

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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Monday 8 June 2020

Morning (Time: 1 hour 30 minutes)

Paper Reference **1MA1/3F**

Mathematics

Paper 3 (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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.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 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 Change 300 centimetres into metres.

There are 100 centimetres in 1 metre. So dividing 300 centimetres by 100 converts it to metres

..... 3 metres

(Total for Question 1 is 1 mark)

- 2 Work out $\frac{1}{3}$ of 24

$\frac{1}{3} \times 24 = 8$

..... 8

(Total for Question 2 is 1 mark)

- 3 Write 40% as a fraction.

Percent means out of 100

..... $\frac{40}{100}$

(Total for Question 3 is 1 mark)

- 4 Work out 2.5^2

Type into the calculator

..... 6.25

(Total for Question 4 is 1 mark)

- 5 Write the following numbers in order of size.
Start with the smallest number.

1 -4 0 7 -6 -3 2

..... -6 -4 -3 0 1 2 7

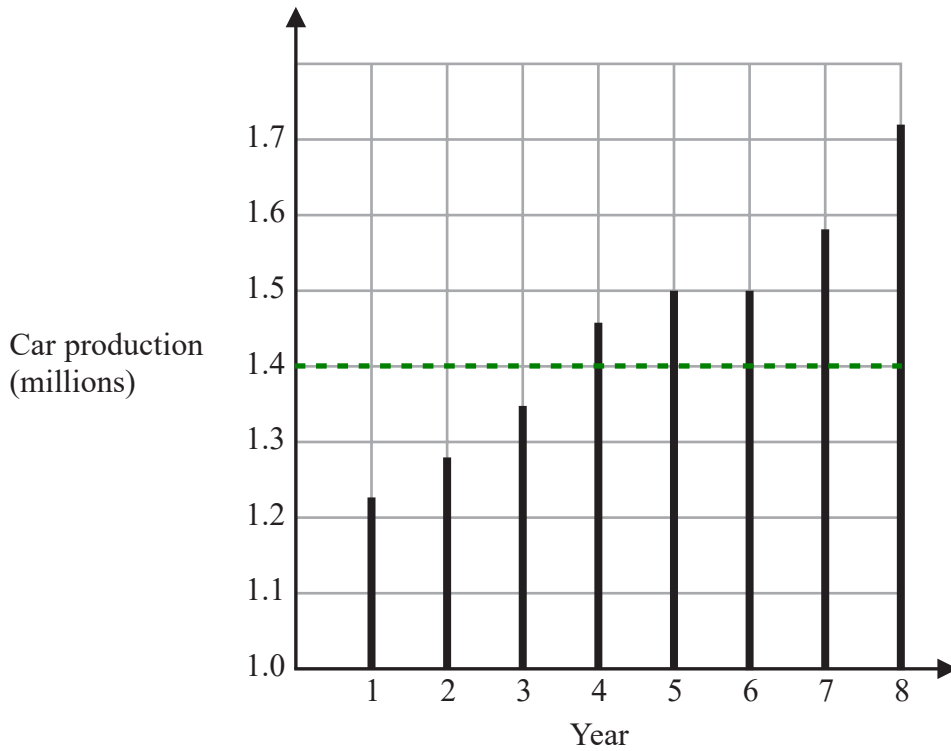
(Total for Question 5 is 1 mark)

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6 The graph shows some information about car production in the UK over eight years.



(a) For how many of these years was car production more than 1.4 million?

Years 4, 5, 6, 7 and 8 were above 1.4 million

5
.....
(1)

(b) In which two years was car production the same?

Both years 5 and 6 had 1.5 million

5 , 6
.....
(1)

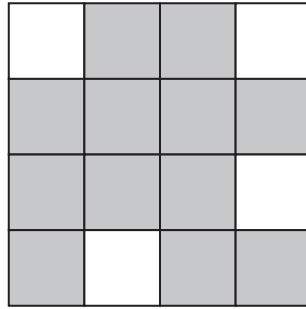
(Total for Question 6 is 2 marks)

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7



What fraction of the shape is shaded?
Give your answer in its simplest form.

$$\frac{12}{16}$$

12 out of the 16 squares are shaded

Entering the 12/16 into the calculator simplifies it

2/4

(Total for Question 7 is 2 marks)

8 Karim buys 200 tiles.

The tiles are sold in boxes.
There are 25 tiles in each box.
Each box of tiles costs £9.75

Work out the total cost of the boxes of tiles Karim buys.

$$200 \div 25 \leftarrow \text{Dividing the 200 tiles by the 25 tiles in each box finds that there are 8 boxes}$$

$$9.75 \times 8 \leftarrow \text{Multiplying the £9.75 cost of each box by the 8 boxes works out the total cost}$$

£ 78

(Total for Question 8 is 3 marks)

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9 (a) Work out the value of $\frac{300}{2 \times 5}$

Type into calculator

30

(1)

(b) Work out the value of $(6 - 2.5)(8 + 4)$

Type into calculator

42

(1)

(c) Write down the reciprocal of 20

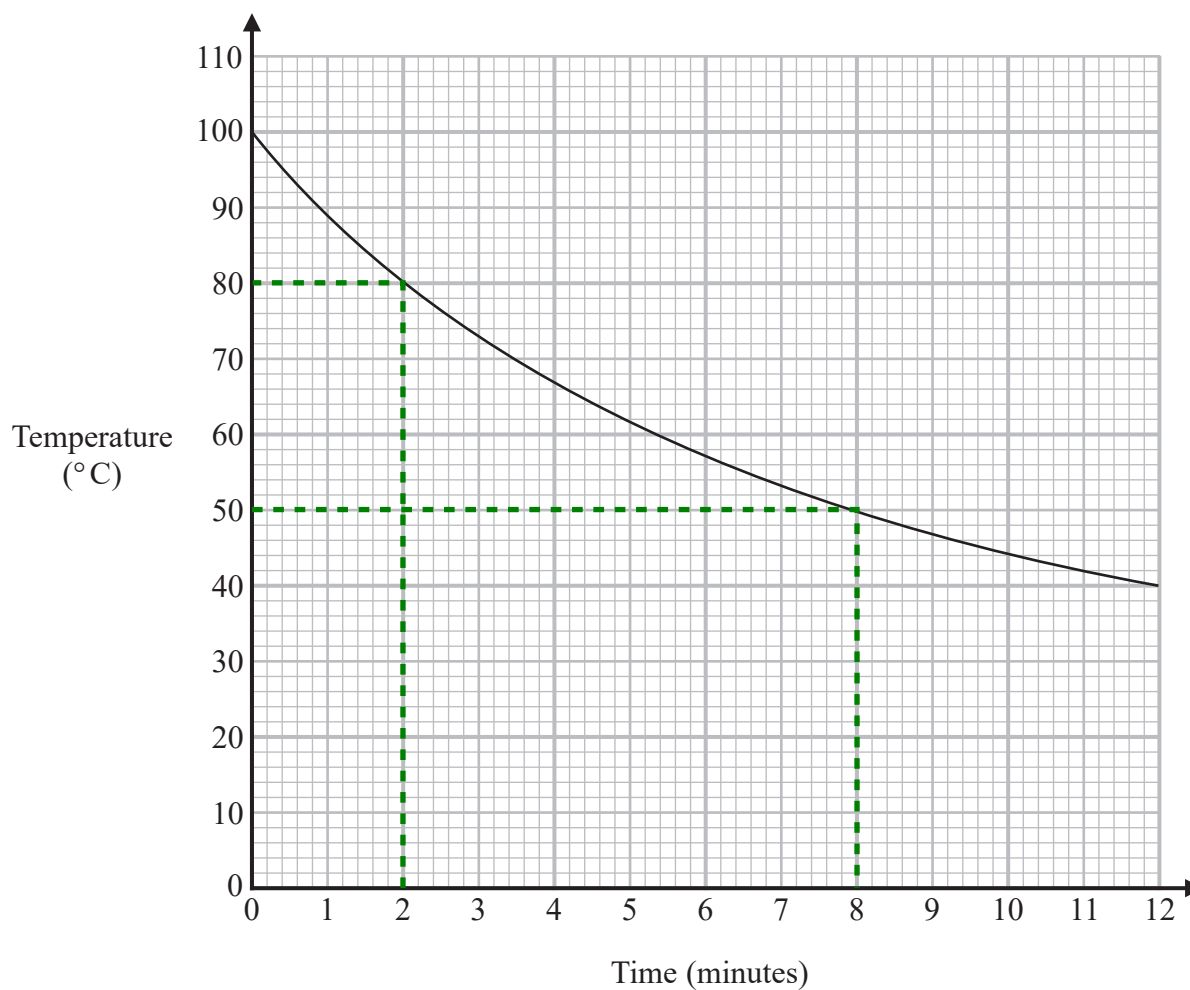
Reciprocal means 1 divided by

$\frac{1}{20}$

(1)

(Total for Question 9 is 3 marks)

- 10 The graph shows information about the time, in minutes, a liquid has been cooling and the temperature of the liquid in $^{\circ}\text{C}$.



- (a) What is the temperature of the liquid at time 2 minutes?

Reading up from 2 minutes to the line then across to the temperature

80 $^{\circ}\text{C}$

(1)

Pam recorded the time when the liquid had a temperature of 50°C .

- (b) Write down this time.

Reading across from 50°C to the line then down to the time

8 minutes

(1)

Pam says that the temperature of the liquid drops more in the first 3 minutes of cooling than it does between time 9 minutes and time 12 minutes.

- (c) Is Pam correct?
Give a reason for your answer.

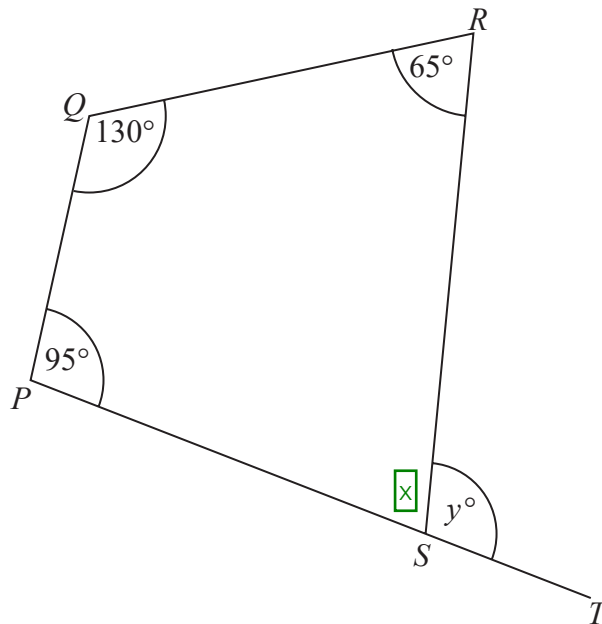
Yes, as the gradient in the first 3 minutes is steeper than the last 3 minutes

The temperature was dropping quicker and both ranges of time are the same length so it must have dropped more

(1)

(Total for Question 10 is 3 marks)

- 11 $PQRS$ is a quadrilateral.
 PST is a straight line.



Find the value of y .

$$360 - 95 - 130 - 65$$

There are 360° in total in a quadrilateral. So subtracting the 95° , 130° and 65° from 360° finds that the missing angle x is 70°

$$180 - 70$$

There are 180° around a point on a straight line. So subtracting angle x from 180° finds that angle y is 110°

$$y = 110$$

(Total for Question 11 is 3 marks)

12 Here are the first five terms of a number sequence.

45 40 35 30 25

(a) (i) Write down the next two terms of this sequence.

It goes down 5 between each term

20 , 15
.....
(1)

A term of this sequence is -5

(ii) Which term?

10, 5, 0, -5 ← Continuing to count down in 5s until -5 is reached. It is the 11th term

11
.....
(1)

The n th term of a different sequence is given by the expression $4n + 3$

(b) Find the 9th term of this sequence.

$4(9) + 3$ ← On the 9th term, $n = 9$. Substituting this into the expression works out the 9th term

39
.....
(1)

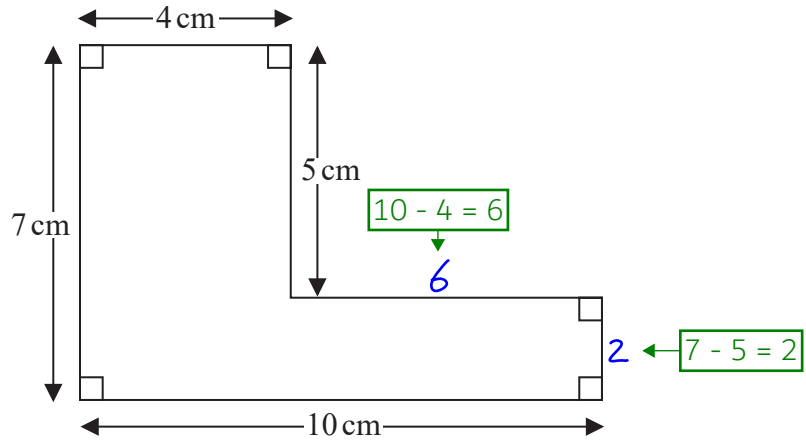
(Total for Question 12 is 3 marks)

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13



Work out the perimeter of this shape.

$4 + 5 + 6 + 2 + 10 + 7$ ← The perimeter is all of the outside sides added together

..... 34 cm

(Total for Question 13 is 2 marks)

14 (a) Simplify $3x + 5y + 2x - 4y$

Collecting the like terms. $3x + 2x = 5x$ and $5y - 4y = y$

..... $5x + y$
(2)

(b) Solve $5p + 7 = 22$

$5p = 15$ ← Subtracting 7 from both sides gets the p term on its own

Dividing both sides by 5 gets p on its own

$p =$ 3
(2)

(Total for Question 14 is 4 marks)

15 Here are the costs of the same type of batteries in two shops.

Shop A
Pack of 4 batteries
£1.60

Shop B
Pack of 6 batteries
£2.70

Harry needs to buy at least 30 batteries.

He assumes that he has to buy batteries in whole packs.

Harry wants to buy the batteries as cheaply as possible from the same shop.

(a) Which shop should he buy the batteries from, shop A or shop B?

You must show all your working.

$$\frac{30}{4} = 7.5$$

Dividing the 30 batteries by the 4 in each pack from A works out that 7.5 lots of 4 batteries are needed to get 30 batteries

$$8 \times 1.60 = 12.80$$

As they have to be bought in whole packs, 8 packs are needed to get at least 30 batteries. Multiplying 8 packs by the £1.60 for each pack works out that the price from shop A is £12.80

$$\frac{30}{6} = 5$$

Dividing the 30 batteries by the 6 in each pack from B works out that 5 lots of 4 batteries are needed to get 30 batteries

$$5 \times 2.70 = 13.50$$

Multiplying 5 packs by the £2.70 for each pack works out that the price from shop B is £13.50

A

Shop A is £12.80 and is cheaper than shop B which is £13.50

(4)

Harry's assumption is wrong.

He can buy single batteries for 40p each in shop A and for 45p each in shop B.

(b) Does this affect which of these two shops Harry should buy the batteries from?

Give a reason for your answer.

No, as shop A will cost even less and the cost from shop B will not change

More than 30 batteries are in 8 packs of 4. So buying 7 packs of 4 and some singles will make shop A even cheaper

(1)

(Total for Question 15 is 5 marks)

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16 There are only 5 blue cards, 2 green cards and 4 red cards in a pack.

Isabella is going to take at random one card from the pack.

(a) Write down the probability that Isabella will take a blue card.

5 + 2 + 4 = 11 cards in total. Out of these, there are 5 blue cards

$$\frac{5}{11}$$

(2)

Ken is going to throw a biased dice once.
The probability that the dice will land on six is 0.3

(b) What is the probability that the dice will **not** land on six?

It is certain to either land on six or not land on six so the probabilities must add to 1. Subtracting the 0.3 from 1 leaves the probability of it not landing on six

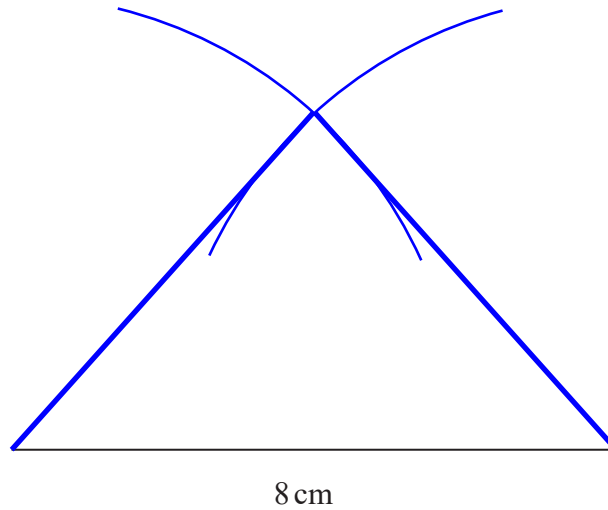
$$0.7$$

(1)

(Total for Question 16 is 3 marks)

- 17 Draw accurately an isosceles triangle with sides of length 8 cm, 6 cm and 6 cm.
One side of the triangle has been drawn for you.

Using a compass, scribe arcs with a radius of 6 cm from both ends of the 8 cm line.
Draw lines using a ruler from the ends of the 8 cm line to where the arcs cross



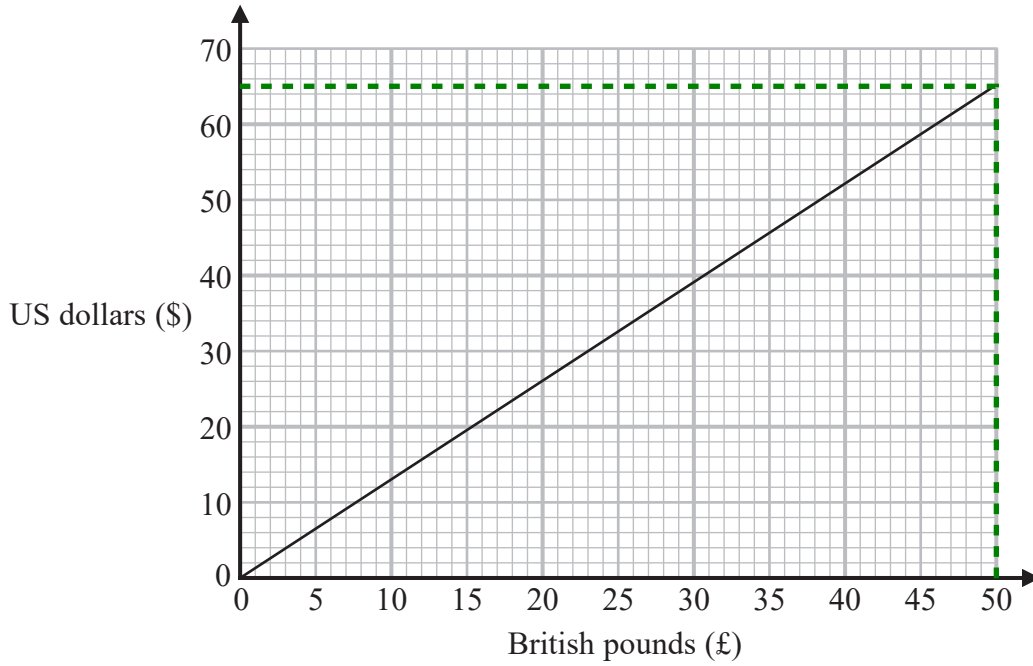
(Total for Question 17 is 2 marks)

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18 This graph can be used to change between US dollars (\$) and British pounds (£).



Rosie bought a ring in the USA.
She paid 345 US dollars.

Work out in pounds the amount Rosie paid for the ring.

$50 \div 65$ ← From the graph, \$65 = £50. Dividing the £50 by 65 works out that \$1 = £0.76...

$345 \times 0.76...$ ← Each \$1 is £0.76.. so multiplying the £0.76... by 345 finds that \$345 is £265.38...

Giving the £265.38... to the nearest penny

£ 265.38

(Total for Question 18 is 3 marks)

19 Here are the types of sandwiches sold in a cafe last week.

Sandwiches
Tuna
Cheese
Chicken
Egg

56 tuna sandwiches were sold.

This was 40% of the total number of sandwiches sold.

(a) Work out the total number of sandwiches sold.

$$56 \div 40 \leftarrow \text{Dividing the 56 tuna sandwiches by 40 finds that 1\% of the total number of sandwiches is 1.4}$$

$$1.4 \times 100 \leftarrow \text{Multiplying the value of 1\% by 100 finds that 100\% of the sandwiches is 140}$$

140

(2)

Of the 56 tuna sandwiches sold, 18 were sold on Friday.

(b) Write 18 as a percentage of 56

Give your answer correct to the nearest whole number.

$$\frac{18}{56} \times 100 \leftarrow \begin{array}{l} \text{Expressing the 18 as a fraction of the 56.} \\ \text{Multiplying this by 100 converts it to a percentage} \end{array}$$

32

%

(2)

(Total for Question 19 is 4 marks)

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20 Akhtar, Ben and Carl each have some money.

Akhtar has £65

Ben has £100

Carl has three £5 notes, one £20 note and some £10 notes.

The mean amount of money per person is £80

How many £10 notes does Carl have?

$3 \times 5 + 20 = 35$

Adding the three £5 notes and the one £20 note finds that Carl has £35 not including the £10 notes

$\begin{matrix} t \\ m \\ n \end{matrix}$

Writing a formula triangle for mean, total, number. Total is the total amount of money and number is the number of people

80×3

Covering t in the formula triangle finds that total = mean × number. So multiplying the £80 mean by the 3 people finds that the total amount of money is £240

$240 - 65 - 100 - 35$

Subtracting the £65 Akhtar has, the £100 Ben has and the £35 Carl has not including the £10 notes finds that the £10 notes Carl has must be worth £40

$40 \div 10$

Dividing the £40 by £10 finds that Carl has 4 £10 notes

4

(Total for Question 20 is 4 marks)

21 Malik is going to throw a fair coin 50 times.

(a) Write down an estimate for the number of times the coin will land on heads.

The probability of heads is $\frac{1}{2}$ and $\frac{1}{2} \times 50 = 25$

25

(1)

Paula and Simon are trying to find out if a different coin is biased.

Paula throws this coin 10 times.

She records the number of times the coin lands on heads.

Simon throws the same coin 100 times.

He records the number of times the coin lands on heads.

(b) Whose results will be more useful in deciding if the coin is biased?

Give a reason for your answer.

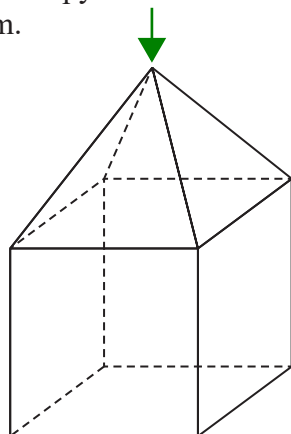
Simon, as he throws it more times

The more times the coin is thrown, the more likely the relative frequency of heads is to be an accurate estimate of the probability it will be heads. The estimated probability of a heads could be used to decide if the coin is likely to be biased

(1)

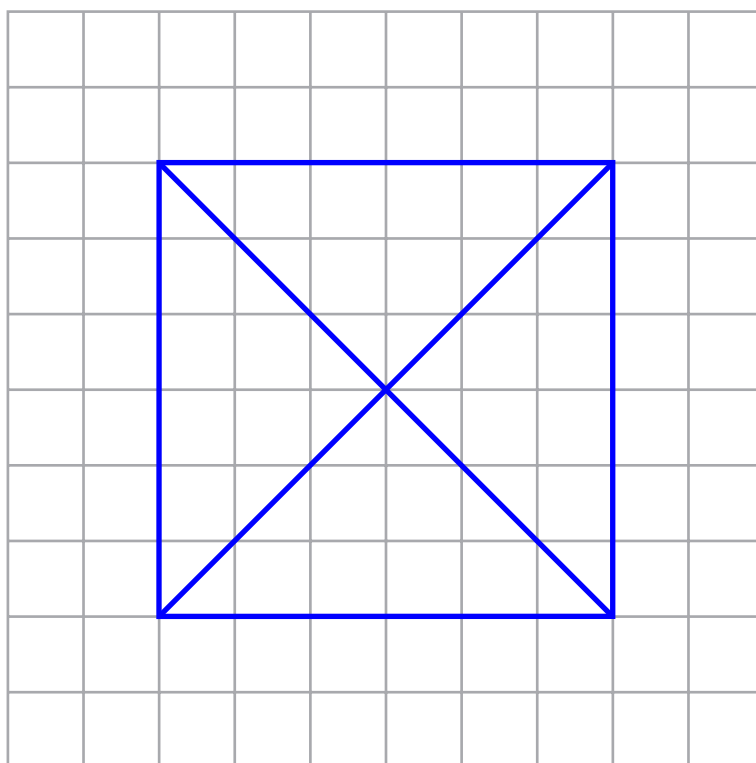
(Total for Question 21 is 2 marks)

- 22 Here is a solid made from a square-based pyramid and a cube.
Each edge of the solid has length 6 cm.



The plan is the view from above

On the centimetre grid, draw the plan of this solid.



(Total for Question 22 is 2 marks)

23 (a) Simplify $n^3 \times n^5$

$$a^x \times a^y = a^{x+y}. \text{ So } n^3 \times n^5 = n^{3+5} = n^8$$

$$n^8$$

(1)

(b) Simplify $\frac{c^3 d^4}{c^2 d}$

$$a^x / a^y = a^{x-y}$$

d is basically d¹

$$cd^3$$

(2)

(c) Solve $\frac{5x}{2} > 7$

$$5x > 14 \leftarrow \text{Multiplying both sides by 2 eliminates the 2 as the denominator on the left}$$

Dividing both sides by 5 gets x on its own

$$x > \frac{14}{5}$$

(2)

(Total for Question 23 is 5 marks)

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24 Andy cycles a distance of 30 km at an average speed of 24 km/h. He then runs a distance of 12 km at an average speed of 8 km/h.

Work out the total time Andy takes.
Give your answer in hours and minutes.

$$s \begin{matrix} d \\ t \end{matrix}$$

Writing a formula triangle for speed, distance, time

$$30 \div 24 = 1.25$$

Covering t in the formula triangle finds that time = distance \div speed. So the time cycling is 1.25 hours (as hours was involved in the km/h)

$$12 \div 8 = 1.5$$

Covering t in the formula triangle finds that time = distance \div speed. So the time running is 1.5 hours (as hours was involved in the km/h)

$$1.25 + 1.5$$

Adding the 1.25 hours cycling and the 1.5 hours running finds that the total time is 2.75 hours

Formatting 2.75 hours as a sexagesimal gives 2^o45'0", which can be read as 2 hours and 45 minutes

..... 2 hours 45 minutes

(Total for Question 24 is 3 marks)

25 A number, m , is rounded to 1 decimal place. The result is 9.4

Complete the error interval for m .

$$9.4 \pm \frac{0.1}{2}$$

Adding and subtracting half of the resolution to the 9.4 finds the upper and lower bound. The resolution is 0.1 as this is the place value of the 1st decimal place

..... 9.35 $\leq m <$ 9.45

(Total for Question 25 is 2 marks)

26 Maisie knows that she needs 3 kg of grass seed to make a rectangular lawn 5 m by 9 m.

Grass seed is sold in 2 kg boxes.

Maisie wants to make a rectangular lawn 10 m by 14 m.

She has 5 boxes of grass seed.

(a) Has Maisie got enough grass seed to make a lawn 10 m by 14 m?

You must show all your working.

$$5 \times 2 = 10 \quad \leftarrow \text{Multiplying the 5 boxes of grass seed by the 2 kg in each box finds that there is 10 kg in 5 boxes}$$

$$5 \times 9 \quad \leftarrow \text{Area of rectangle = length} \times \text{width. So the area of the 5 m by 9 m lawn is } 45 \text{ m}^2$$

$$45 \div 3 = 15 \quad \leftarrow \text{Dividing the } 45 \text{ m}^2 \text{ by the 3 kg finds that 1 kg can cover } 15 \text{ m}^2$$

$$10 \times 14 \quad \leftarrow \text{Area of rectangle = length} \times \text{width. So the area of the 10 m by 14 m lawn is } 140 \text{ m}^2$$

$$140 \div 15 = 9.\dot{3} \quad \leftarrow \text{Dividing the } 140 \text{ m}^2 \text{ by the } 15 \text{ m}^2 \text{ covered per kg finds that } 9.3\dots \text{ kg is needed}$$

Yes \leftarrow The 10 kg Maisie has is more than the 9.3... kg needed

(4)

Maisie opens the 5 boxes of grass seed.

She finds that 4 of the boxes contain 2 kg of grass seed.

The other box contains 1 kg of grass seed.

(b) Does this affect whether Maisie has enough grass seed to make her lawn?

Give a reason for your answer.

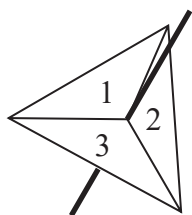
Yes, as 9 kg is not enough

$$4 \times 2 + 1 = 9 \text{ kg of grass seed. } 9.3\dots \text{ kg is needed}$$

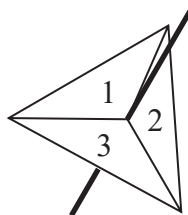
(1)

(Total for Question 26 is 5 marks)

27 Amanda has two fair 3-sided spinners.



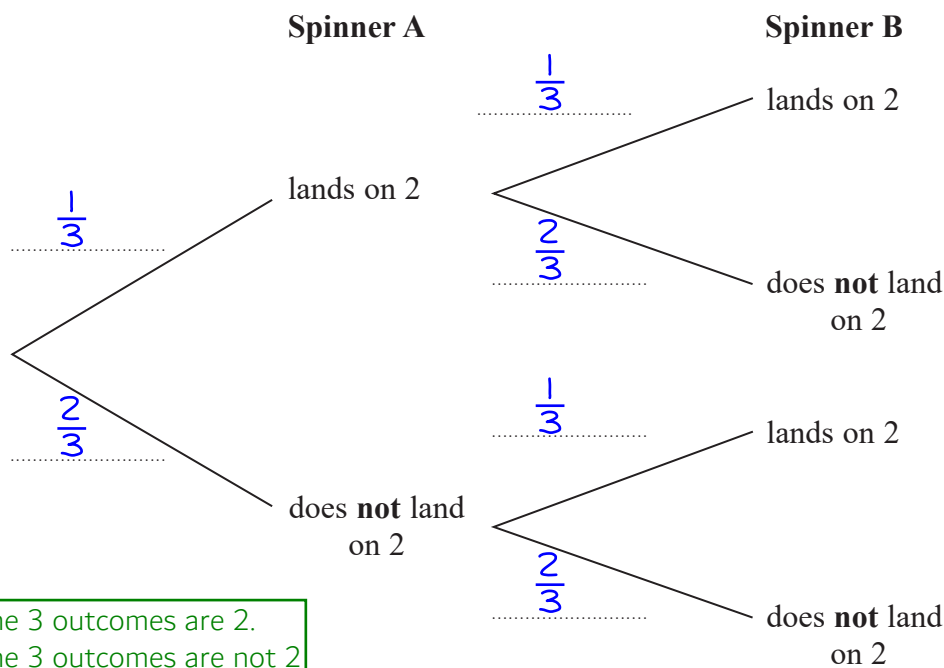
Spinner A



Spinner B

Amanda spins each spinner once.

(a) Complete the probability tree diagram.



1 out of the 3 outcomes are 2.
2 out of the 3 outcomes are not 2

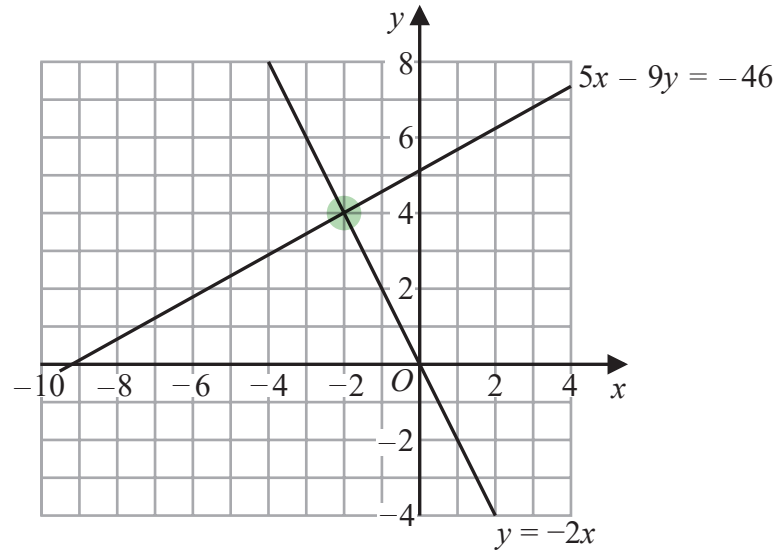
(2)

(b) Work out the probability that Spinner A lands on 2 and Spinner B does **not** land on 2

$\frac{1}{3} \times \frac{2}{3}$ ← 2 AND not 2. AND means to multiply the probabilities

$\frac{2}{9}$
(2)

(Total for Question 27 is 4 marks)

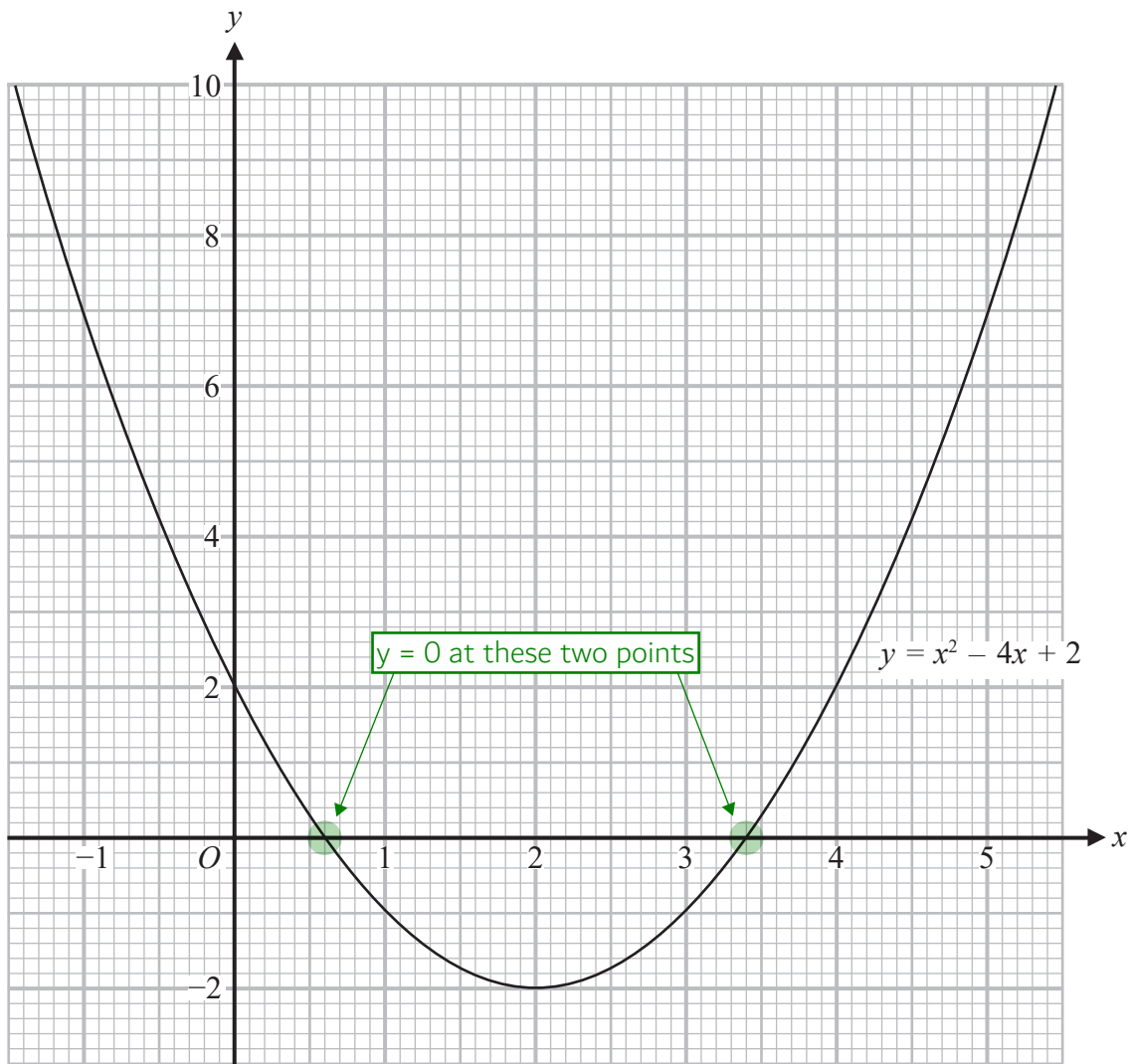


(a) Use these graphs to solve the simultaneous equations

$$\begin{aligned} 5x - 9y &= -46 \\ y &= -2x \end{aligned}$$

The solutions are where the graphs cross

$$\begin{aligned} x &= \dots\dots\dots -2 \dots\dots\dots \\ y &= \dots\dots\dots 4 \dots\dots\dots \\ & \quad (1) \end{aligned}$$



(b) Use this graph to find estimates for the solutions of the quadratic equation $x^2 - 4x + 2 = 0$

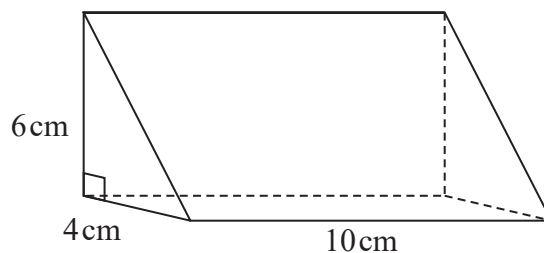
y has been replaced with 0 so it is basically asking what x is when $y = 0$

$$x = 0.6, x = 3.4$$

(2)

(Total for Question 28 is 3 marks)

29 The diagram shows a solid triangular prism.



The prism is made from wood with a density of 0.8 g/cm^3

Work out the mass of this prism.

d m v ← Writing a formula triangle for density, mass, volume

$\frac{1}{2} \times 4 \times 6$ ← Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$. So the area of the triangle is 12 cm^2

12×10 ← Volume of prism = area of cross section \times length. The area of the triangular cross section is 12 cm^2 and the length is 10 cm . So the volume of the prism is 120 cm^3

0.8×120 ← Covering m in the formula triangle finds that mass = density \times volume

..... 96 g

(Total for Question 29 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS