

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

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Thursday 7 November 2019

Morning (Time: 1 hour 30 minutes)

Paper Reference **1MA1/2F**

Mathematics

Paper 2 (Calculator)

Foundation Tier

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.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **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 80
- 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.
- 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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Worked Solutions



Pearson

Please note that these worked solutions have neither been provided nor approved by Pearson Education and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue should be written in the exam.

Anything written in green in a rectangle doesn't have to be written in the exam.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 Write these numbers in order of size.
Start with the smallest number.

8 -4 1 -7 -2

The less positive or the more negative a number is, the smaller it is

..... -7, -4, -2, 1, 8

(Total for Question 1 is 1 mark)

2 Write the number 8375 correct to the nearest thousand.

The 8 is in the thousands place. The 3 in the next place causes it to round down and everything after the thousands is ignored and set to 0

..... 8000

(Total for Question 2 is 1 mark)

3 Write 0.23 as a percentage.

To convert a decimal to a percentage, multiply it by 100

..... 23 %

(Total for Question 3 is 1 mark)

4 Find the value of $\sqrt{17.64}$

Type into the calculator

..... 4.2

(Total for Question 4 is 1 mark)

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2

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5 Find the value of 6^5

Type into the calculator

7776

(Total for Question 5 is 1 mark)

6 There are 14 rows of seats in a cinema.
There are 15 seats in each row.

A film was shown in the cinema on Saturday.
Each ticket for the film cost £6.50

The tickets that were sold cost a total of £1274

How many tickets were **not** sold?

$14 \times 15 = 210$ ← Multiplying the 14 rows by the 15 seats in each row works out that there are 210 seats

$1274 \div 6.50$ ← Dividing the £1274 total cost of all the tickets by the £6.50 for each ticket works out that 196 tickets were sold

$210 - 196$ ← Subtracting the 196 tickets sold from the 210 seats works out that 14 tickets were not sold

14

(Total for Question 6 is 3 marks)

- 7 Harry has 20 sweets.
He gives 7 of the sweets to Nadia.

What fraction of the 20 sweets does Harry have now?

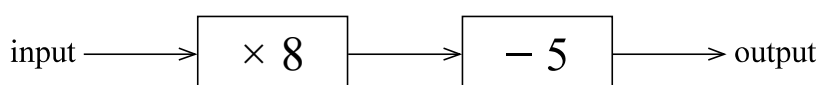
$20 - 7$ ← Subtracting the 7 sweets given from the 20 sweets works out that there are 13 sweets left

Expressing the 13 sweets left as a fraction of the 20 sweets

$$\frac{13}{20}$$

(Total for Question 7 is 2 marks)

- 8 Here is a number machine.



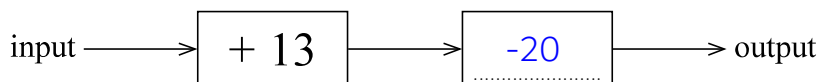
(a) Work out the output when the input is 6

6×8 ← Taking the input and multiplying it by 8. Then subtracting 5 from the result
 $48 - 5$ ←

$$43$$

(1)

Here is a different number machine.



When the input is 17, the output is 10

(b) Complete the number machine.

$17 + 13$ ← Adding 13 to the input gives 30

$30 - 10$ ← Subtracting the output from the 30 works out that the difference is 20. This is what could be subtracted from the 30 to get 10

(1)

(Total for Question 8 is 2 marks)

9 Here is a list of numbers.

6 4 8 9 4 3

(a) Work out the median.

3, 4, 4, 6, 8, 9

Writing the numbers in order then underlining from either end until the two middle numbers are found

$\frac{4+6}{2}$

Working out the mean of 4 and 6 works out what is halfway between them

$\frac{5}{(2)}$

Aisha picks at random one of the numbers.

(b) What is the probability that she picks an odd number?

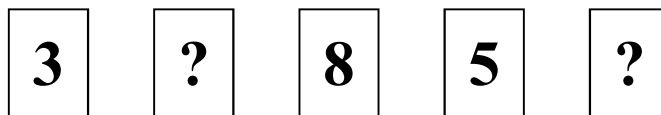
The 9 and 3 are odd. 2 out of the 6 numbers are odd

$\frac{2}{6}$
 (2)

Clara has five cards.

There is a number on each card.

Two of the numbers are hidden.



The mode of the five numbers is 3
The mean of the five numbers is 5

One of the hidden numbers must be 3 in order for the mode to be 3 as then 3 would appear more times than any other number

(c) Work out the two numbers that are hidden.

$\frac{t}{m \ n}$

Writing a formula triangle for mean, where m is mean, t is the total of all the numbers and n is the number of numbers

5×5

Covering t in the formula triangle finds that total = mean \times number. The mean is 5 and the number of numbers is 5. So the total of the numbers is 25

$25 - 3 - 3 - 8 - 5$

Subtracting the known numbers from the total leaves the other hidden number

$\frac{3}{(2)}, \frac{6}{(2)}$

(Total for Question 9 is 6 marks)

10 Here is the charge at a car park in Spain.

<p>Car park</p> <p>0.024 euros per minute</p>
--

Jon parked his car in this car park.

Jon drove into the car park at 10 45

When he drove out of the car park he had to pay 8.40 euros.

At what time did Jon drive out of the car park?

$$\frac{8.40}{0.024}$$

This works out how many lots of 0.024 euros were spent and so how many minutes the car was in the car park. The car was in the car park for 350 minutes

$$10^{\circ}45' + 0^{\circ}35'$$

Adding the 350 minutes to the 10 45 by entering them as sexagesimals on the calculator

16°35'0" can be read as 16 35

16 35

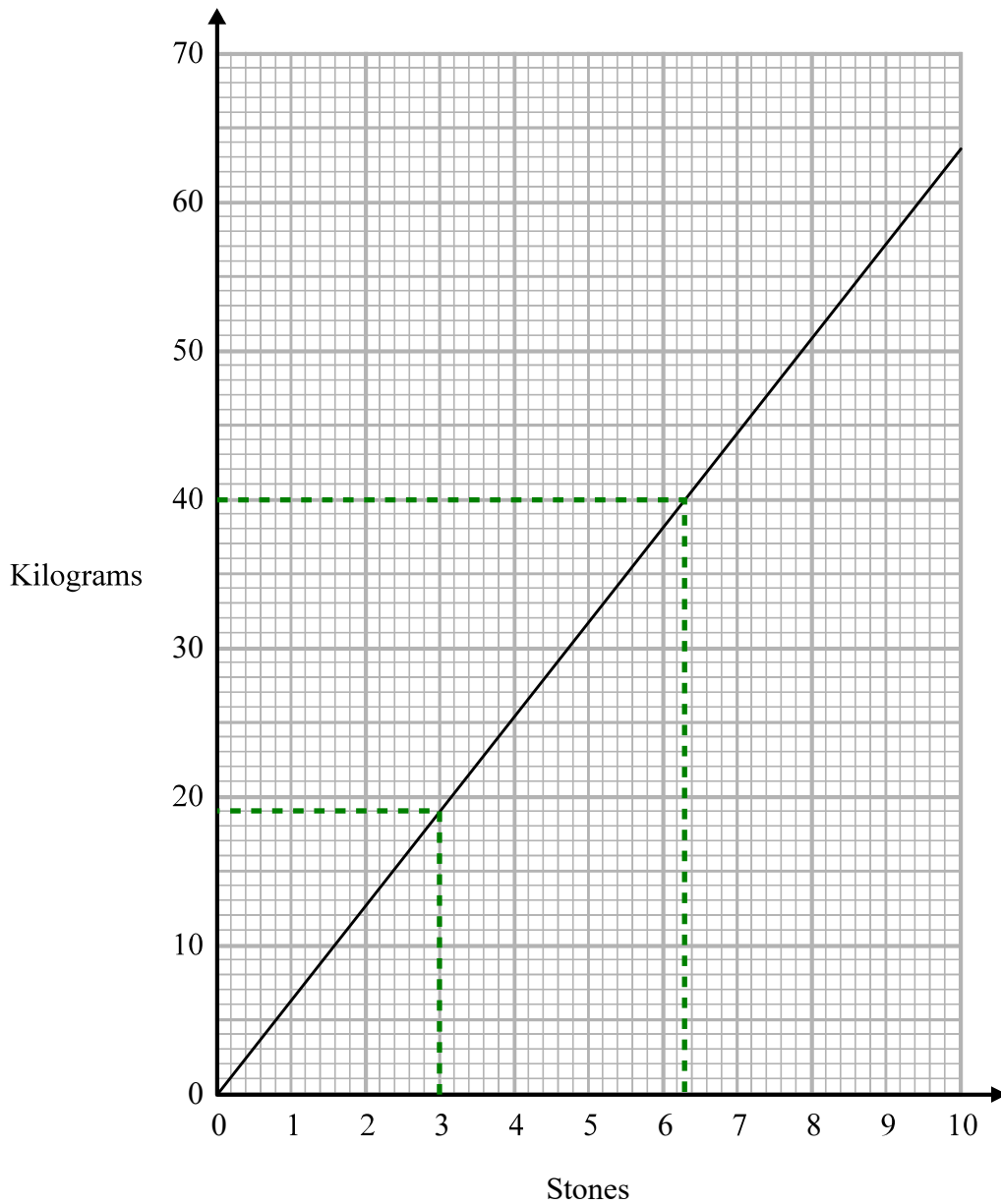
(Total for Question 10 is 3 marks)

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11 You can use this graph to change between stones and kilograms.



(a) Change 3 stones to kilograms.

Reading up from 3 stones to the line then across converts it into kilograms 19 kilograms
(1)

(b) Change 80 kilograms to stones.

6.3 × 2 ← 40 is the largest factor of 80 within the range of data given on the graph. Reading across from 40 kg to the line then down finds that this is 6.3 stones. 40 kg is half of 80 kg so the 6.3 stones must be multiplied by 2
..... 12.6 stones
(2)

(Total for Question 11 is 3 marks)

12 Find the number that is exactly halfway between $\frac{1}{10}$ and $\frac{3}{5}$

$$\frac{1}{10} + \frac{3}{5} \leftarrow \text{Adding the two fractions works out that they have a total of } \frac{7}{10}$$

$$\frac{7}{10} \div 2 \leftarrow \text{Dividing the total by 2 (as there are 2 fractions) works out that the mean is } \frac{7}{20}, \text{ which is halfway between the two fractions}$$

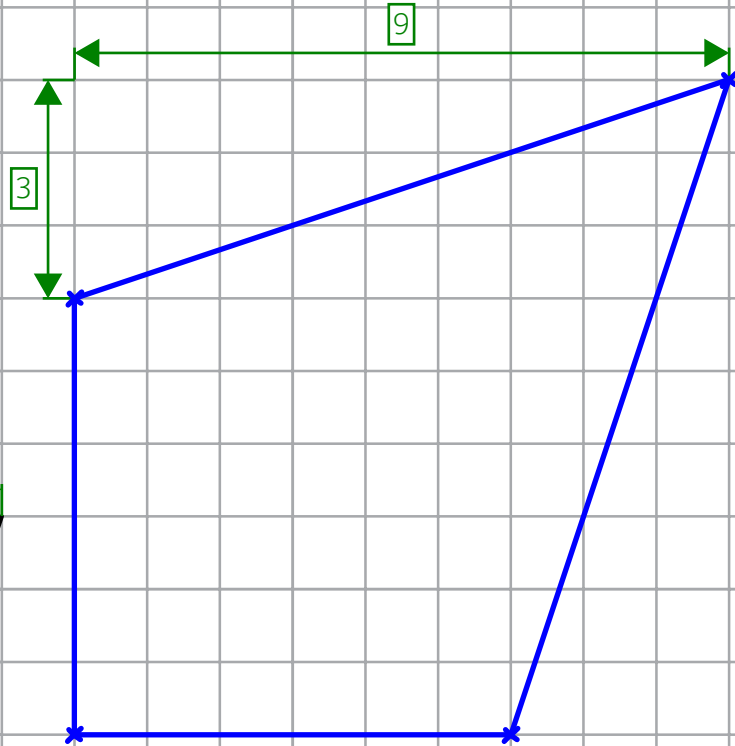
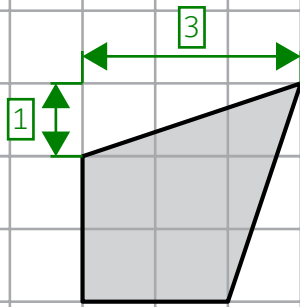
$$\frac{7}{20}$$

(Total for Question 12 is 2 marks)

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On the grid, draw an enlargement of the shaded shape with a scale factor of 3

(Total for Question 13 is 2 marks)

Multiplying all the sides by 3

- 14 A shop sells compost in 20 litre bags and in 40 litre bags.
One day the shop had two special offers for the compost.



Which offer is the better value for money?
You must show how you get your answer.

- 20×2 ← This works out that 40 litres are bought using the first offer
- $350 \div 40 = 8.75$ ← Dividing the cost of 350p by 40 litres works out that it costs 8.75p per litre for the first offer
- 40×3 ← This works out that 120 litres are bought using the second offer
- $900 \div 120 = 7.5$ ← Dividing the cost of 900 by 120 litres works out that it costs 7.5p per litre for the second offer
- 40 litre bags ← 7.5p per litre is less than 8.75p per litre so is better value

(Total for Question 14 is 3 marks)

15 The length of a plane is 19.2 metres.

Lukas buys a scale model of the plane.
The scale of the model is 1 : 24

Work out the length of the scale model of the plane.
Give your answer in centimetres.

$$19.2 \times 100$$

1 metre = 100 centimetres. So multiplying the 19.2 metres by 100 converts it to 1920 centimetres

$$1920 \div 24$$

The 24 parts of the ratio representing the actual length is 24 times greater than the 1 part representing the length of the scale model. So dividing the actual length by 24 works out the length of the scale model

.....80..... centimetres

(Total for Question 15 is 3 marks)

16 Maria invests £4500 in a savings account for 3 years.
The account pays simple interest at a rate of 1.8% per year.

Work out the total amount of interest Maria gets by the end of the 3 years.

$$\frac{1.8}{100} \times 4500$$

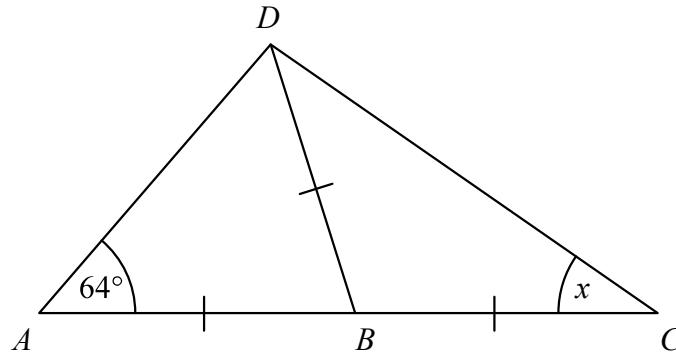
Putting the 1.8% over 100 converts it to a fraction. Doing this fraction of the £4500 works out that 1.8% of £4500 is £81

$$81 \times 3$$

As it is simple interest, the amount of interest is the same every year so multiplying the £81 by 3 works out the interest by the end of the 3 years

£.....243.....

(Total for Question 16 is 2 marks)



ABC is a straight line.

$AB = BC = BD$.

Angle $DAB = 64^\circ$

Work out the size of the angle marked x .

Give a reason for each stage of your working.

Angle $ADB = 64^\circ$ as base angles of an isosceles triangle are equal

Triangle ABD is isosceles as it has two equal sides. The base angles are opposite the equal sides

$180 - 64 - 64$

Angle $ABD = 52^\circ$ as angles in a triangle add up to 180°

Subtracting angle BAD and angle ADB from 180° leaves angle ABD

$180 - 52$

Angle $DBC = 128^\circ$ as angles around a point on a straight line add up to 180°

Subtracting angle ABD from 180° leaves angle DBC

$180 - 128$

$52 \div 2$

$x = 26$ as base angles of an isosceles triangle are equal and angles in a triangle add up to 180°

Triangle DBC is isosceles as it has two equal sides. The base angles are opposite the equal sides. Subtracting angle DBC from 180° gives the total of angle x and angle BDC . Dividing this total by the 2 equal angles gives angle x

(Total for Question 17 is 4 marks)

- 18 Ben is n years old.
 Chloe is twice as old as Ben.
 Dan is five years younger than Ben.

The total of Ben's age, Chloe's age and Dan's age is T years.

- (a) Find a formula for T in terms of n .

Adding together all of their ages gives the total age, T . Ben is n , Chloe is $2n$ and Dan is $n - 5$. The formula does not need to be simplified

$$T = n + 2n + n - 5$$

(3)

- (b) In the table below, put a tick (✓) in the box next to the identity.

$3h + 2 = 14$	
$3a + 4b - 2c$	
$A = \pi r^2$	
$5m - 3m = 2m$	✓
$x + 7 \leq 12$	

It is true for all values of m

(1)

(Total for Question 18 is 4 marks)

19 Here are the ingredients needed to make 16 biscuits.

<p style="text-align: center;">Biscuits</p> <p style="text-align: center;">Ingredients to make 16 biscuits</p> <p style="text-align: center;">175 g of butter 75 g of sugar 250 g of flour</p>
--

Anna has

500 g of butter
300 g of sugar
625 g of flour

Work out the greatest number of biscuits Anna can make.

$$500 \div 175 = 2.8\dots$$

$$300 \div 75 = 4$$

$$625 \div 250 = 2.5$$

Dividing the amount of ingredients she has by the amount of each ingredient needed to make 16 works out how many lots of the 16 biscuits can be made. The 2.5 is the smallest amount therefore the flour is the limiting factor. Only 2.5 lots of the 16 biscuits can be made

$$16 \times 2.5$$

Doing 2.5 lots of the 16 biscuits

40

(Total for Question 19 is 3 marks)

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20 An estimate of the height, H metres, of a tall building can be found using the formula

$$H = 4f + 12$$

where the building is f floors high.

A tall building is 110 floors high.

The real height of the building is 442 m.

Seb uses the formula to find an estimate of the height of this building.

He then finds the difference between his estimate and the real height.

Show that this difference is less than 5% of the real height.

$$4 \times 110 + 12$$

Substituting 110 for f in the right side of the formula finds that the estimated height is 452 m

$$452 - 442$$

Subtracting the real height from the estimated height works out that the difference is 10 m

$$\frac{10}{442} \times 100 = 2.2\ldots\%$$

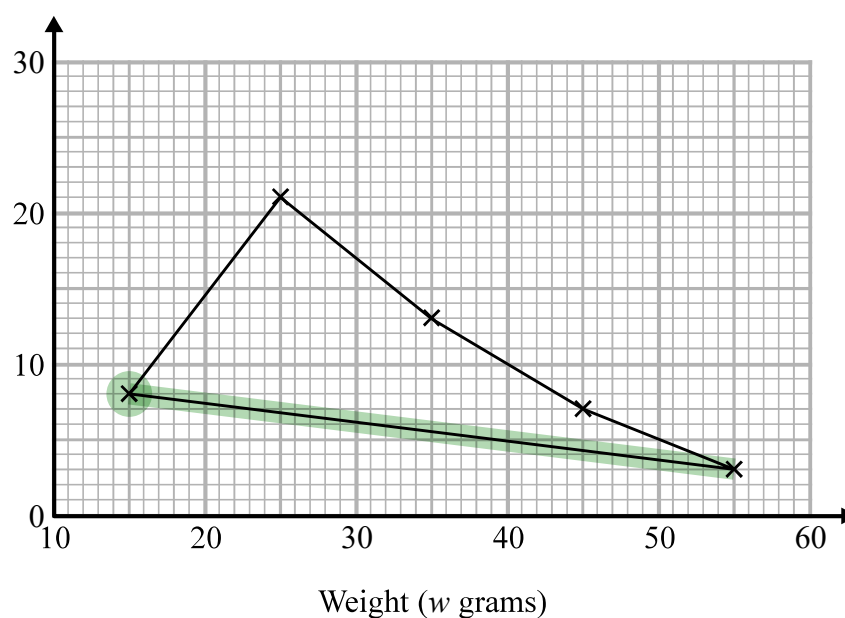
Putting the difference of 10 m over the 442 m expresses the difference as a fraction of the real height. Multiplying this by 100 converts it to a percentage, which is less than 5%

(Total for Question 20 is 4 marks)

21 The table shows some information about the weights of 50 potatoes.

Weight (w grams)	Frequency
$10 < w \leq 20$	6
$20 < w \leq 30$	21
$30 < w \leq 40$	13
$40 < w \leq 50$	7
$50 < w \leq 60$	3

Iveta drew this frequency polygon for the information in the table. The frequency polygon is **not** fully correct.



Write down **two** things that are wrong with the frequency polygon.

1 The first point is not plotted at 6

2 There should not be a line connecting the first and last point

(Total for Question 21 is 2 marks)

22 The length of a pencil is 128 mm correct to the nearest millimetre.

Complete the error interval for the length of the pencil.

$128 \pm \frac{1}{2}$

Adding and subtracting half of the resolution (which is 1 as it is to the nearest 1 millimetre) works out the upper and lower bound

$$\dots\dots\dots 127.5 \dots\dots \text{ mm} \leq \text{length} < \dots\dots\dots 128.5 \dots\dots \text{ mm}$$

(Total for Question 22 is 2 marks)

23 Tom and Adam have a total of 240 stamps.

The ratio of the number of Tom's stamps to the number of Adam's stamps is 3 : 7

Tom buys some stamps from Adam.

The ratio of the number of Tom's stamps to the number of Adam's stamps is now 3 : 5

How many stamps does Tom buy from Adam?

You must show all your working.

$240 \div 10$

3 + 7 = 10 parts in total in the 1st ratio, which represent the total of 240 stamps. Dividing the 240 stamps by the 10 parts works out that 1 part of the 1st ratio is worth 24 stamps

$24 \times 3 = 72$

Multiplying the value of 1 part of the 1st ratio by the 3 parts which represent the number of Tom's stamps works out that Tom had 72 stamps

$240 \div 8$

3 + 5 = 8 parts in total in the 2nd ratio, which represent the total of 240 stamps. Dividing the 240 stamps by the 8 parts works out that 1 part of the 2nd ratio is worth 30 stamps

30×3

Multiplying the value of 1 part of the 2nd ratio by the 3 parts which represent the number of Tom's stamps works out that Tom now has 90 stamps

$90 - 72$

Subtracting the 72 stamps Tom had from the 90 stamps Tom now has works out that Tom bought 18 stamps from Adam

..... 18

(Total for Question 23 is 4 marks)

- 24 Each person in a fitness club is going to get a free gift.
Stan is going to order the gifts.

Stan takes a sample of 50 people in the fitness club.
He asks each person to tell him the gift they would like.

The table shows information about his results.

Gift	Number of people
sports bag	17
gym towel	7
headphones	11
voucher	15

There are 700 people in the fitness club.

- (i) Work out how many sports bags Stan should order.

$$\frac{17}{50} \times 700$$

17/50 is the fraction of the sample which chose sports bag so he should order this fraction of the 700 people

238

(2)

- (ii) Write down any assumption you made **and** explain how this could affect your answer.

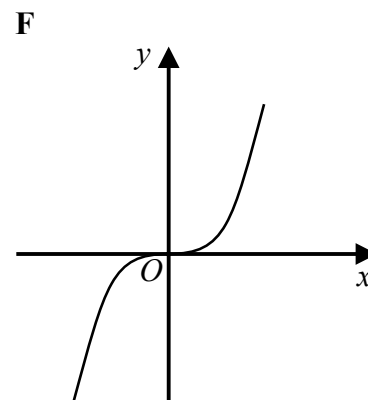
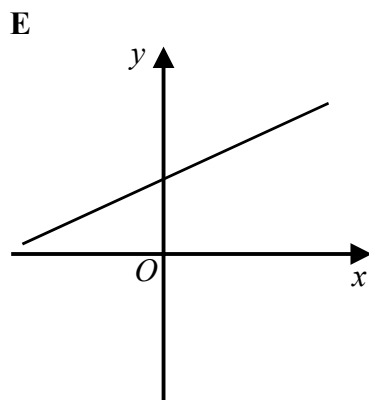
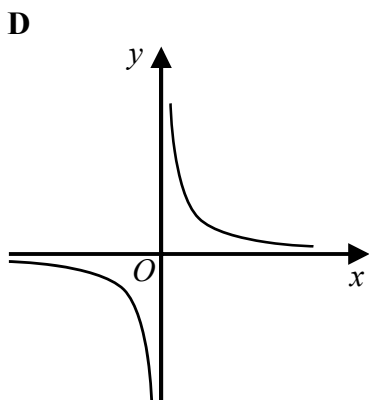
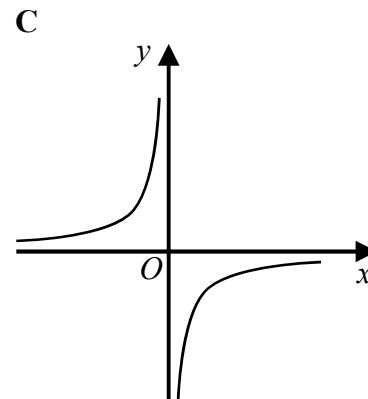
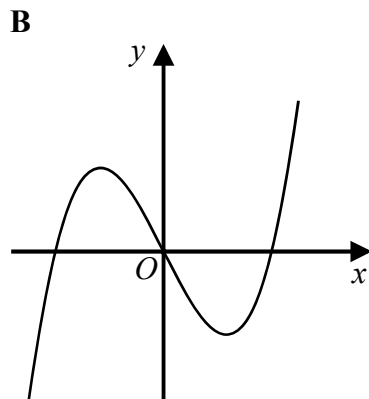
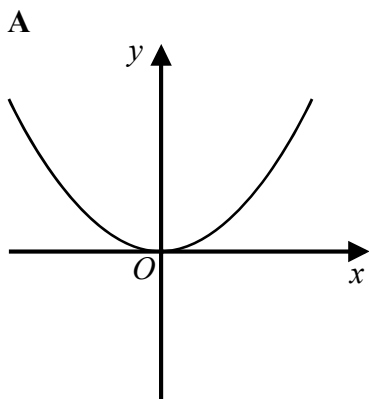
The sample is representative. The answer could be different

The proportion of the people wanting the sports bag out of the 700 people may not be the same as the proportion of the people wanting the sports bag out of the sample of 50 people. We assumed the proportion is the same

(1)

(Total for Question 24 is 3 marks)

25 Here are six graphs.



Write down the letter of the graph that could have the equation

(a) $y = x^3$

Using table mode on the calculator, define $f(x) = x^3$. Start: -5. End: 5. Step 1

..... **F**
(1)

(b) $y = \frac{1}{x}$

Using table mode on the calculator, define $f(x) = 1/x$. Start: -5. End: 5. Step 1

..... **D**
(1)

(Total for Question 25 is 2 marks)

These give a table of values for each equation and can be compared to the six graphs

26 The n th term of a sequence is $2n^2 - 1$

The n th term of a different sequence is $40 - n^2$

Show that there is only one number that is in both of these sequences.

1, 7, 17, 31, 49

39, 36, 31, 24, 15, 4, -9

Using table mode on the calculator, define $f(x) = 2x^2 - 1$ and define $g(x) = 40 - x^2$. Start: 1. End: 30.
Step: 1. This lists out the first 30 terms both sequences. Only 31 is in both sequences and this is shown as one of the sequences increases and the other decreases. The second sequence will continue below -9 but the increasing first sequence starts at 1 so there cannot be any other numbers in both sequences

(Total for Question 26 is 3 marks)

27 Work out $(3.42 \times 10^{-7}) \div (7.5 \times 10^{-6})$

Give your answer in standard form.

0.0456 ← Typing it into the calculator give this

0.0456 must be multiplied by 10 twice to give 4.56, which is at least 1 and less than 10. So 4.56 needs to be multiplied by 10^{-2} to keep it equal

4.56×10^{-2}

(Total for Question 27 is 2 marks)

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28 The number of days, d , that it will take to build a house is given by

$$d = \frac{720}{n}$$

where n is the number of workers used each day.

Ali's company will take 40 days to build the house.

Hayley's company will take 30 days to build the house.

Hayley's company will have to use more workers each day than Ali's company.

How many more?

$$dn = 720$$

$$n = \frac{720}{d}$$

Rearranging the formula to get n on its own so that the number of workers can be worked out. First multiplying both sides by n to eliminate it as the denominator. Then dividing both sides by d

$$\frac{720}{40} = 18$$

Substituting 40 for d works out that Ali's company uses 18 workers

$$\frac{720}{30} = 24$$

Substituting 30 for d works out that Hayley's company uses 24 workers

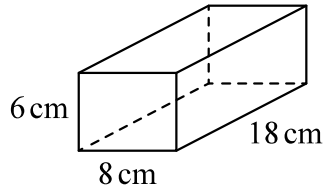
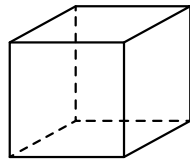
$$24 - 18$$

Subtracting the 18 workers used by Ali's company from the 24 workers used by Hayley's company works out that Hayley's company will use 6 more workers than Ali's company

..... 6

(Total for Question 28 is 3 marks)

29 The diagram shows a cube and a cuboid.



The total surface area of the cube is equal to the total surface area of the cuboid.

Janet says,

“The volume of the cube is equal to the volume of the cuboid.”

Is Janet correct?

You must show how you get your answer.

$8 \times 6 \times 2 + 18 \times 8 \times 2 + 18 \times 6 \times 2$ ← Adding the areas of all six faces works out that the surface area of the cuboid is 600 cm^2

The area of the left face. Multiplying by 2 as the right face is also the same
 The area of the bottom face. Multiplying by 2 as the top face is also the same
 The area of the front face. Multiplying by 2 as the back face is also the same
 ← Area of rectangle = length \times width

$600 \div 6$ ← The surface area of the cube is also 600 cm^2 . Dividing this by the 6 equal faces works out that the area of one face of the cube is 100 cm^2

$\sqrt{100}$ ← Area of square = length². So length = $\sqrt{\text{area of square}}$.
 The edge length of the cube is 10 cm

$10^3 = 1000$ ← Volume of cube = length³. So the volume of the cube is 1000 cm^3

$18 \times 8 \times 6 = 864$ ← Volume of cuboid = length \times width \times height. So the volume of the cuboid is 864 cm^3

No ← The volume of the cube is not equal to the volume of the cuboid

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(Total for Question 29 is 5 marks)

30 Here are two column vectors.

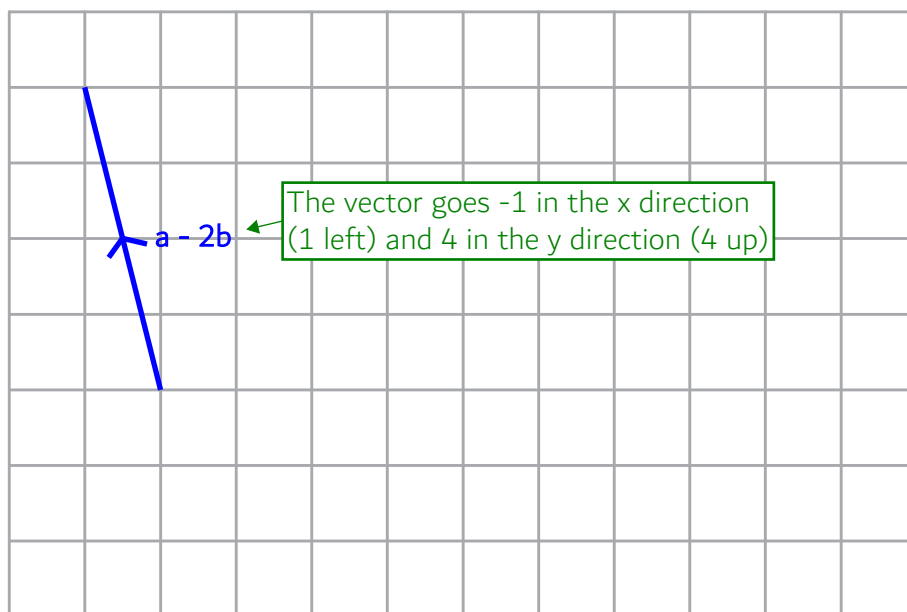
$$\mathbf{a} = \begin{pmatrix} 5 \\ 2 \end{pmatrix} \quad \mathbf{b} = \begin{pmatrix} 3 \\ -1 \end{pmatrix}$$

x-component
y-component

On the grid below, draw and label the vector $\mathbf{a} - 2\mathbf{b}$

$$5 - 2 \times 3 = -1 \quad \leftarrow \text{Working out the x-component of the vector}$$

$$2 - 2 \times (-1) = 4 \quad \leftarrow \text{Working out the y-component of the vector}$$



(Total for Question 30 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS