

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)

--	--	--	--	--

--	--	--	--	--

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 ►

P58873A

©2019 Pearson Education Ltd.

6/1/1

.CG Maths.
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 indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

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

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

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

$$0.23 \times 100 = 23$$

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)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

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?

$$14 \times 15 - \frac{1274}{6.50}$$

Multiplying the 14 rows by the 15 seats in each row works out how many seats there are.
Dividing the £1274 by the £6.50 works out how many tickets were sold. Subtracting the number of tickets sold from the number of seats works out how many 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?

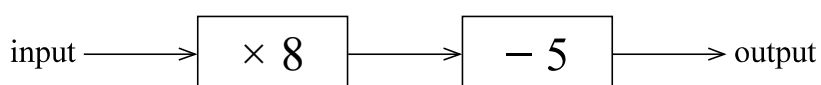
$$\frac{20-7}{20}$$

Subtracting the 7 sweets from the 20 works out how many sweets Harry has now. Expressing this as a fraction of the 20 sweets

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

(Total for Question 7 is 2 marks)

- 8 Here is a number machine.



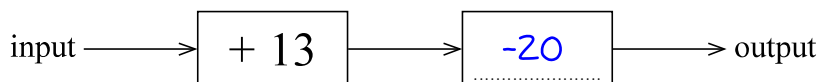
- (a) Work out the output when the input is 6

$$\begin{aligned} 6 \times 8 &= 48 \\ 48 - 5 &= 43 \end{aligned}$$

$$43$$

(1)

Here is a different number machine.



When the input is 17, the output is 10

- (b) Complete the number machine.

$$17 + 13 = 30$$

20 must be subtracted from 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 crossing off 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.

3	?	8	5	?
---	---	---	---	---

The mode of the five numbers is 3

The mean of the five numbers is 5

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

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

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

Writing the formula triangle for mean. m is the mean, t is total and n is number

$5 \times 5 = 3 + 3 + 8 + 5$

From the formula triangle, total = mean x number. The mean is 5 and the number is 5 as there are 5 numbers. 5 x 5 works out the total of the numbers. Subtracting the known numbers from the total leaves the other hidden number

$3, 6$
 (2)

(Total for Question 9 is 6 marks)

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

<p style="text-align: center;">Car park 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 therefore how many minutes the car was in the car park. It was 350 minutes

$$10^{\circ}45' + 0^{\circ}350'$$

Adding the 350 minutes to the 10 45 using the time button on the calculator

..... 16 35

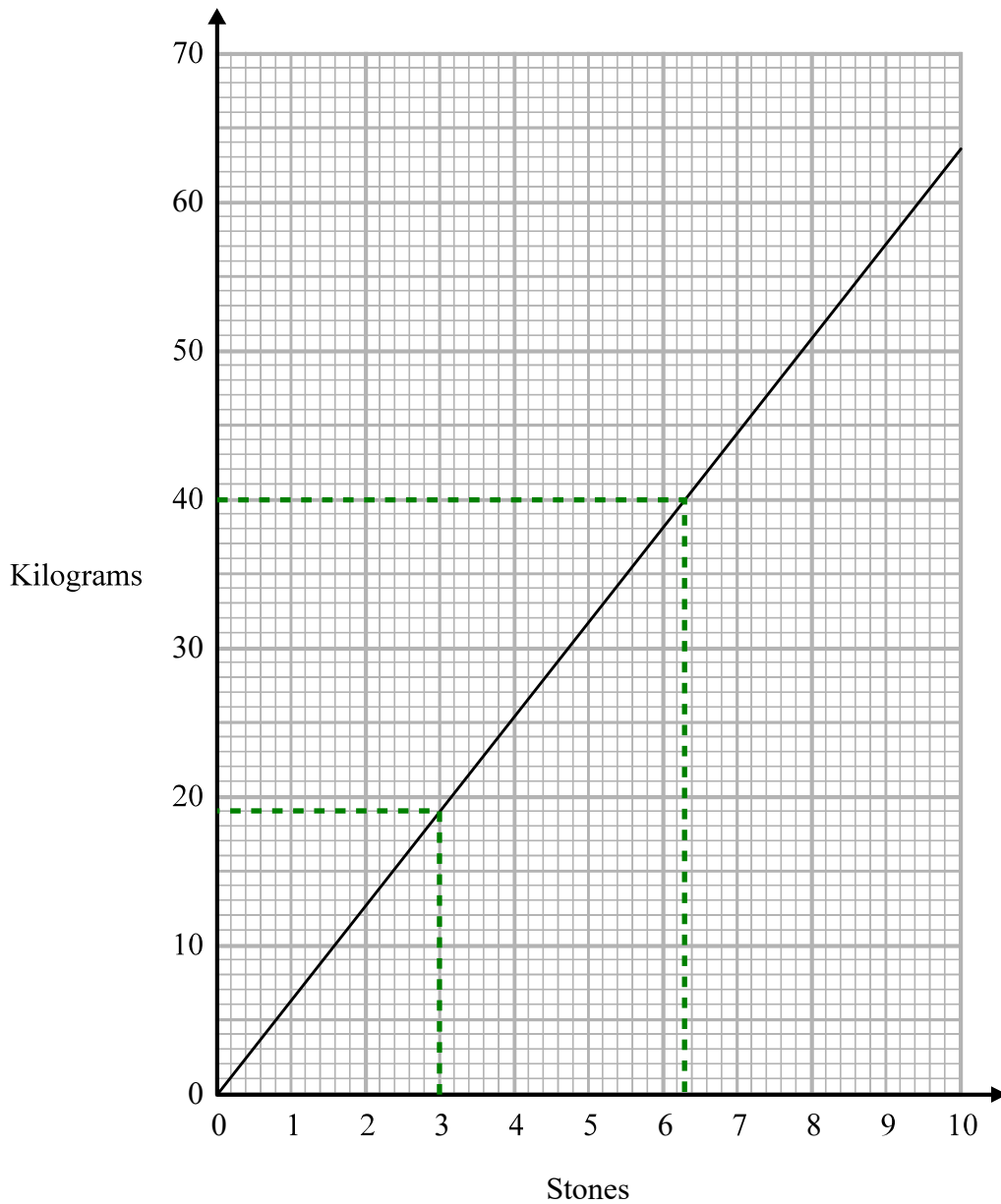
(Total for Question 10 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

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 the 3 stones 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 40kg to the line then down finds that this is 6.3 stones. 40kg is half of 80kg so the 6.3 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 $\frac{3}{5}$

$$\frac{\frac{1}{10} + \frac{3}{5}}{2}$$

Working out the mean of the two fractions works out what is exactly halfway between them. Adding them together to get the total then dividing by 2 as there are 2 fractions does this

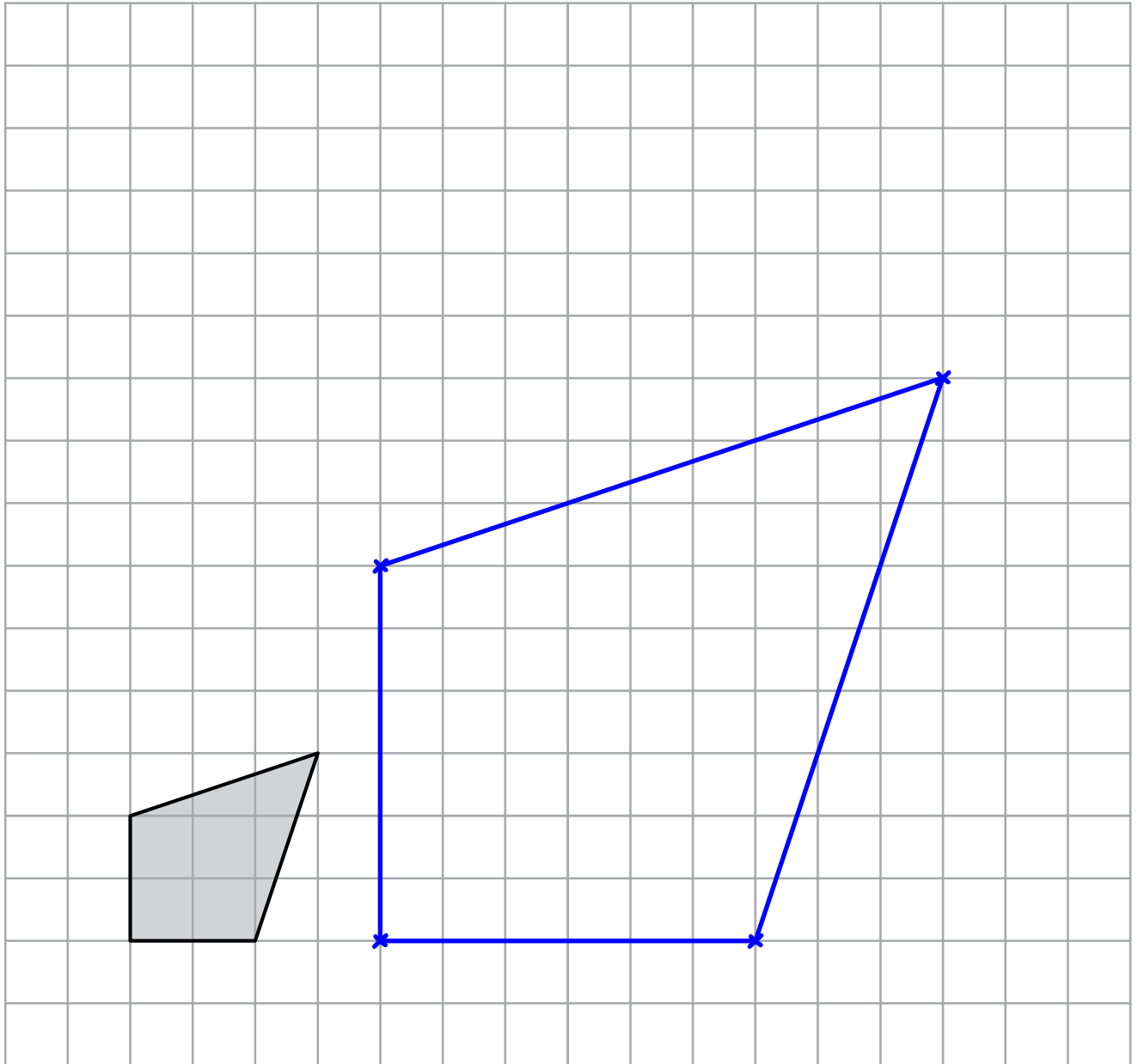
$$\frac{7}{20}$$

(Total for Question 12 is 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



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

(Total for Question 13 is 2 marks)

All the sides are 3 times as long. First drawing the corners then joining them up

- 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.

$$\frac{3.50}{20 \times 2} - \frac{9}{40 \times 3} = \frac{1}{80}$$

20 x 2 works out how many litres are bought using the first offer. Dividing the cost of £3.50 by this many litres works out the cost per litre of the first offer. 40 x 3 works out how many litres are bought using the second offer. Dividing the cost of £9 by this many litres works out the cost per litre of the second offer. Subtracting the cost per litre of the second offer from the cost per litre of the first offer gives a positive result so therefore the cost per litre of the first offer must be more

40 litres

(Total for Question 14 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

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.

$$\frac{19.2 \times 100}{24}$$

There are 100cm in 1m so multiplying the 19.2 metres by 100 converts it in to centimetres.
The 24 parts of the ratio is 24 times greater than the 1 part which represents the scale model. Therefore 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.

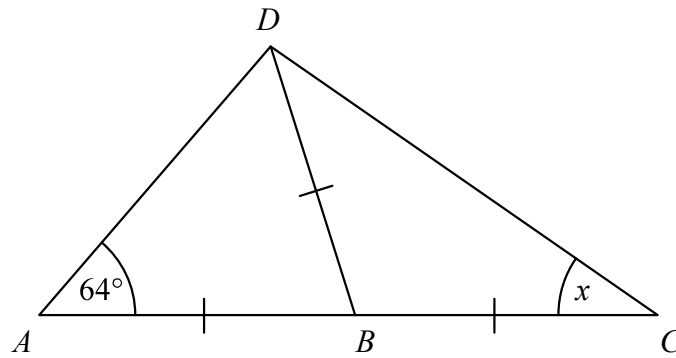
Work out the total amount of interest Maria gets by the end of the 3 years.

$$4500 \times \frac{1.8}{100} \times 3$$

Percentage is out of 100 so dividing the 1.8 by 100 converts it into a fraction. Multiplying the £4500 by this fraction finds 1.8%. As it is simple interest, the amount of interest is the same every year so multiplying it 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.

Triangles ADB and BCD are isosceles as two of the sides in each triangle are equal

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

$$180 - 64 - 64 = 52$$

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

$$180 - 52 = 128$$

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

$$(180 - 128)/2 = 26$$

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

(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.

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

As it is always true regardless of what m is

(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.

$$\frac{500}{175} = 2.8\dots$$

$$\frac{300}{75} = 4$$

$$\frac{625}{250} = 2.5$$

$$2.5 \times 16$$

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 lot of the 16 biscuits can be made

.....40.....

(Total for Question 19 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

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.

$$\frac{4 \times 110 + 12 - 442}{442} \times 100 = 2.3\%$$

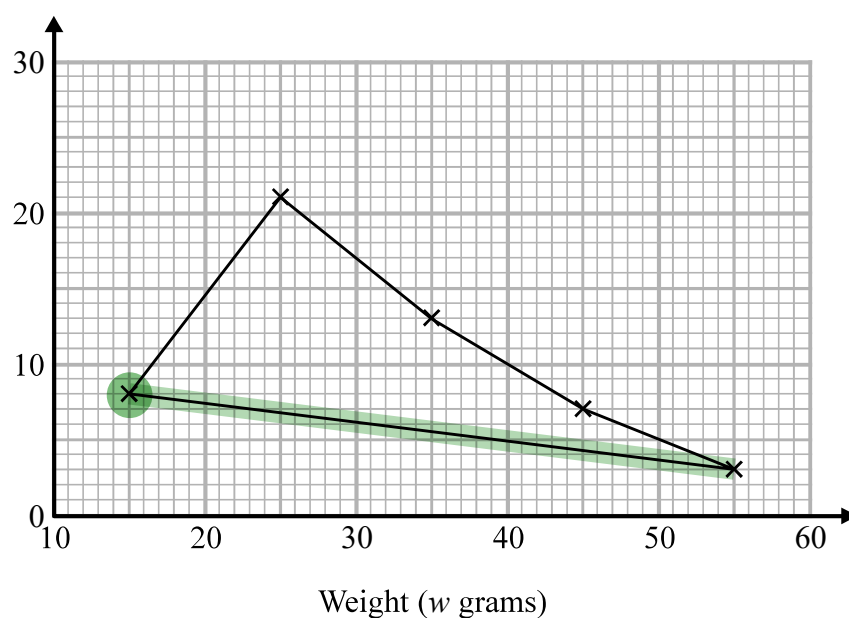
Substituting 110 for f in the formula works out the estimate of the height of the building.
Subtracting the real height works out the difference. Putting this as a fraction of the real height then multiplying by 100 converts it into a percentage difference. 2.3% is less than 5%

(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 isn't plotted at 6

2 There shouldn't 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 (what it is to the nearest) works out the upper and lower bound of the measurement

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

(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.

$$\frac{3}{8} \times 240 - \frac{3}{10} \times 240$$

There are 10 parts in total in the first ratio as $3 + 7 = 10$. Tom had 3 parts of these so had $\frac{3}{10}$ of the stamps. $\frac{3}{10} \times 240$ works out $\frac{3}{10}$ of the 240 stamps and therefore works out how many stamps he had. There are 8 parts in total in the second ratio as $3 + 5 = 8$. Tom has 3 parts of these so now has $\frac{3}{8}$ of the stamps. $\frac{3}{8} \times 240$ works out $\frac{3}{8}$ of the 240 stamps and therefore works out how many stamps he now has. Subtracting the number of stamps he had from the number he now has works out the difference and therefore how many he must have bought 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 it out of the sample of 50 people.
We assumed the proportion is the same meaning that the sample is representative

(1)

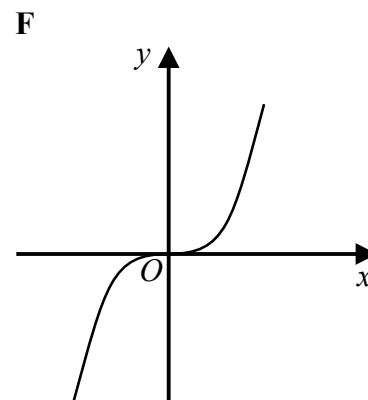
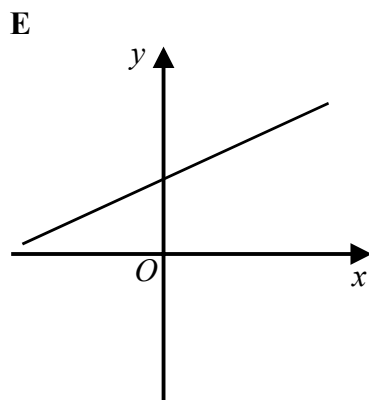
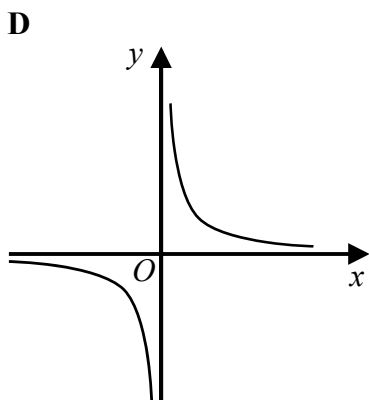
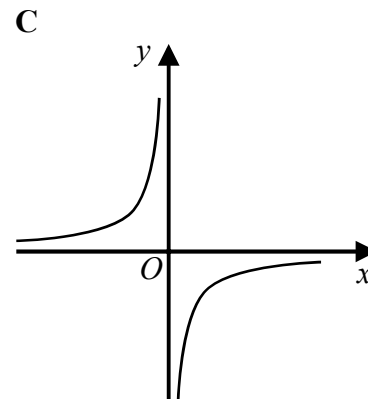
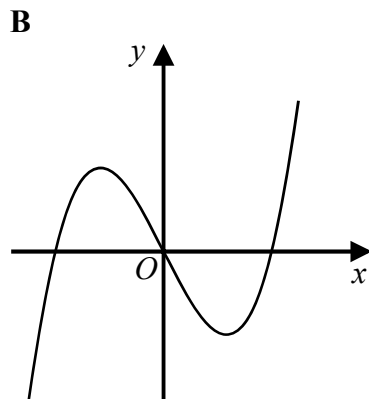
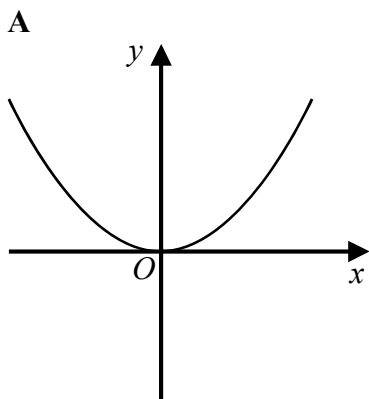
(Total for Question 24 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

25 Here are six graphs.



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

(a) $y = x^3$

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

F

(1)

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

Using table mode, enter $f(x) = 1/x$. 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, enter $f(x) = 2x^2 - 1$ and $g(x) = 40 - x^2$. Start: 1. End: 30. Step: 1

This lists out 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 into the calculator give this

The answer must be multiplied by 10 twice to give a number between 1 and 10 and therefore it needs to be multiplied by 10^{-2} to keep it equal

..... 4.56×10^{-2}

(Total for Question 27 is 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

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 equation to make n the subject 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

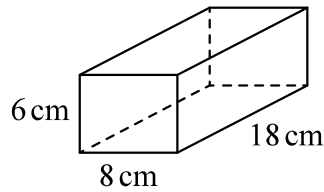
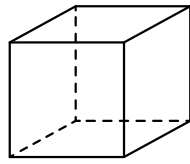
$$\frac{720}{30} - \frac{720}{40}$$

$720/30$ works out how many workers Hayley's company will have to use and $720/40$ works out how many workers Ali's company will have to use. Subtracting these works out the difference and therefore how many more Hayley's company will have to use

.....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.

$$18 \times 8 \times 6 = 864$$

This is the volume of the cuboid. Volume of cuboid = length \times width \times height

$$\left(\frac{6 \times 8 \times 2 + 18 \times 6 \times 2 + 18 \times 8 \times 2}{6} \right)^3 = 1000$$

This is the volume of the cube. Volume of cube = length³. The length of the sides on the cube is found by square rooting the area of one of the square faces. The area of one of the square faces is found by dividing the total surface area of the cube by 6 as there are 6 identical square faces. The surface area of the cube is the same as the surface area of the cuboid and this is found by adding together the areas of all the faces on the cuboid. Area of rectangle = length \times width. 6×8 works out the area of the front face. Opposite faces on a cuboid are the same so this is multiplied by 2 to also account for the back face. 18×6 works out the area of the right face. This is multiplied by 2 to also account for the left face. 18×8 works out the area of the bottom face. This is multiplied by 2 to also account for the top face

No

The volume of the cube is not equal to the volume of the cuboid

(Total for Question 29 is 5 marks)

30 Here are two column vectors.

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

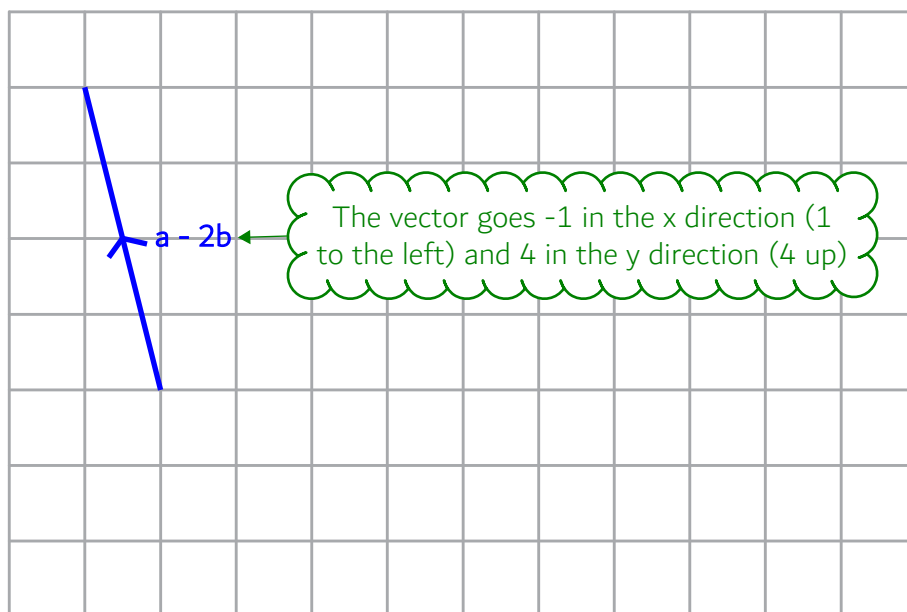
On the grid below, draw and label the vector $\mathbf{a} - 2\mathbf{b}$

$$5 - 2 \times 3 = -1$$

Working out the x component of the vector

$$2 - 2 \times -1 = 4$$

Working out the y component of the vector



(Total for Question 30 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS