

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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Tuesday 6 November 2018

Morning (Time: 1 hour 30 minutes)

Paper Reference **1MA1/1F**

Mathematics

Paper 1 (Non-Calculator)

Foundation Tier

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.
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 not be used.**



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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6/7/7/7/7/7/1/

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

0.400 0.020 0.370 0.152 0.200

Writing each number to the same number of decimal places can make them easier to compare

..... 0.02, 0.152, 0.2, 0.37, 0.4

(Total for Question 1 is 1 mark)

- 2 Write 0.6 as a percentage.

To convert a decimal to a percentage, multiply it by 100.
To do this, move the decimal point twice to the right

..... 60 %

(Total for Question 2 is 1 mark)

- 3 Here is a list of numbers.

3 5 7 12 15 18 20

From the list, write down a factor of 10

$5 \times 2 = 10$, so 5 is a factor of 10

..... 5

(Total for Question 3 is 1 mark)

- 4 Write 7829 to the nearest 1000

7 is in the thousands place. The 8 in the next place causes the 7 to round up to an 8 and every digit after it becomes 0

..... 8000

(Total for Question 4 is 1 mark)

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5 (a) Work out $3 \times 5 + 7$

$15 + 7 \leftarrow$ The order of operations (BIDMAS) needs to be followed. So doing the multiplication first

22

(1)

(b) Work out 2^3

$$2^3 = 2 \times 2 \times 2$$

8

(1)

(c) Write brackets () in this statement to make it correct.

$$7 \times (2 + 3) = 35$$

The brackets make what is in them happen first. $2 + 3 = 5$ then $7 \times 5 = 35$

(1)

(Total for Question 5 is 3 marks)

6 Sue has 2 cats.

Each cat eats $\frac{1}{4}$ of a tin of cat food each day.

Sue buys 8 tins of cat food.

Has Sue bought enough cat food to feed her 2 cats for 14 days?

You must show how you get your answer.

$$\frac{1}{4} \times \frac{2}{1}$$

Multiplying the $\frac{1}{4}$ of a tin each day by the 2 cats works out that $\frac{2}{4}$ of a tin is used each day. 2 is expressed as a fraction by putting it over 1. To multiply fractions: multiply the numerators and multiply the denominators

$$\frac{8}{1} \div \frac{2}{4}$$

Dividing the 8 tins by the $\frac{2}{4}$ of a tin per day to work out how many days they will last. Expressing 8 as a fraction by putting it over 1

$$\frac{8}{1} \times \frac{4}{2}$$

To divide by a fraction: keep the 1st number, change the division to a multiplication, flip the 2nd fraction

$$\frac{32}{2} = 16$$

To multiply fractions: multiply the numerators and multiply the denominators. Then dividing the 32 by the 2 gives 16 days

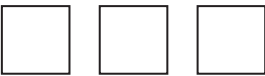
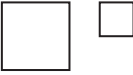


Yes

16 days is more than the 14 days

(Total for Question 6 is 3 marks)

7 There are only apple trees, cherry trees, pear trees and plum trees in an orchard.

The pictogram shows information about the numbers of apple trees, cherry trees and pear trees in the orchard.

Apple	
Cherry	
Pear	
Plum	

Key:

 represents 4 trees

There is a total of 30 trees in the orchard.

Complete the pictogram.

$$5 \times 4$$

There are 5 whole symbols (ignoring the fractions of symbols for now). Multiplying this by 4 works out that these represent 20 trees

$$20 + 3$$

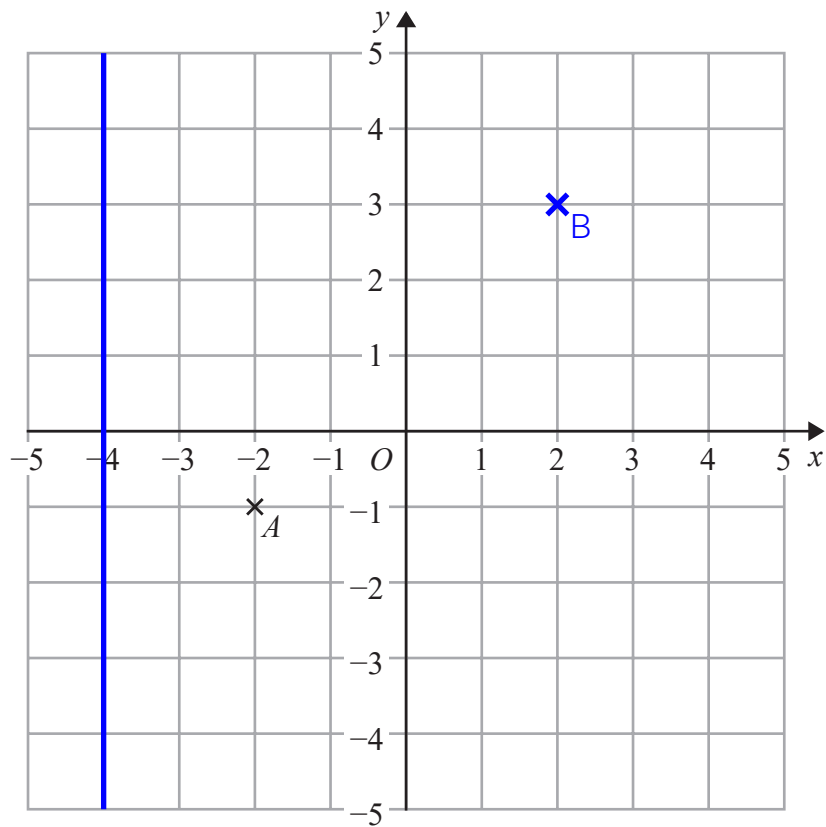
There are another 3 quarters of a symbol. Each quarter of a symbol represents 1 tree. So there are 23 trees in total in the pictogram so far

$$30 - 23 = 7$$

Subtracting the 23 trees in the pictogram so far from the 30 total trees leaves 7 plum trees

7 trees can be represented by $7/4$ symbols, which is $1\frac{3}{4}$

(Total for Question 7 is 3 marks)



- (a) Write down the coordinates of point A .

x-coordinate y-coordinate
 (..... -2 , -1 )
 (1)

- (b) On the grid, mark with a cross (\times) the point $(2, 3)$
Label this point B .

(1)

- (c) On the grid, draw the line with equation $x = -4$

Every point on the line has x-coordinate of 4

(1)

(Total for Question 8 is 3 marks)

9 $g = 9$
 $h = 4$

Work out the value of $2g + 3h$

$2 \times 9 + 3 \times 4$ ← Substituting 9 for g and 4 for h

$18 + 12$ ← Simplifying

..... 30

(Total for Question 9 is 2 marks)

10 Write down two prime numbers that have a sum of 32 ← Prime numbers are only divisible by themselves and 1. Sum means added together

$32 - 2$ ← 2 is the smallest prime number. Subtracting this from the 32 works out that 30 must be added to it to get 32. This 30 is not prime as it is divisible by 2

$32 - 3$ ← 3 is the next smallest prime number. Subtracting this from the 32 works out that 29 must be added to it to get 32. This 29 is prime

..... 3 , 29

(Total for Question 10 is 2 marks)

11 Here are some fractions.

$$\frac{9 \div 3}{12 \div 3} = \frac{3}{4} \quad \frac{6 \div 2}{8 \div 2} = \frac{3}{4} \quad \frac{18 \div 6}{24 \div 6} = \frac{3}{4} \quad \frac{10 \div 2}{16 \div 2} = \frac{5}{8} \quad \frac{15 \div 5}{20 \div 5} = \frac{3}{4}$$

One of these fractions is **not** equivalent to $\frac{3}{4}$

(a) Which fraction?

To simplify a fraction: divide both the numerator and denominator by the same number to get smaller whole numbers. All of the fractions simplify to $\frac{3}{4}$ except for $\frac{10}{16}$

$$\frac{10}{16}$$

(1)

(b) Work out $\frac{1}{12} + \frac{5}{6} \times 2$

$$\frac{1}{12} + \frac{10}{12}$$

To add the fractions, the denominators must be the same. 12 is a common multiple of 6 and 12 so converting $\frac{5}{6}$ to $\frac{10}{12}$ by multiplying both the numerator and denominator by 2

The numerators can then be added and the denominator stays the same

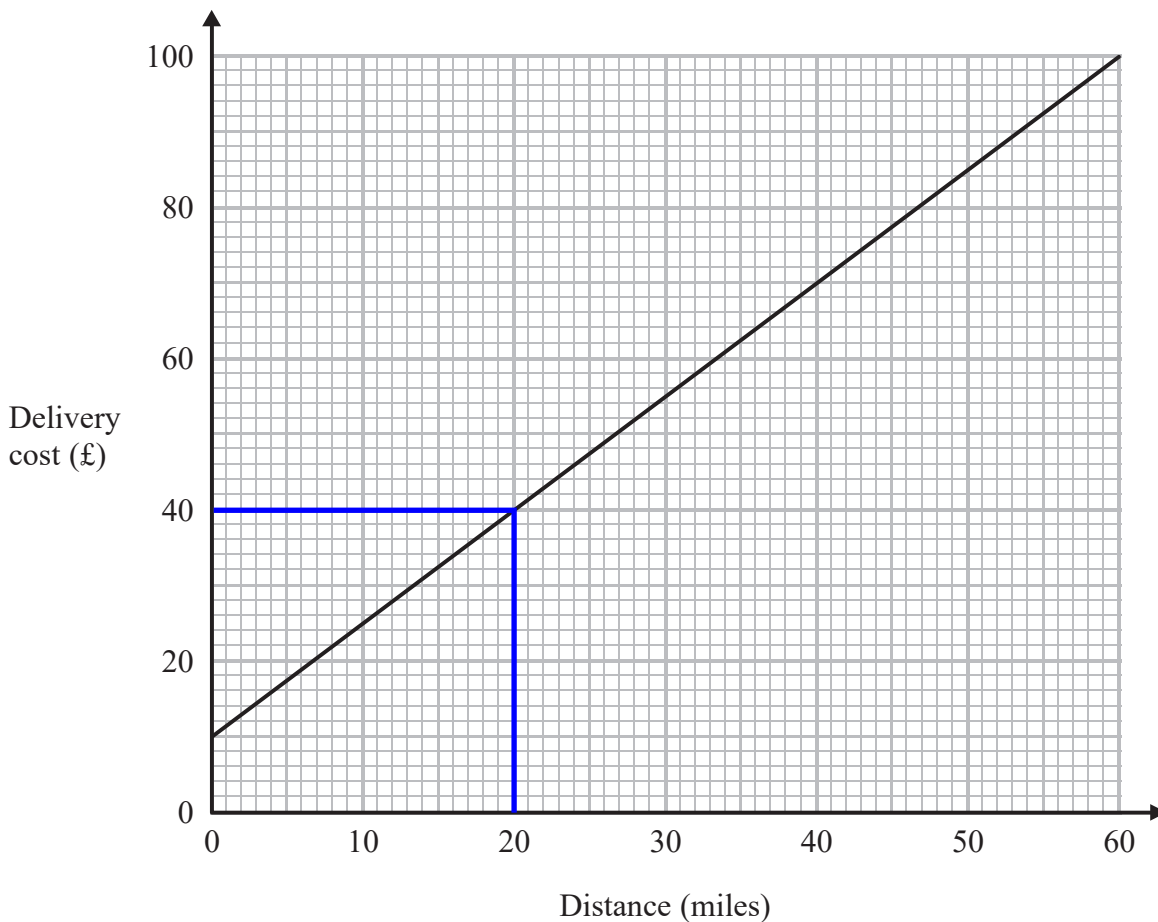
$$\frac{11}{12}$$

(2)

(Total for Question 11 is 3 marks)

12 Tom uses his lorry to deliver bricks.

You can use this graph to find the delivery cost for different distances.



For each delivery, there is a fixed charge plus a charge for the distance.

(a) How much is the fixed charge?

The fixed charge is the cost when there is a delivery with a distance of 0 miles

£ 10
(1)

Tom makes two deliveries of bricks.

The distance of one delivery is 20 miles more than the distance of the other delivery.

(b) Work out the difference between the two delivery costs.

The cost of a delivery with 0 miles is £10 and the cost of a delivery with distance of 20 miles (which is 20 miles more than 0 miles) is £40. Difference = largest - smallest = $40 - 10 = 30$

£ 30
(2)

(Total for Question 12 is 3 marks)

13 Azmol, Ryan and Kim each played a game.

Azmol's score was four times Ryan's score.
Kim's score was half of Azmol's score.

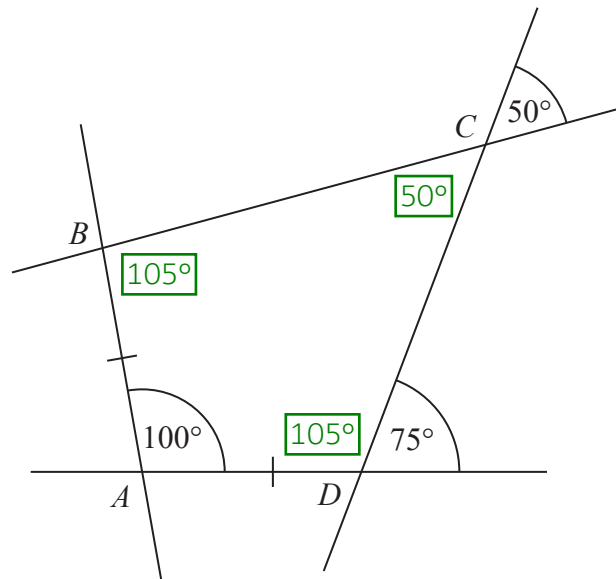
Write down the ratio of Azmol's score to Ryan's score to Kim's score.

If Ryan scored 1, Azmol would score 4 as this is 4 times Ryan's score and Kim would score 2 as this is half of Azmol's score

4:1:2

(Total for Question 13 is 2 marks)

14 The diagram shows quadrilateral $ABCD$ with each of its sides extended.



$$AB = AD$$

Show that $ABCD$ is a kite.

Give a reason for each stage of your working.

$$180 - 75 \leftarrow \text{Subtracting the } 75^\circ \text{ from } 180^\circ \text{ works out that angle } ADC = 105^\circ$$

Angle $ADC = 105^\circ$ as there are 180° around a point on a straight line

Angle $BCD = 50^\circ$ as vertically opposite angles are equal

$$100 + 50 + 105 \leftarrow \text{Adding all the angles in the quadrilateral so far works out that there are } 255^\circ \text{ in it so far}$$

$$360 - 255 \leftarrow \text{Subtracting the } 255^\circ \text{ so far from } 360^\circ \text{ works out that angle } ABC = 105^\circ$$

Angle $ABC = 105^\circ$ as angles in a quadrilateral add up to 360°

So $ABCD$ is a kite as it has four sides, two of the opposite angles are equal and the other two opposite angles aren't equal

(Total for Question 14 is 4 marks)

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15 Shahid is going to use these instructions to make a fizzy drink.

Mix 5 parts of orange juice with 2 parts of lemonade

Shahid thinks that he has 300 ml of orange juice and 200 ml of lemonade.

(a) If Shahid is correct, what is the greatest amount of fizzy drink he can make?

$$\begin{array}{r}
 060 \\
 5 \overline{) 300} \\
 \underline{300} \\
 00
 \end{array}$$

5 parts represent the 300 ml of orange juice. So dividing the 300 ml by 5 works out that 1 part of the ratio is worth 60 ml

$$\begin{array}{r}
 60 \\
 \times 2 \\
 \hline
 120
 \end{array}$$

Multiplying the value of 1 part by the 2 parts which represent lemonade works out that there would be 120 ml of lemonade

$$\begin{array}{r}
 +300 \\
 \hline
 420
 \end{array}$$

Adding the 300 ml of orange juice to the 120 ml of lemonade works out that the greatest amount of drink is 420 ml

There cannot be any more drink as adding more lemonade would mean that more orange juice is needed and all 300 ml of orange juice was already used

..... 420 ml
(3)

Shahid has 300 ml of orange juice but he only has 160 ml of lemonade.

(b) Does this affect the greatest amount of fizzy drink he can make?
Give a reason for your answer.

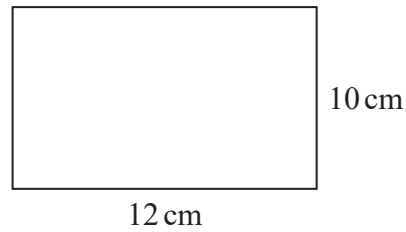
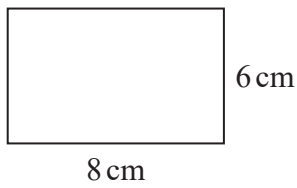
No, as only 120 ml of lemonade is needed

160 ml is still more than 120 ml

(1)

(Total for Question 15 is 4 marks)

16 Here are two rectangles.



Jim says,

“The two rectangles are similar because $8 + 4 = 12$ and $6 + 4 = 10$ ”

Is Jim correct?

Explain your answer.

No, as the sides need to be multiplied by the same number

Similar shapes have the same proportion between their sides, meaning that you can scale (multiply) all the sides on the smaller shape to get the sides on the larger shape

(Total for Question 16 is 1 mark)

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17 80 people are asked if they like coffee.

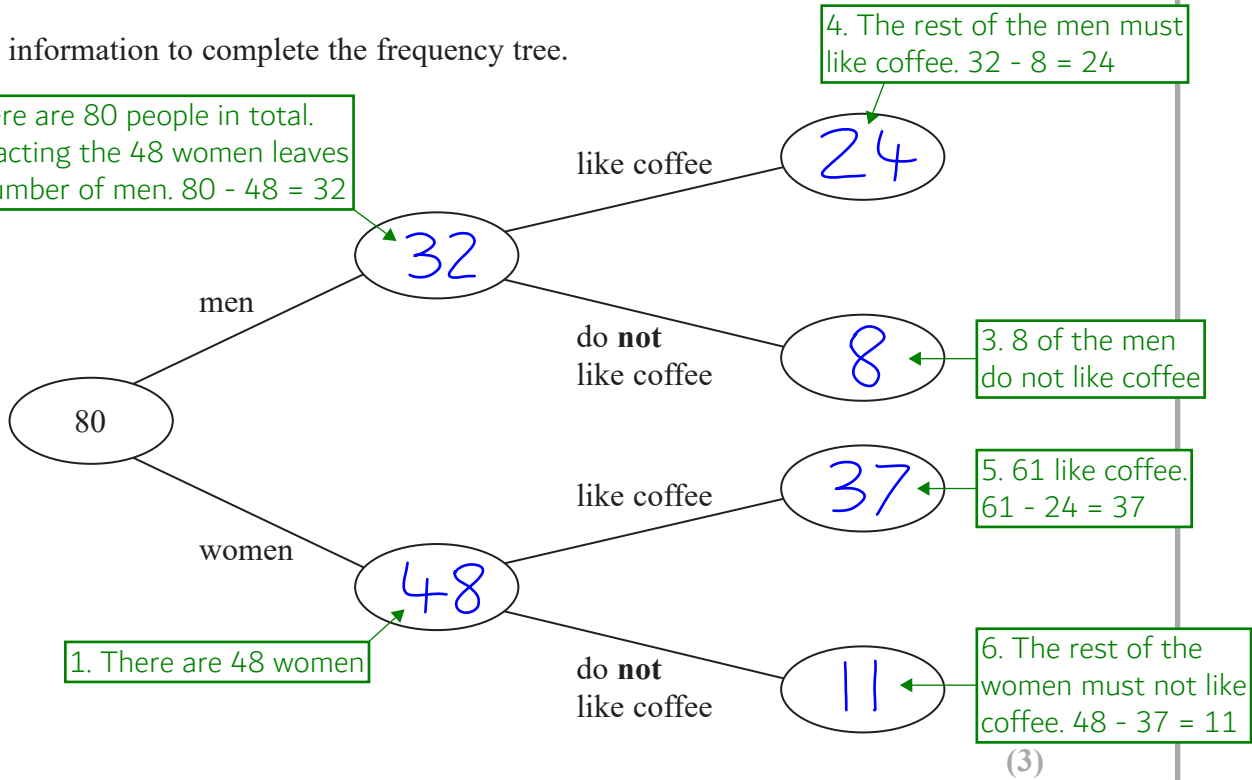
48 of these people are women.

61 of the 80 people like coffee.

8 of the men do **not** like coffee.

(a) Use this information to complete the frequency tree.

2. There are 80 people in total. Subtracting the 48 women leaves the number of men. $80 - 48 = 32$



One of the people who like coffee is chosen at random.

(b) Find the probability that this person is a woman.

37 out of the 61 who like coffee are women

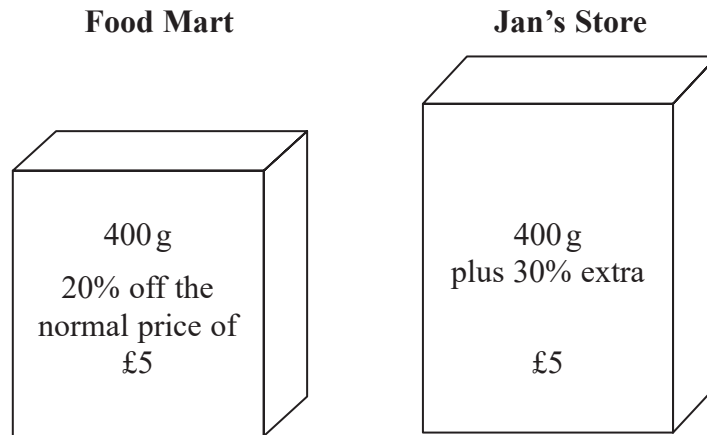
$$\frac{37}{61}$$

(2)

(Total for Question 17 is 5 marks)

18 Food Mart and Jan's Store sell boxes of the same type of breakfast cereal.

Each shop has a special offer.



Which box of cereal is the better value for money?

You must show your working.

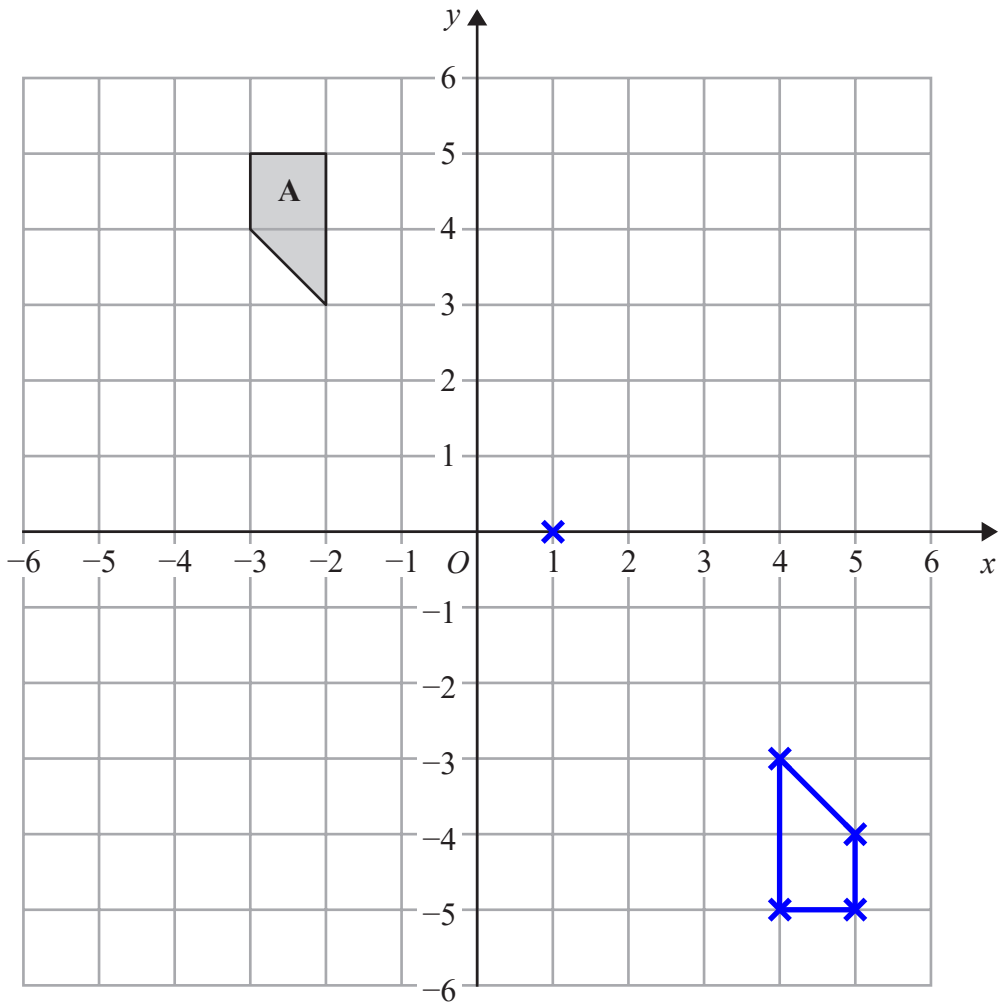
- $5 \div 10$ ← This works out that 10% of the £5 is £0.50
- 0.50×2 ← Multiplying the value of 10% by 2 works out that 20% of the £5 is £1
- $5 - 1$ ← Subtracting the value of 20% from the £5 works out that the price from Food Mart is reduced to £4
- $400 \div 4 = 100$ ← Dividing the 400 g by the £4 works out that there is 100 g for every £1 from Food Mart
- $400 \div 10$ ← This works out that 10% of the 400 g is 40 g
- 40×3 ← Multiplying the value of 10% by 3 works out that 30% of the 400 g is 120 g
- $400 + 120$ ← Adding the value of 30% to the 400 g works out that the mass from Jan's store is increased to 520 g
- $$\begin{array}{r} 104 \\ 5 \overline{) 520} \end{array}$$
 ← Dividing the 520 g by the £5 works out that there is 104 g for every £1 from Jan's Store
- Jan's Store ← As there is more mass of cereal for every £1 spent

(Total for Question 18 is 4 marks)

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Rotate shape A 180° about (1, 0)

(Total for Question 19 is 2 marks)

Using tracing paper, sketch around shape A. Put something sharp (maybe the needle of a compass) in at (1, 0) and rotate the tracing paper 180° around that point

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20 Work out the value of $\frac{3^7 \times 3^{-2}}{3^3}$

$$\frac{3^5}{3^3} \leftarrow a^x \times a^y = a^{x+y}. \text{ So adding the indices on the numerator. } 7 + -2 = 5$$

$$3^2 \leftarrow a^x / a^y = a^{x-y}. \text{ So subtracting the indices. } 5 - 3 = 2$$

$$3^2 = 3 \times 3 = 9$$

9

(Total for Question 20 is 2 marks)

21 $v^2 = u^2 + 2as$

$$u = 12 \quad a = -3 \quad s = 18$$

(a) Work out a value of v .

$$12^2 + 2 \times -3 \times 18 \leftarrow \text{Substituting in the values of } u, a \text{ and } s \text{ into the right side of the formula}$$

$$\begin{array}{r} 18 \\ \times 6 \\ \hline 108 \end{array} \leftarrow 2 \times -3 = -6. \text{ Then } -6 \times 18 = -108$$

$$\begin{array}{r} 12^2 \\ -108 \\ \hline 036 \end{array} \leftarrow 12^2 = 12 \times 12 = 144. \text{ Then subtracting the } 108. \text{ So } v^2 = 36$$

$$6^2 = 6 \times 6 = 36$$

6

(2)

(b) Make s the subject of $v^2 = u^2 + 2as$

$$v^2 - u^2 = 2as \leftarrow \text{Subtracting } u^2 \text{ from both sides gets the term involving } s \text{ on its own}$$

Dividing both sides by $2a$ gets s on its own

$$s = \frac{v^2 - u^2}{2a}$$

(2)

(Total for Question 21 is 4 marks)

- 22 A bonus of £2100 is shared by 10 people who work for a company.
40% of the bonus is shared equally between 3 managers.
The rest of the bonus is shared equally between 7 salesmen.

One of the salesmen says,

“If the bonus is shared equally between all 10 people I will get 25% more money.”

Is the salesman correct?

You must show how you get your answer.

$$2100 \div 10 = 210$$

This works out that 10% of the £2100 is £210. It also works out that each salesman would get £210 if the bonus was shared equally between all 10 people

$$\begin{array}{r} 210 \\ \times 6 \\ \hline 1260 \end{array}$$

100% - 40% = 60%, which is the percentage the salesmen get. Multiplying the value of 10% by 6 works out that 60% of the £2100 is £1260

$$7 \overline{) 1260} \begin{array}{r} 0180 \\ 1256 \\ \hline 00 \end{array}$$

Dividing the £1260 by the 7 salesmen works out that each salesman gets £180

$$4 \overline{) 180} \begin{array}{r} 045 \\ 180 \\ \hline 00 \end{array}$$

25% is 1/4. So dividing the £180 by 4 works out that 25% of the £180 is £45

$$\begin{array}{r} 180 \\ + 45 \\ \hline 225 \end{array}$$

Adding the value of 25% to the £180 works out that 25% more than the £180 is £225

No

25% more money would be £225, which is not the £210 they would get if it was shared equally between all 10 people

(Total for Question 22 is 5 marks)

23 It would take 120 minutes to fill a swimming pool using water from 5 taps.

(a) How many minutes will it take to fill the pool if only 3 of the taps are used?

$$\begin{array}{r} 120 \\ \times 5 \\ \hline 600 \end{array}$$

Multiplying the 120 minutes by the 5 taps works out that 600 minutes worth of work is done

$$\begin{array}{r} 200 \\ 3 \overline{)600} \end{array}$$

Dividing the 600 minutes worth of work by the 3 taps works out that it would take 200 minutes

200 minutes
(2)

(b) State one assumption you made in working out your answer to part (a).

All taps work at the same rate

(1)

(Total for Question 23 is 3 marks)

24 A plane travels at a speed of 213 miles per hour.

(a) Work out an estimate for the number of seconds the plane takes to travel 1 mile.

s^d
 t

Writing a formula triangle for distance, speed, time

$$\frac{1}{213} \times 60 \times 60$$

Covering t in the formula triangle finds that time = distance/speed. So putting the distance of 1 mile over the speed of 213 miles per hour expresses the time taken in hours (as hours was involved in the units of mile per hour). 1 hour = 60 minutes and 1 minute = 60 seconds. So multiplying by 60 converts it to minutes then multiplying by 60 again converts it to seconds

$$200 \overline{)3600}$$

$60 \times 60 = 3600$. Then dividing this by 200 instead of 213 as it is an estimate and this is easier to do

18 seconds
(3)

(b) Is your answer to part (a) an underestimate or an overestimate?
Give a reason for your answer.

Overestimate as the speed was rounded down

Dividing by less gives a larger answer

(1)

(Total for Question 24 is 4 marks)

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25 Solve the simultaneous equations

$5x + y = 21$ ← 1st equation

$x - 3y = 9$ ← 2nd equation

$5x - 15y = 45$ ← Multiplying the 2nd equation by 5 gives the same number of x as the 1st equation. This forms the 3rd equation

$16y = -24$ ← Subtracting the 3rd equation from the 1st equation cancels out the x term and leaves an equation just in terms of y

$y = \frac{-24}{16}$ ← Dividing both sides by 16 gets y on its own. Dividing both the numerator and denominator by 8 simplifies it to $-\frac{3}{2}$

$x - 3\left(\frac{-3}{2}\right) = 9$ ← Substituting the value of y into the 2nd equation

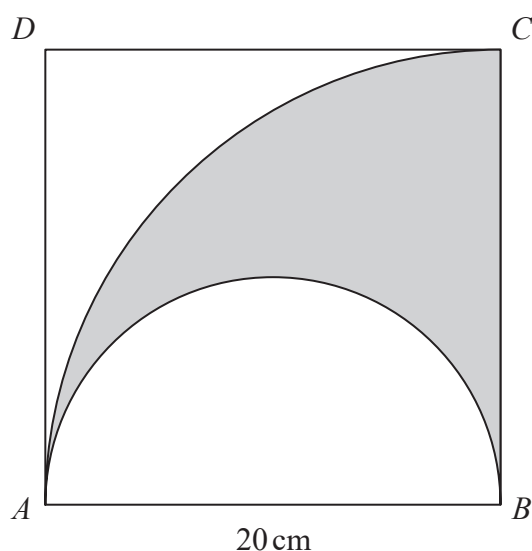
$x = \frac{18}{2} - \frac{9}{2}$ ← $-3\left(-\frac{3}{2}\right) = \frac{9}{2}$. Subtracting $\frac{9}{2}$ from both sides gets x on its own. Writing 9 as $\frac{18}{2}$ so that it has the same denominator

Subtracting the numerators and the denominator stays the same

$x = \dots\dots\dots \frac{9}{2}$
 $y = \dots\dots\dots -\frac{3}{2}$

(Total for Question 25 is 3 marks)

- 26 The diagram shows a square $ABCD$ with sides of length 20 cm. It also shows a semicircle and an arc of a circle.



AB is the diameter of the semicircle.
 AC is an arc of a circle with centre B .

Show that $\frac{\text{area of shaded region}}{\text{area of square}} = \frac{\pi}{8}$

$$20^2 = 400 \quad \leftarrow \quad \text{Area of square} = \text{length}^2. \text{ So the area of the square is } 400 \text{ cm}^2$$

$$400\pi \div 4 = 100\pi \quad \leftarrow \quad \text{Area of circle} = \pi \times \text{radius}^2. \text{ The radius of the quarter circle } ABC \text{ is } 20 \text{ cm and } 20^2 = 400. \text{ So the area of the whole circle would be } 400\pi \text{ cm}^2 \text{ and dividing this by } 4 \text{ works out that the area of the quarter circle } ABC \text{ is } 100\pi \text{ cm}^2$$

$$20 \div 2 \quad \leftarrow \quad \text{Radius is half of the diameter so the radius of the semicircle is } 10 \text{ cm}$$

$$\pi \times 10^2 \quad \leftarrow \quad \text{Area of circle} = \pi \times \text{radius}^2. \text{ So the area of the whole circle would be } 100\pi \text{ cm}^2$$

$$100\pi \div 2 \quad \leftarrow \quad \text{The semicircle is half of the whole circle so its area is } 50\pi \text{ cm}^2$$

$$100\pi - 50\pi \quad \leftarrow \quad \text{Subtracting the area of the semicircle from the quarter circle works out that the shaded area is } 50\pi \text{ cm}^2$$

$$\frac{50\pi}{400} = \frac{\pi}{8} \quad \leftarrow \quad \text{Putting the shaded area over the area of the square. Dividing both the numerator and denominator by } 50 \text{ simplifies the fraction}$$

(Total for Question 26 is 4 marks)

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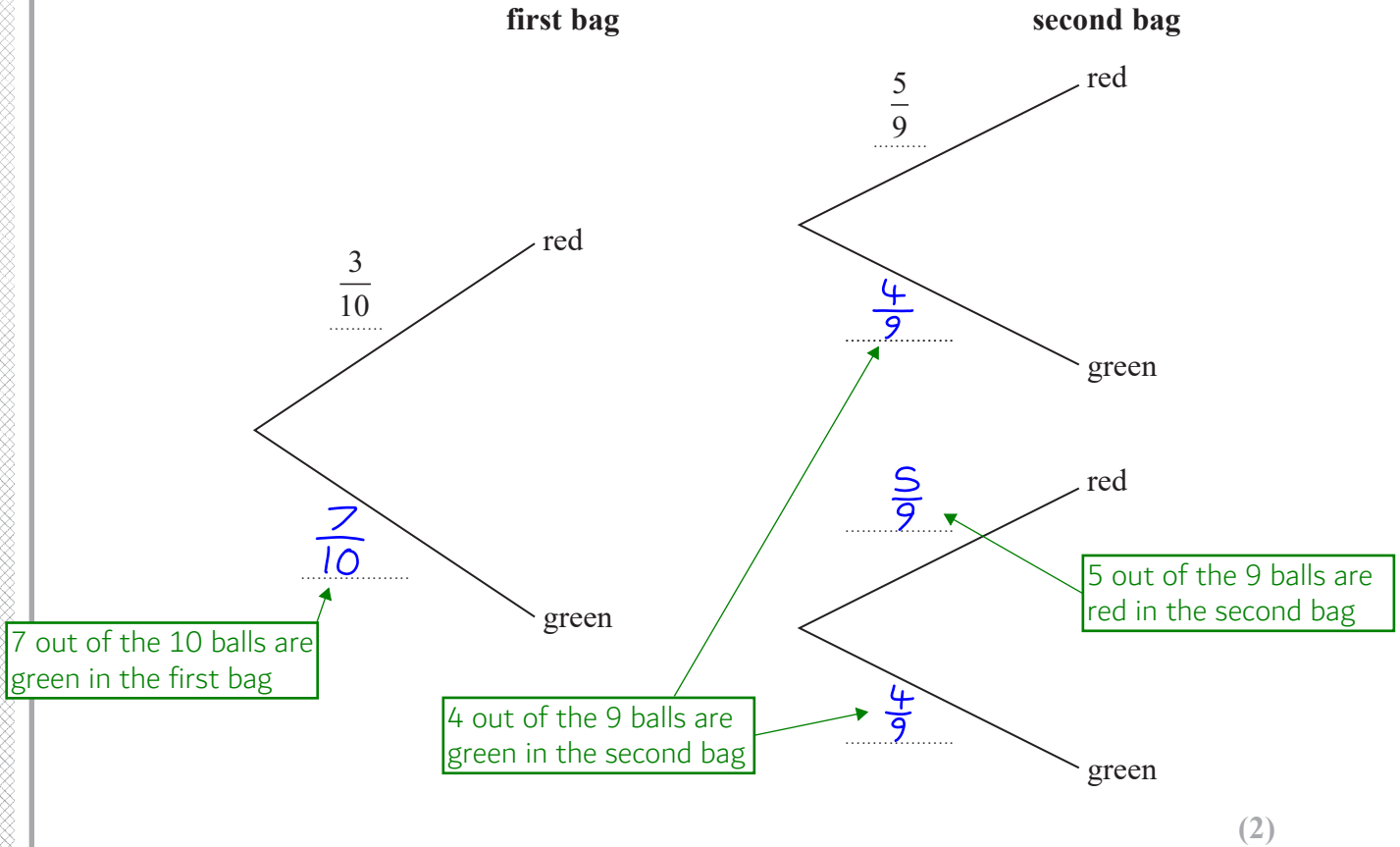
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27 Amina has two bags.

In the first bag there are 3 red balls and 7 green balls.
In the second bag there are 5 red balls and 4 green balls.

Amina takes at random a ball from the first bag.
She then takes at random a ball from the second bag.

(a) Complete the probability tree diagram.



(b) Work out the probability that Amina takes two red balls.

$\frac{3}{10} \times \frac{5}{9}$ ← Red AND red. AND means to multiply the probabilities

To multiply fractions: multiply the numerators and multiply the denominators

$\frac{15}{90}$

(2)

(Total for Question 27 is 4 marks)

28 The size of each interior angle of a regular polygon is 11 times the size of each exterior angle.

Work out how many sides the polygon has.

$$x + 11x \leftarrow \text{Let } x \text{ be the exterior angle. The interior angle is } 11x \text{ as it is 11 times the exterior angle. Adding these together expresses the total of the exterior and interior angles}$$

$$12x = 180 \leftarrow \text{Collecting like terms. The total of the exterior and interior angles must be } 180^\circ \text{ as they lie around a point on a straight line}$$

$$12 \overline{) \begin{array}{r} 0 \ 1 \ 5 \\ 1 \ 8 \ 6 \end{array}} \leftarrow \text{Dividing both sides by 12 finds that } x = 15, \text{ so the exterior angle is } 15^\circ$$

$$15 \overline{) \begin{array}{r} 0 \ 2 \ 4 \\ 3 \ 6 \ 0 \end{array}} \leftarrow \text{The exterior angles of any polygon add up to } 360^\circ. \text{ As it is regular, all the exterior angles are the same. So dividing } 360^\circ \text{ by the size of each exterior angle works out that there are 24 exterior angles. There must be 24 sides}$$

24

(Total for Question 28 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS