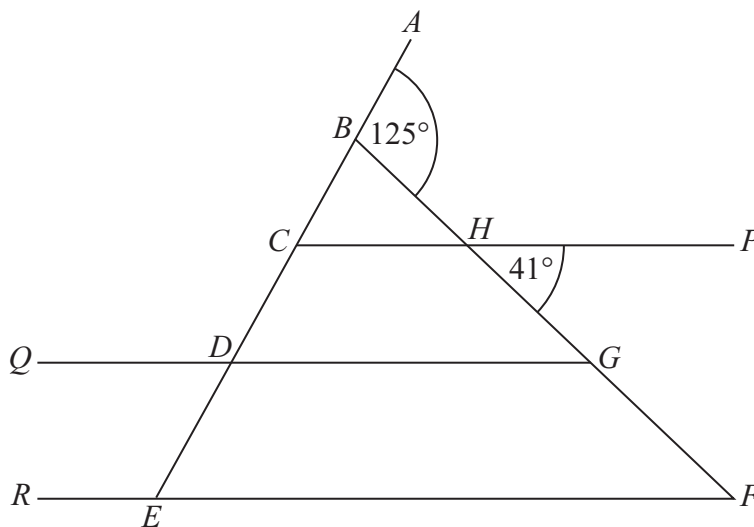


Diagram **NOT** accurately drawn

Triangles BCH , BDG and BEF are similar triangles.

Angle $ABH = 125^\circ$.

Angle $PHG = 41^\circ$.

(a) Find the size of angle RED .

.....
(3)

$BC = CD = DE = 10$ m.

$DG = 24$ m.

(b) Find the length of

(i) CH ,

..... m

(ii) EF .

..... m
(4)

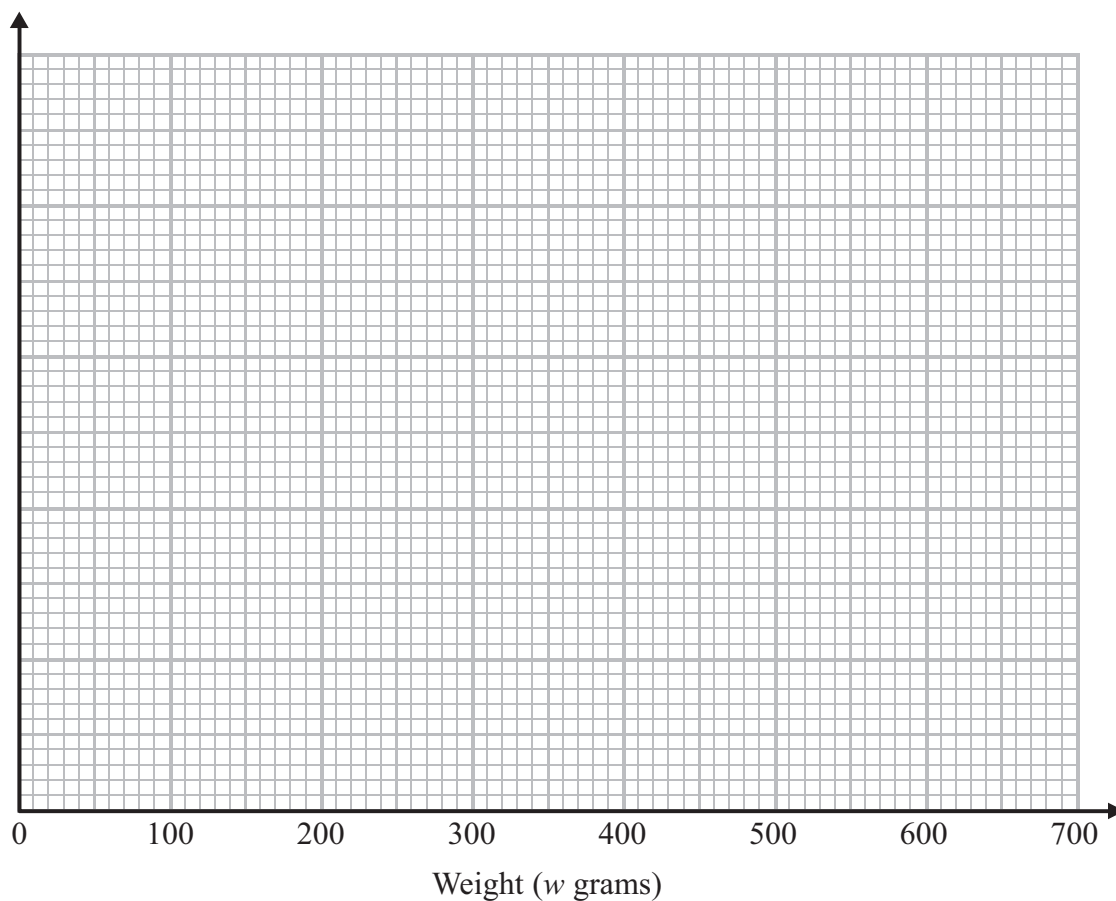
(Total for Question 16 is 7 marks)



17 The table shows some information about the weights of the fish Ryan caught last week.

Weight (w grams)	Frequency
$0 < w \leq 100$	2
$100 < w \leq 200$	4
$200 < w \leq 250$	8
$250 < w \leq 300$	6
$300 < w \leq 400$	12
$400 < w \leq 650$	5

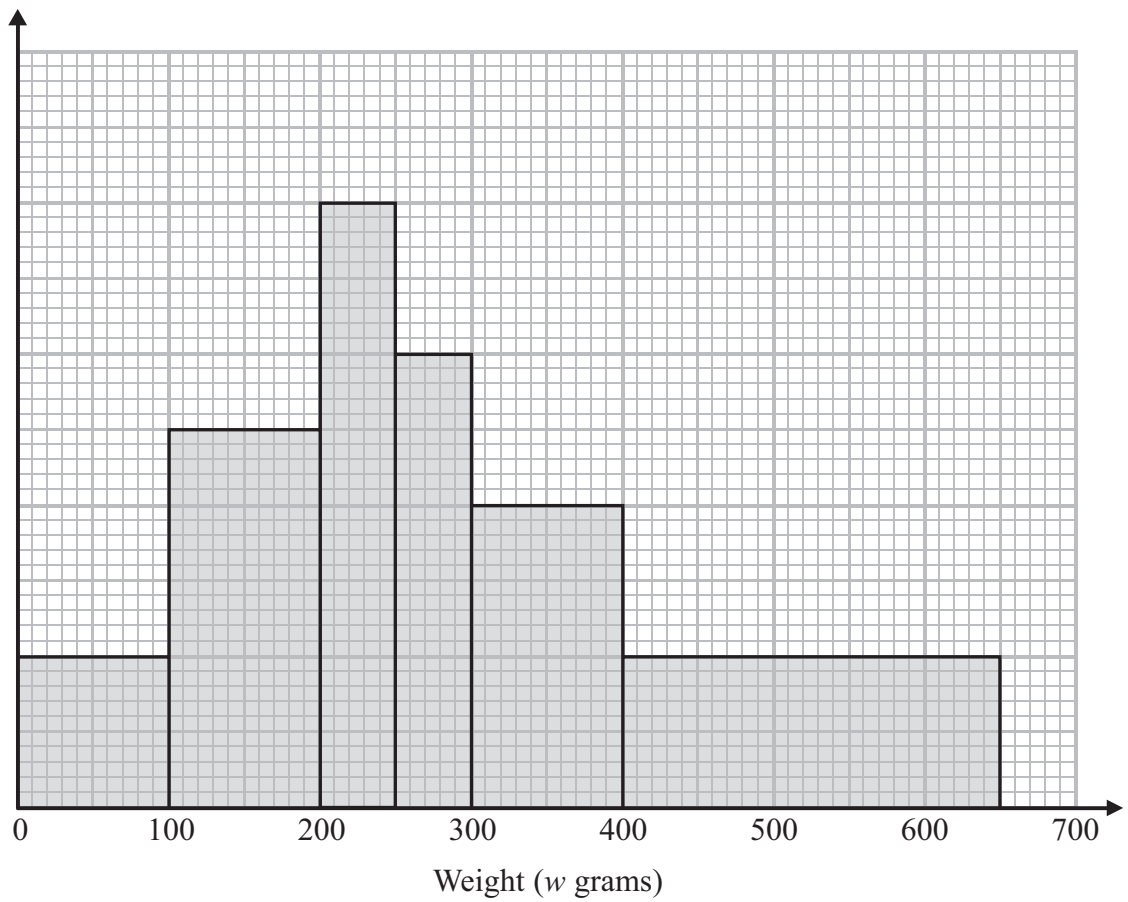
(a) Use the information in the table to draw a histogram.



(3)



David drew this histogram for the weights of the fish he caught last week.



David caught 23 fish last week.

David took home all the fish with a weight of more than 450 g.

- (b) What percentage of the number of fish David caught did he take home?
Give your answer correct to 3 significant figures.

.....%

(3)

(Total for Question 17 is 6 marks)



18 A company has two types of lorry, Type A and Type B.

The company has 6 Type A lorries
4 Type B lorries.

Type A lorries can carry up to 10 tonnes of recycled waste.
Type B lorries can carry up to 15 tonnes of recycled waste.

Type A lorries can make up to 8 return journeys each day.
Type B lorries can make up to 6 return journeys each day.

The company has 8 drivers.

The drivers are allocated a Type A lorry or a Type B lorry to drive each day.

The company has to move at least 540 tonnes of recycled waste each day.

Let t represent the number of Type A lorries used one day.

Let f represent the number of Type B lorries used the same day.

(a) Explain why

(i) $t + f \leq 8$

(ii) $80t + 90f \geq 540$

(2)

(b) Write down two additional inequalities involving t and f .

$t \geq 0, f \geq 0$

(1)

(c) On the grid, show by shading, the feasible region that satisfies the conditions.

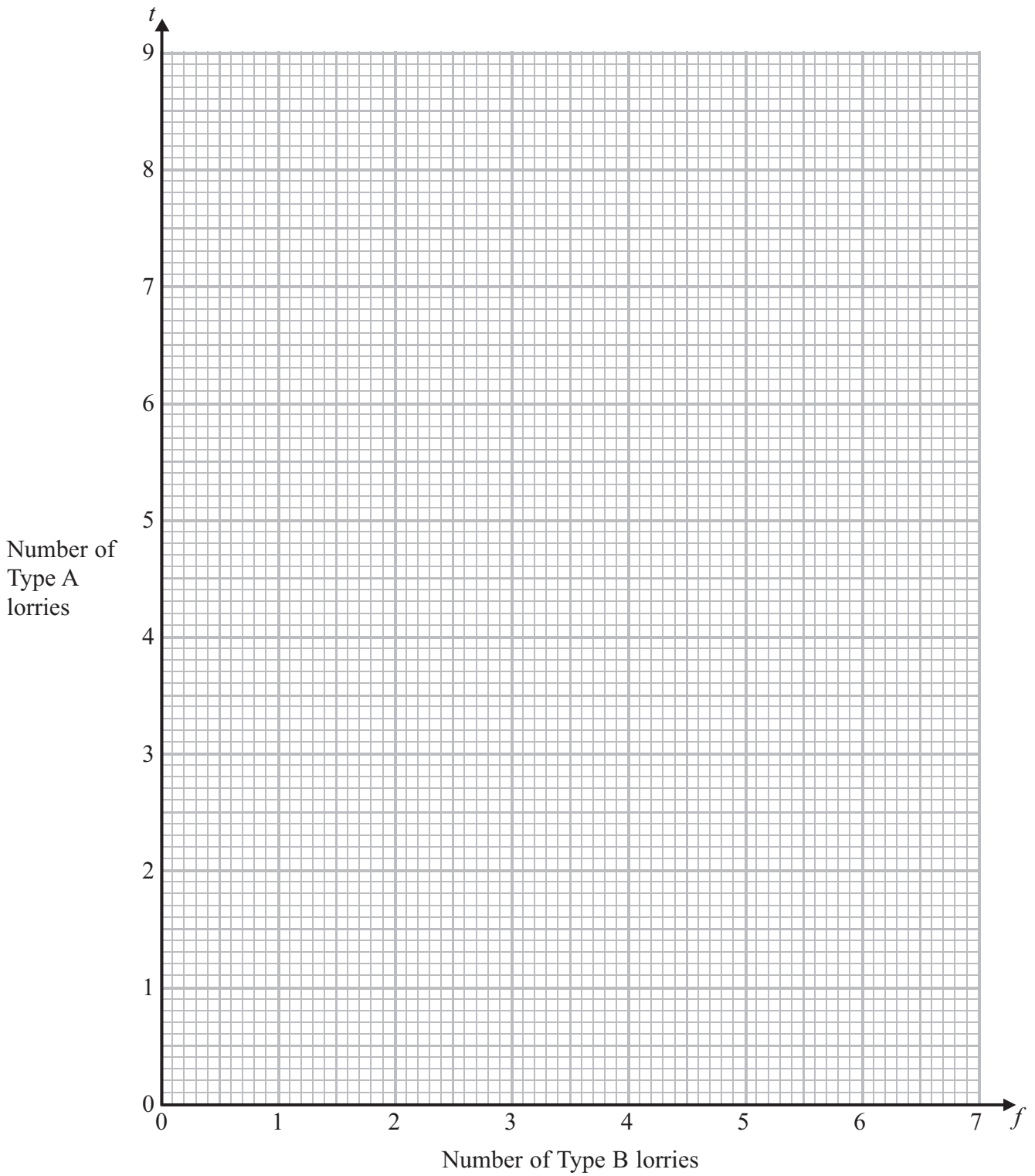
(2)

Each day the company makes a profit of
£200 when a Type A lorry is used,
£150 when a Type B lorry is used.

(d) How many of each type of lorry should the company use each day to maximise their profit?

(2)





(Total for Question 18 is 7 marks)



P 4 0 6 8 1 A 0 2 5 2 8

19 Eve sells coffee pots in 3 sizes.



Small



Medium



Large

All the coffee pots are mathematically similar.

The small coffee pot holds 512 ml of coffee.

The large coffee pot holds 1l of coffee.

The small coffee pot has a height of 12 cm.

(a) Work out the height of the large coffee pot.

..... cm

(3)

The medium coffee pot has a height of 13.5 cm.

(b) Work out how much coffee the medium coffee pot holds.

..... ml

(3)

(Total for Question 19 is 6 marks)

TOTAL FOR PAPER IS 100 MARKS



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