

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

0.4 0.02 0.37 0.152 0.2

All the numbers have 0 units. Compare the tenths to decide on the order

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

A number 10 can be divided by to get a whole number

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 $3 \times 5 + 7$

BIDMAS so multiplication needs to be done first.

$$3 \times 5 = 15$$

$$15 + 7 = 22$$

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.

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

BIDMAS so brackets need to be done first.

$$2 + 3 = 5$$

$$7 \times 5 = 35$$

(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.

$$8 \div \frac{1}{4} = 8 \times 4 = 32$$

$$2 \times 14 = 28$$

Yes

This works out the number of days worth of food 8 tins provides. To divide by a fraction, keep the first number, change the division sign to a multiplication and take the reciprocal of (flip) the second fraction

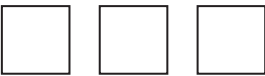
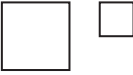


This works out the number of days worth of food needed by 2 cats for 14 days

There is 32 days worth of food and only 28 are needed so there is enough cat food

(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.

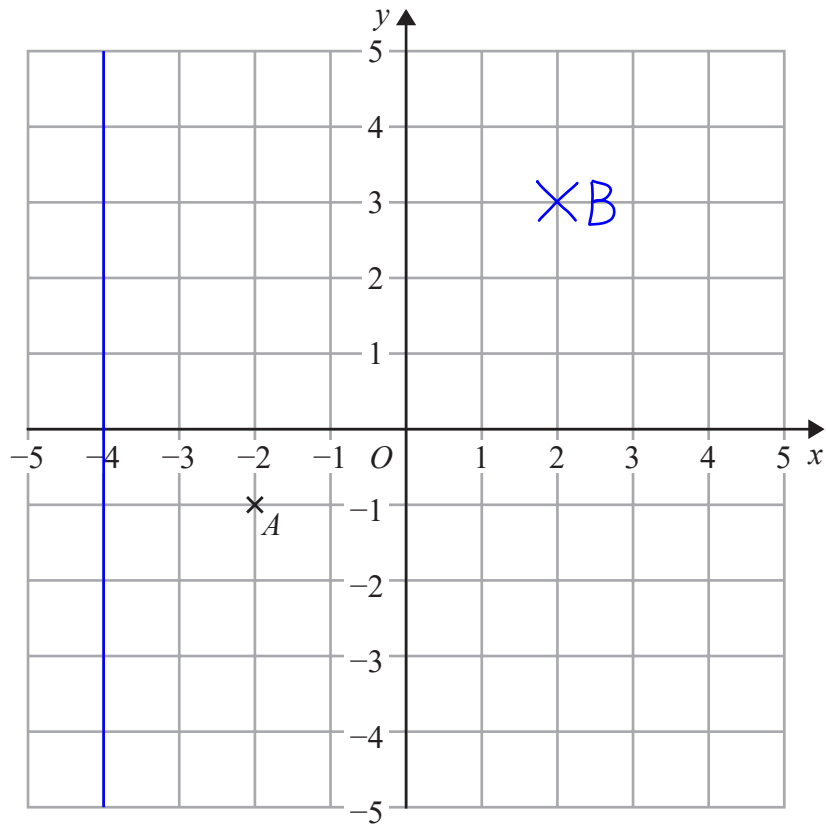
As a full square represents 4 trees, $\frac{1}{4}$ of a square represents 1 tree, $\frac{1}{2}$ of a square represents 2 trees and $\frac{3}{4}$ of a square represents 3 trees. Therefore there are 12 apple trees, 5 cherry trees and 6 pear trees.

$$12 + 5 + 6 = 23$$

$$30 - 23 = 7$$

So there are 7 plum trees

(Total for Question 7 is 3 marks)



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

The x-coordinate (how far across) is first and this is -2.
The y-coordinate (how far up) is next and this is -1

(-2 , -1)
(1)

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

2 in the x direction (across) and 3 in the y direction (up)

(1)

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

Regardless of what y is, x is always -4

(1)

(Total for Question 8 is 3 marks)

9 $g = 9$
 $h = 4$

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

$$18 + 12$$

Substitute g for 9 and h for 4

$$2 \times 9 = 18$$

$$3 \times 4 = 12$$

30

(Total for Question 9 is 2 marks)

10 Write down two prime numbers that have a sum of 32

Try subtracting prime numbers (only divisible by themselves and 1) from 32, starting with the smallest, until we get a prime number.

$$32 - 2 = 30, \text{ which is not prime}$$

$$32 - 3 = 29, \text{ which is prime}$$

3, 29

(Total for Question 10 is 2 marks)

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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. All of the fractions simplify to $\frac{3}{4}$ except for $\frac{10}{16}$

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

(1)

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

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

To add the fractions, we must make the denominators the same. 12 is a common multiple of 6 and 12 so we can convert $\frac{5}{6}$ to $\frac{10}{12}$ by multiplying both the denominator and numerator by 2. Once the denominators are the same, the numerators can be added

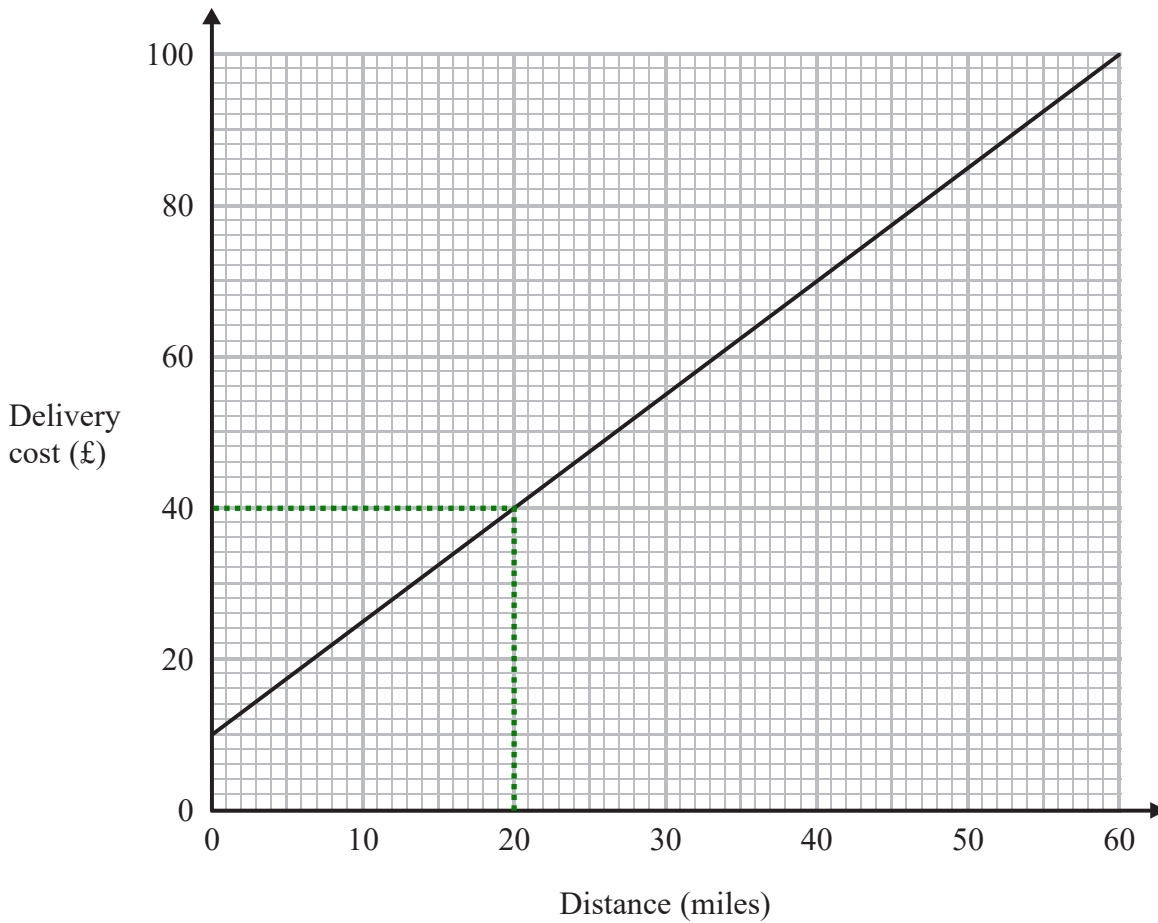
$$\frac{11}{12}$$

(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 distance of 20 miles is £40. $40 - 10 = 30$

£ 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.

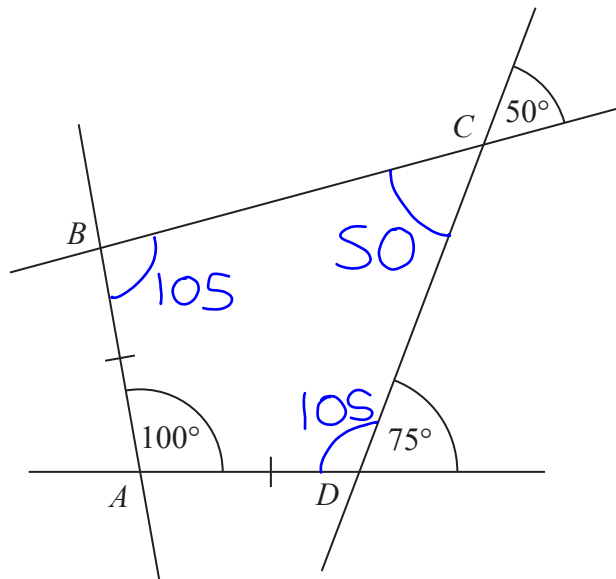
Write down the ratio of Azmol's score to Ryan's score to Kim's score.

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.

Angle ADC is 105 as there are 180 degrees around a point on a straight line and $180 - 75 = 105$

Angle BCD is 50 as vertically opposite angles are equal

$$100 + 50 + 105 = 255$$

$$360 - 255 = 105$$

Angle ABC is 105 as angles in a quadrilateral add up to 360 degrees

Therefore $ABCD$ 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?

$$5p = 300$$

$$p = 60$$

$$2p = 120$$

$$300 + 120 = 420$$

If all of the orange juice is used, 5 parts is 300ml. Dividing by 5 works out that 1 part is worth 60ml. Then multiplying by 2 works out that the 2 parts for lemonade is worth 120ml. Using 300ml of orange juice with 120ml of lemonade produces a drink of 420 ml

$$2q = 200$$

$$q = 100$$

$$5q = 500$$

If all of the lemonade is used, 2 parts is 200ml. Dividing by 2 works out that 1 part is worth 100ml. Then multiplying by 5 works out that the 5 parts for orange juice is worth 500ml. There isn't this much orange juice so we can't use all the lemonade

420 m/ (3)

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

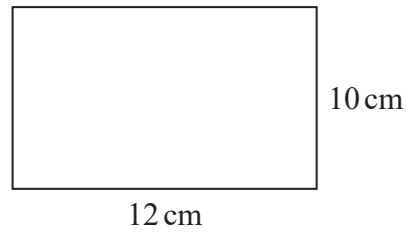
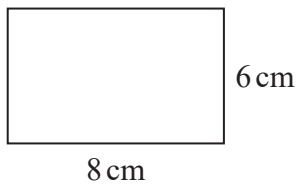
(b) Does this affect the greatest amount of fizzy drink he can make? Give a reason for your answer.

No, as only 120ml of lemonade is needed

(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.

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

No, as you need to multiply the sides by the same number

(Total for Question 16 is 1 mark)

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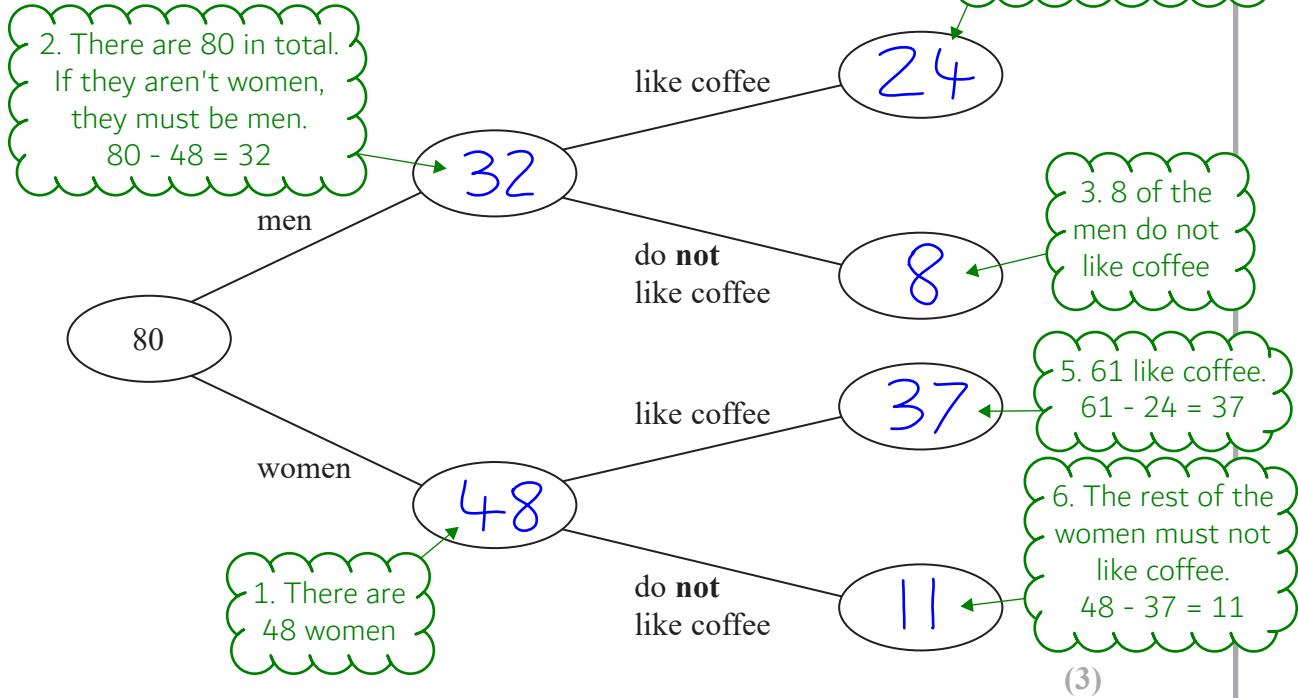
17 80 people are asked if they like coffee.

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.



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

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

There are 61 who like coffee.
37 of these are women

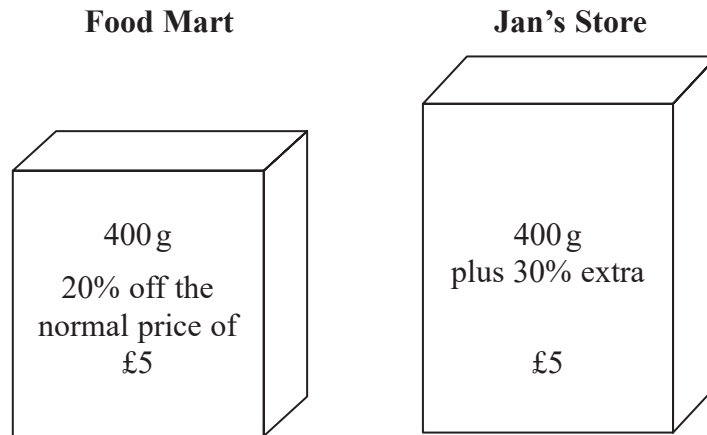
$$\frac{37}{61}$$

(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.

Food Mart

$$10\% \text{ is } \pounds 0.50$$

$$20\% \text{ is } \pounds 1$$

$$\pounds 5 - \pounds 1 = \pounds 4$$

$$400 \div 4 = 100$$

To find 10% of £5, divide it by 10 (move the decimal point once to the left). 20% is 2 x 10% which is 2 x £0.50 = £1. Subtracting the £1 is reducing the cost by 20%. Dividing the 400g by the price of £4 works out how much mass you get for £1

Jan's Store

$$10\% \text{ is } 40$$

$$30\% \text{ is } 120$$

$$400 + 120 = 520$$

$$\begin{array}{r} 104 \\ 5 \overline{)520} \end{array}$$

To find 10% of 400g, divide it by 10 (move the decimal point once to the left). 30% is 3 x 10% which is 3 x 40g = 120g. Adding the 120g is increasing the mass by 30%. Dividing the 520g by the price of £5 works out how much mass you get for £1

Jan's Store

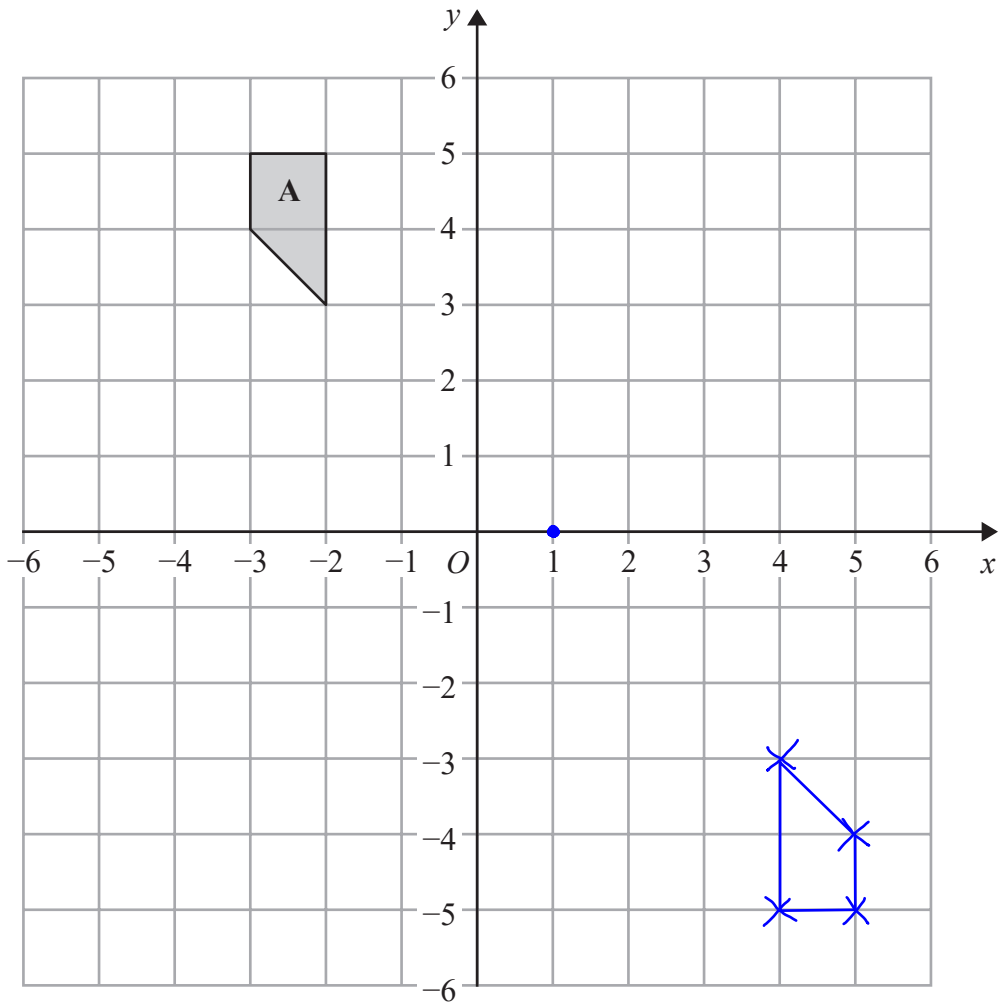
It is better value as there is more mass per pound

(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)

The easiest method is to get tracing paper (you can ask for this in the exam), draw around shape A then rotate the paper around $(1, 0)$. Draw the shape in its new location

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20 Work out the value of $\frac{3^7 \times 3^{-2}}{3^3} = \frac{3^5}{3^3} = 3^2$

$a^x \times a^y = a^{x+y}$
 $a^x \div a^y = a^{x-y}$
 First add the indices
 $7 + -2 = 5$
 Next subtract the indices
 $5 - 3 = 2$
 $3^2 = 3 \times 3 = 9$

9

(Total for Question 20 is 2 marks)

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

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

$$\begin{array}{r} 144 \\ -108 \\ \hline 36 \end{array} \quad \begin{array}{r} 18 \\ \times 6 \\ \hline 108 \\ 4 \end{array}$$

(a) Work out a value of v .

$$\begin{aligned} v &= \sqrt{12^2 + 2 \times (-3) \times 18} \\ &= \sqrt{144 - 108} \\ &= \sqrt{36} \end{aligned}$$

Square rooting both sides makes v the subject. Substitute in the values for u , a and s . Follow BIDMAS when evaluating the value

6

or -6

(2)

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

$$v^2 - u^2 = 2as$$

s wants to stay where it is. Everything else needs to go. Follow BIDMAS backward to decide what to eliminate first

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

(2)

(Total for Question 21 is 4 marks)

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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.

10% is £210

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

Divide £2100 by 10 (remove a 0) to work out 10% of the bonus

60% is £1260

$$\begin{array}{r} 180 \\ 7 \overline{) 1260} \end{array}$$

If 40% goes to the managers, 60% goes to the salesmen. 60% is 6 x 10%

Each salesman gets £180

$2100 \div 10 = 210$

Each salesman would get £210 if it was shared equally by all 10. Remove a 0 to divide by 10

$$\begin{array}{r} 45 \\ 4 \overline{) 180} \end{array}$$

25% is 1/4 so dividing £180 by 4 works out 25% of £180

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

Adding the 25% to £180 works out how much 25% more than £180 is

No

£225 is 25% more and this isn't equal to the £210 they would get

(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?

$$\begin{array}{r} 120 \\ \times 5 \\ \hline 600 \\ 200 \\ \hline 3 \overline{)600} \end{array}$$

This works out the total amount of minutes of work have been done by all 5 taps

Then share the total amount of work by the 3 taps

200 minutes
(2)

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

Each of the taps work at the same rate

If they didn't, it would be impossible to calculate the previous question

(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.

$$\frac{d}{s} = t \quad t = \frac{d}{s}$$

Using the formula triangle (cover what you are trying to find), time = distance/speed

$$\frac{1}{200} \times 60 \times 60$$

Divide the distance of 1 mile by 200 (the speed is roughly 200 miles per hour). Convert into minutes by multiplying by 60 then multiply by 60 again to convert into seconds

$$\frac{3600}{200} = \frac{36}{2}$$

$6 \times 6 = 36$ so $60 \times 60 = 3600$
Simplify the fraction

$$2 \overline{)36} \begin{array}{l} 18 \end{array}$$

18 seconds
(3)

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

Overestimate as we rounded down the speed

Dividing by less gives a larger answer

(1)

(Total for Question 24 is 4 marks)

25 Solve the simultaneous equations

$$\begin{aligned}5x + y &= 21 \\ x - 3y &= 9\end{aligned}$$

$$5x - 15y = 45$$

$$16y = -24$$

$$y = \frac{-24 \div 8}{16 \div 8} = \frac{-3}{2}$$

$$x - 3\left(\frac{-3}{2}\right) = 9$$

$$x + \frac{9}{2} = 9$$

$$x = \frac{18}{2} - \frac{9}{2} = \frac{9}{2}$$

Multiply the second equation by 5 to get the same number of x as the top equation

Subtract the new equation from the top equation to eliminate the x terms

Substitute the value of y into the second equation and rearrange to find x

$$\begin{aligned}x &= \dots\dots\dots \frac{9}{2} \\ y &= \dots\dots\dots \frac{-3}{2}\end{aligned}$$

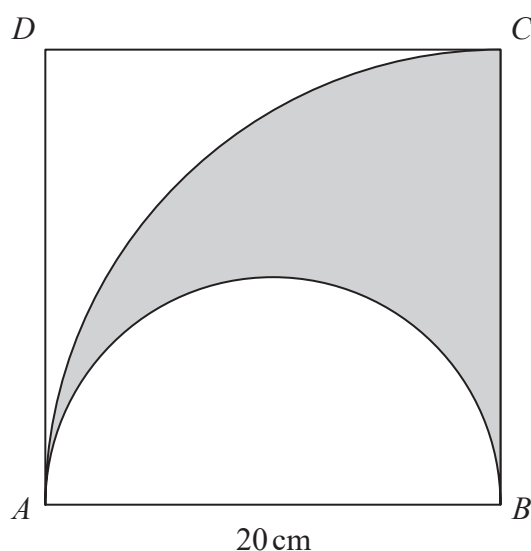
(Total for Question 25 is 3 marks)

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

$$\pi r^2 = \text{area of a circle}$$

Area of the quarter circle ABC

$$\frac{1}{4} \pi \times 20^2 - \frac{1}{2} \pi \times 10^2$$

Area of the semicircle. Subtracting this from the area of the quarter circle gives the area of the shaded region

Length squared gives the area of the square

$$20^2$$

$$\frac{50\pi}{400}$$

$20^2 = 20 \times 20 = 400$
 $1/4 \times 400 = 100$
 So the area of the quarter circle is 100π .
 $10^2 = 10 \times 10 = 100$
 $1/2 \times 100 = 50$
 So the area of the semicircle is 50π .
 Subtracting these gives the area of the shaded region which is 50π .
 The area of the square is 400

The fraction simplifies by dividing the numerator and denominator by 50

$$\frac{\pi}{8}$$

(Total for Question 26 is 4 marks)

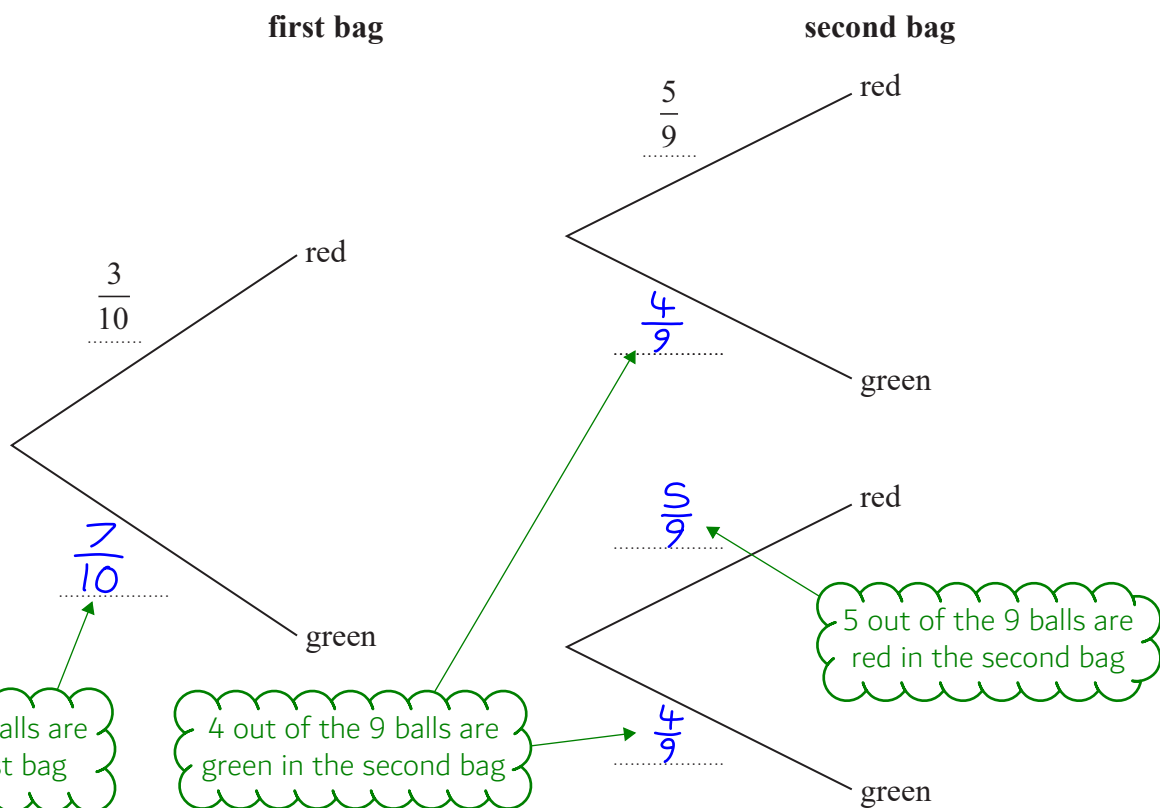
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27 Amina has two bags.

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.



(2)

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

$$\frac{3}{10} \times \frac{5}{9}$$

Red AND red so we multiply the probability of getting red in the first bag by the probability of getting red in the second bag (and means multiply in probability). To multiply fractions, multiply the numerators together and multiply the denominators together

$$\frac{15}{90}$$

(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.

360/exterior angle = number of sides
So we need to find the exterior angle.
Let x = the exterior angle

$$x + 11x = 180$$

The exterior angle add the interior angle is 180 degrees. The interior angle is $11x$ as it is 11 times the exterior angle

$$x = \frac{180}{12}$$

$x + 11x = 12x$
To find x , divide both sides by 12

$$\begin{array}{r} 15 \\ 12 \overline{) 180} \end{array}$$

$$x = 15$$

360/exterior angle = number of sides
The exterior angle is 15 degrees

$$\begin{array}{r} 24 \\ 15 \overline{) 360} \end{array}$$

24

(Total for Question 28 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

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