

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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Pearson

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.

$$\begin{array}{l} \times 3 \quad \left(\begin{array}{l} 100 \text{ cm} = 1 \text{ m} \\ 300 \text{ cm} = 3 \text{ m.} \end{array} \right) \times 3 \end{array}$$

..... 3 metres

(Total for Question 1 is 1 mark)

- 2 Work out $\frac{1}{3}$ of 24 \rightarrow 24 can be written as $\frac{24}{1}$

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

..... 8

(Total for Question 2 is 1 mark)

- 3 Write 40% as a fraction.

$$40\% = \frac{40}{100} = \frac{4}{10}$$

..... $\frac{4}{10}$

(Total for Question 3 is 1 mark)

- 4 Work out $2.5^2 = 2.5 \times 2.5 = (25 \times 25) \div 100$

$$\begin{array}{r} 25 \\ \times 25 \\ \hline 125 \\ 500 \\ \hline 625 \end{array}$$

$$625 \div 100 = \underline{\underline{6.25}}$$

..... 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)

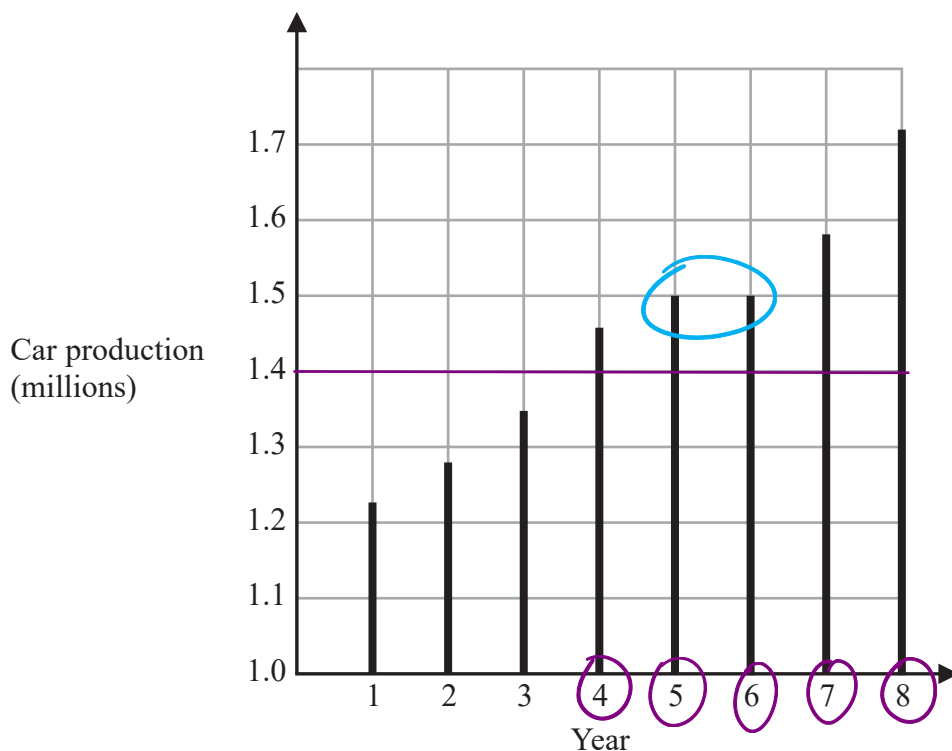
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6 The graph shows some information about car production in the UK over eight years.



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

5
.....
(1)

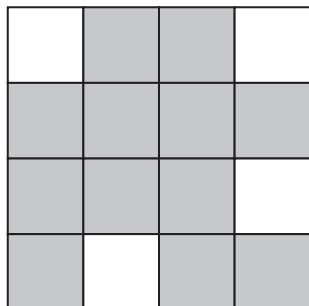
(b) In which two years was car production the same?

5 , 6
.....
(1)

(Total for Question 6 is 2 marks)



7



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

$$\frac{12 \text{ squares shaded}}{16 \text{ squares in total}} = \frac{12}{16} = \frac{3}{4}$$

$\xrightarrow{\div 4}$
 $\xleftarrow{\div 4}$

$$\frac{3}{4}$$

(Total for Question 7 is 2 marks)

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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.

Number of boxes:

$$\frac{200}{25} = 8 \quad \textcircled{1}$$

Total cost of boxes:

$$\begin{array}{l} 1 \text{ box} = \text{£}9.75 \quad \textcircled{1} \\ \times 8 \quad \left\{ \right. \\ 8 \text{ boxes} = \text{£}78 \quad \left. \right\} \times 8 \end{array}$$

①

£ 78

(Total for Question 8 is 3 marks)



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

$$\frac{300}{2 \times 5} = \frac{300}{10} = 30$$

$$\begin{array}{r} \textcircled{1} \quad 30 \\ \hline (1) \end{array}$$

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

$$(6 - 2.5)(8 + 4) = (3.5)(12) = 42$$

$$\begin{array}{r} \textcircled{1} \\ 42 \\ \hline (1) \end{array}$$

- (c) Write down the reciprocal of 20

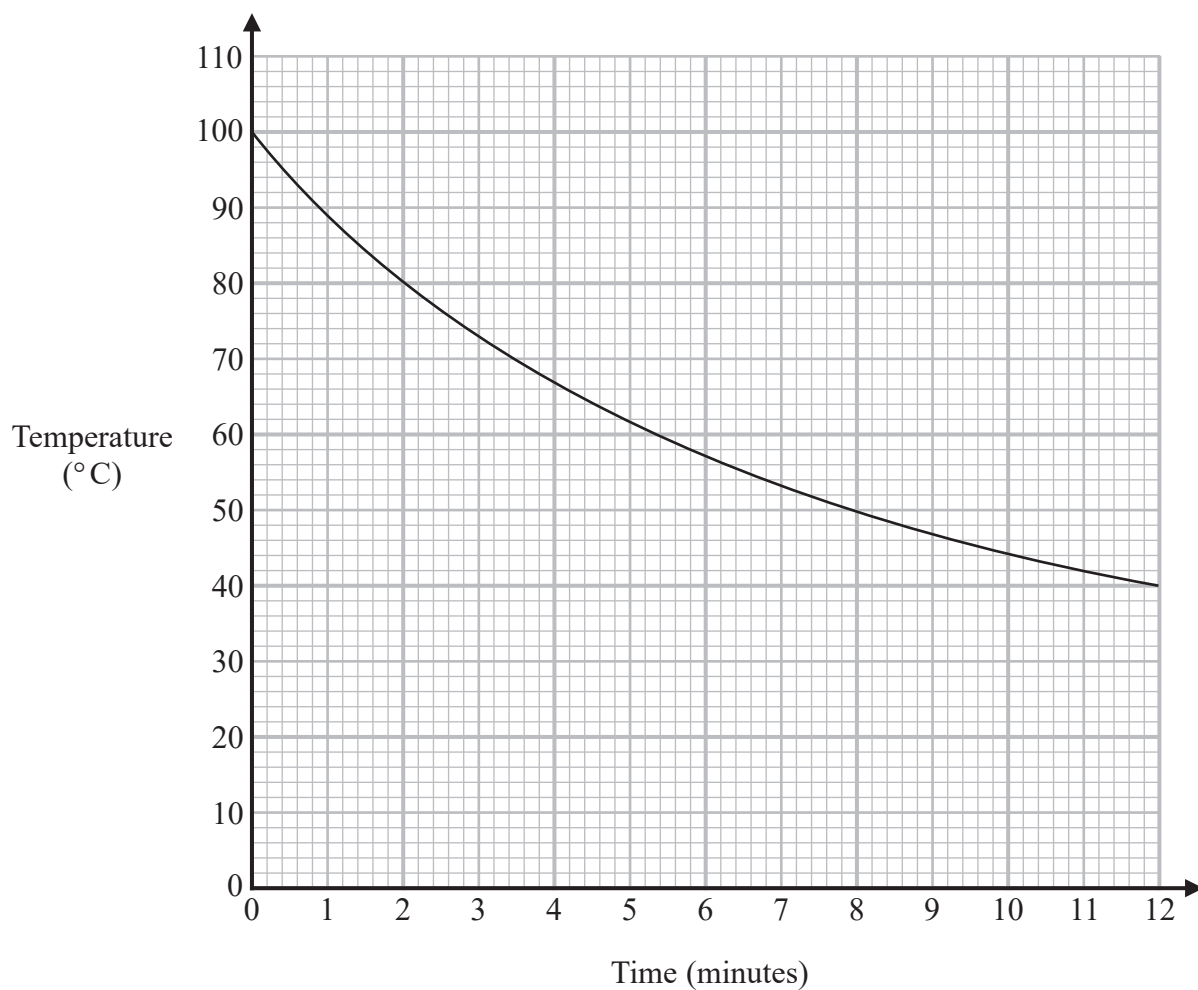
reciprocal means '1 over'

$$\begin{array}{r} \textcircled{1} \\ \frac{1}{20} \\ \hline (1) \end{array}$$

(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 °C.



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

①
..... 80 °C
(1)

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

(b) Write down this time.

①
..... 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, because the gradient is steeper in the first 3 minutes and less steep between 9 and 12 minutes.

①

(1)

(Total for Question 10 is 3 marks)

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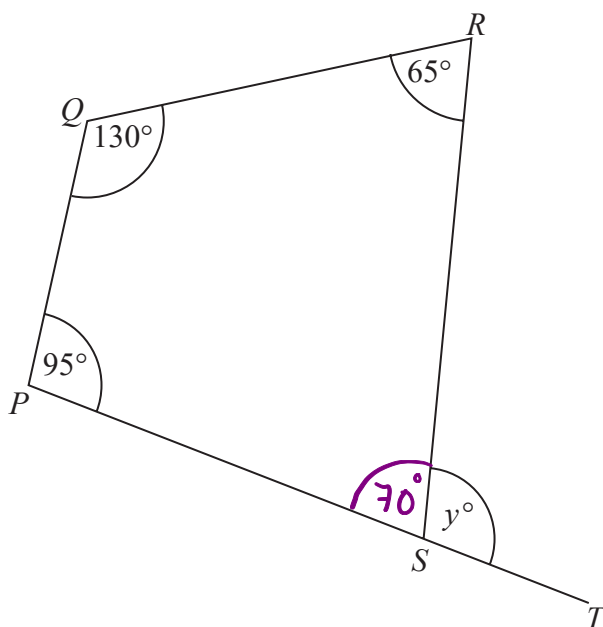
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P 6 2 2 7 6 A 0 7 2 4

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



Find the value of y .

Angles in a quadrilateral add up to 360°

$$95 + 130 + 65 + x = 360^\circ$$

$$\therefore x = 360 - 65 - 130 - 95 = 70^\circ \quad \textcircled{1}$$

Angles on a straight line add up to 180°

$$x + y = 180^\circ \quad \textcircled{1}$$

$$70 + y = 180^\circ$$

$$y = 180^\circ - 70^\circ = \underline{\underline{110^\circ}}$$

$$y = \textcircled{1} \quad 110^\circ$$

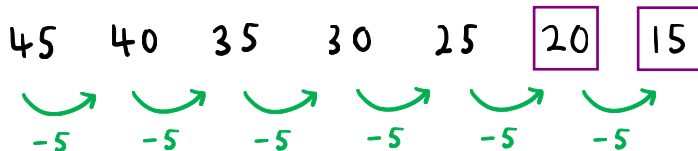
(Total for Question 11 is 3 marks)



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

45 40 35 30 25

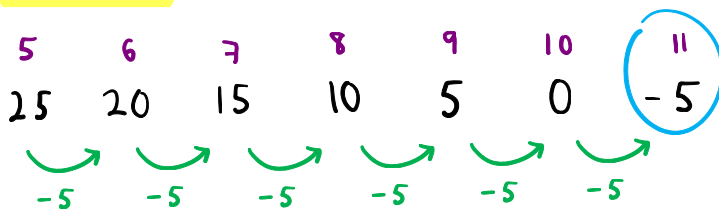
(a) (i) Write down the next two terms of this sequence.



①
 $\frac{20 \quad 15}{(1)}$

A term of this sequence is -5

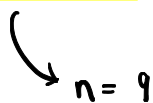
(ii) Which term?



①
 $\frac{11}{(1)}$

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

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



$$4n + 3 = 4(9) + 3 = 36 + 3 = \underline{\underline{39}}$$

①
 $\frac{39}{(1)}$

(Total for Question 12 is 3 marks)

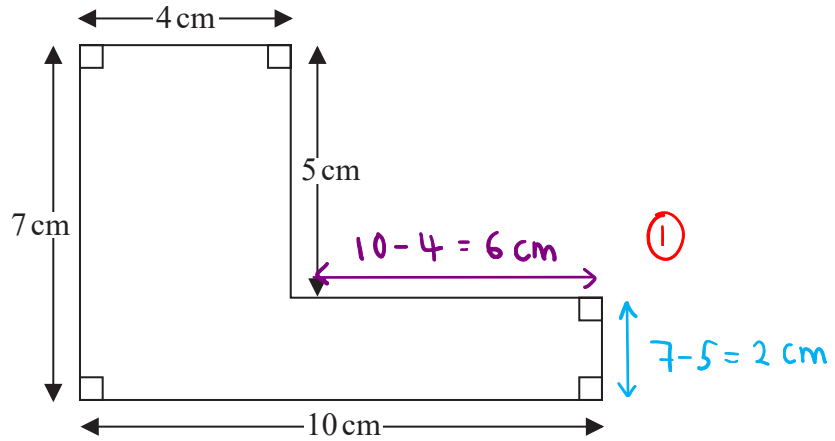
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13



Work out the perimeter of this shape.

$$\text{Perimeter} = 7 + 4 + 5 + 6 + 2 + 10 = 34 \text{ cm}$$

① 34 cm

(Total for Question 13 is 2 marks)



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

$$\begin{aligned} & \textcircled{3x} + \textcircled{5y} + \textcircled{2x} - \textcircled{4y} \quad \textcircled{1} \\ & = 5x + y \end{aligned}$$

$$\begin{aligned} & \textcircled{1} \quad 5x + y. \\ & \quad \quad \quad \textcircled{2} \end{aligned}$$

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

$$\begin{aligned} & 5p + 7 = 22 \\ -7 \quad \left(\quad \quad \quad \right) -7 & \\ & 5p = 15 \\ \div 5 \quad \left(\quad \quad \quad \right) \div 5 & \\ & \underline{\underline{p = 3}} \quad \textcircled{1} \end{aligned}$$

$$\begin{aligned} p = & \quad \textcircled{3} \\ & \quad \quad \quad \textcircled{2} \end{aligned}$$

(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.

| SHOP A | SHOP B |
|---|---|
| $7 \text{ packs} = 4 \times 7 = 28 \text{ batteries}$ $\rightarrow \text{Not enough.}$ | $5 \text{ packs} = 6 \times 5 = 30 \text{ batteries}$ $\rightarrow \text{Perfect amount.}$ |
| $8 \text{ packs} = 4 \times 8 = 32 \text{ batteries}$ $\rightarrow \text{Enough.}$ | $\therefore 5 \text{ packs needed from shop B.}$ |
| $\therefore \text{minimum } 8 \text{ packs needed from shop A.}$ | $1 \text{ pack} = \text{£} 2.70$ $5 \text{ packs} = \text{£} 13.50$ |
| $1 \text{ pack} = \text{£} 1.60$ $8 \text{ packs} = \text{£} 12.80$ | |

$\text{£} 12.80 < \text{£} 13.50 \therefore \text{he should buy the batteries from Shop A.}$

(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.

$$30 \text{ batteries from A} = \text{£} 0.40 \times 30 = \text{£} 12.$$

$$30 \text{ batteries from B} = \text{£} 0.45 \times 30 = \text{£} 13.50$$

Shop A is still cheaper than shop B \therefore there is no effect.

(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.

$$\text{total number of cards} = 5 + 2 + 4 = 11$$

5 blue cards.

$$\therefore P(\text{blue}) = \frac{5}{11}$$

①

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

(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?

$$P(6) = 0.3$$

$$P(\text{not } 6) = 1 - 0.3 = 0.7$$

①

Because sum of probabilities is always 1.

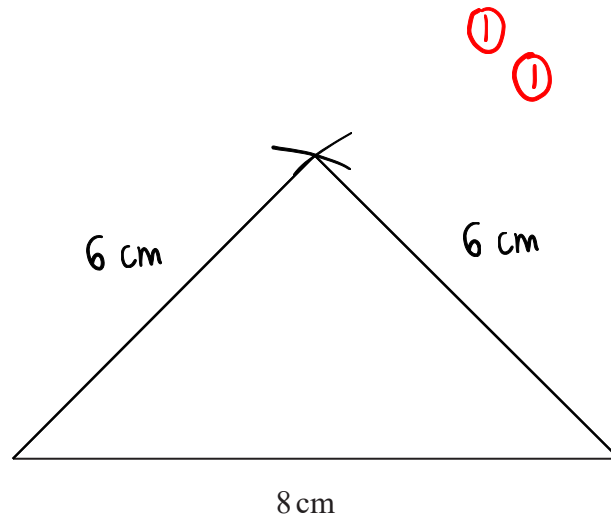
$$0.7$$

(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.



(Total for Question 17 is 2 marks)

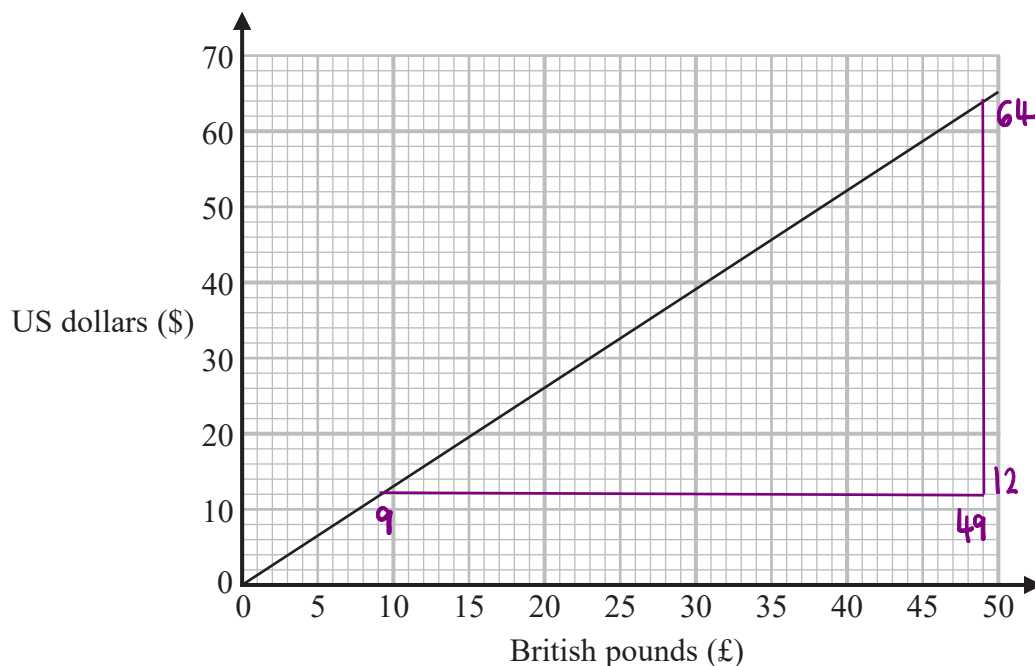
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18 This graph can be used to change between US dollars (\$) and British pounds (£).



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

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

British pounds = x . US dollars = y .

Find equation of line:

$$\left. \begin{aligned} \text{gradient, } m, &= \frac{\Delta y}{\Delta x} = \frac{64-12}{49-9} = 1.3 \\ \text{y-intercept, } c, &= 0. \end{aligned} \right\} \begin{aligned} y &= mx + c \\ y &= 1.3x + 0 \\ \therefore y &= 1.3x \end{aligned} \quad \textcircled{1}$$

Find x when $y = 345$:

$$\begin{aligned} y &= 1.3x \quad \textcircled{1} \\ 345 &= 1.3x \\ \div 1.3 \quad \left(\begin{array}{l} 345 \\ 265.384\dots \end{array} \right) &= x \quad \left(\div 1.3 \right) \end{aligned}$$

£ 265

(Total for Question 18 is 3 marks)

$x = 265.38\dots \therefore$ Rosie paid \approx £265 for the ring.



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.

↪ = 100%

$$\begin{array}{l}
 \div 4 \left(\begin{array}{l} 40\% = 56 \\ 10\% = 14 \end{array} \right) \div 4 \quad \textcircled{1} \\
 \times 10 \left(\begin{array}{l} 100\% = 140 \end{array} \right) \times 10
 \end{array}$$

$$\begin{array}{r}
 \textcircled{1} \\
 140 \\
 \hline
 (2)
 \end{array}$$

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.

$$\text{Percentage} = \frac{18}{56} \times 100 = 32.14285... \approx 32\%$$

①

$$\begin{array}{r}
 \textcircled{1} \\
 32 \\
 \hline
 (2) \quad \%
 \end{array}$$

(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?

Amount Carl has = C

$$\text{Mean} = \frac{\text{total amount of money}}{3} = \frac{65 + 100 + C}{3} = 80.$$

$$\begin{array}{l} \frac{65 + 100 + C}{3} = 80. \\ \times 3 \quad \left(\begin{array}{l} \\ \end{array} \right) \times 3 \end{array}$$

$$65 + 100 + C = 240.$$

$$\therefore C = 240 - 100 - 65 = £75$$

$$\text{Three } £5 \text{ notes} = 3 \times £5 = £15.$$

$$\text{one } £20 \text{ note} = 1 \times £20 = £20$$

$$£35$$

$$£75 - £35 = £40 = \underline{\underline{4 \text{ } £10 \text{ notes.}}}$$

(Total for Question 20 is 4 marks)

4



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.

$$P(H) = \frac{1}{2}$$

$$\frac{1}{2} \times 50 = 25$$

①

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, because 100 is more than 10. ①

(1)

(Total for Question 21 is 2 marks)

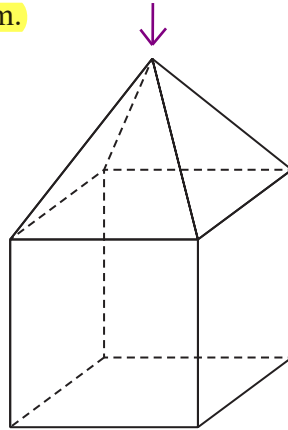
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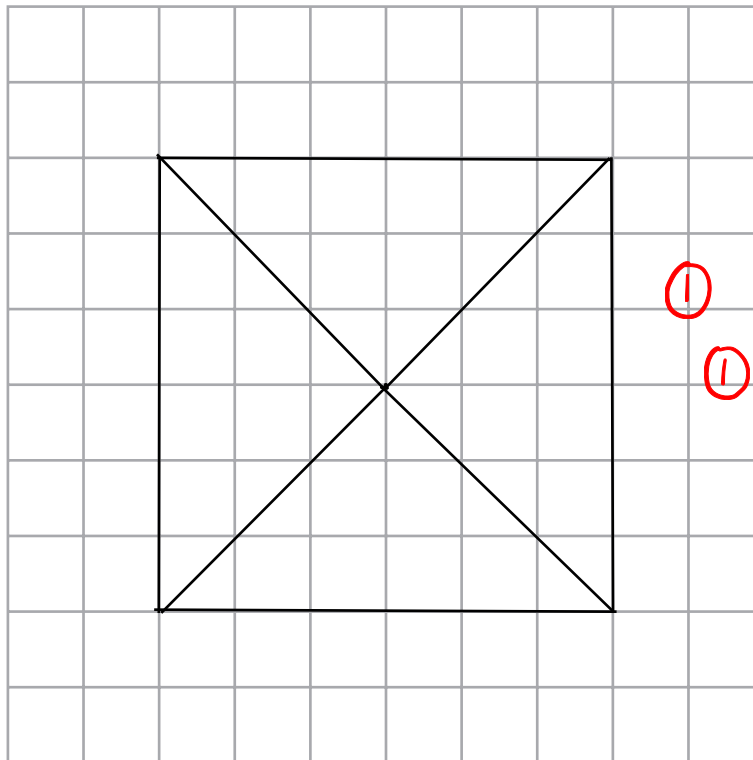
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- 22 Here is a solid made from a square-based pyramid and a cube.
 Each edge of the solid has length 6 cm.



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



(Total for Question 22 is 2 marks)

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

$$x^a \times x^b = x^{a+b}$$

$$\therefore n^3 \times n^5 = n^{3+5} = n^8$$

①

$$\frac{n^8}{(1)}$$

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

$$\frac{x^a}{x^b} = x^{a-b}$$

①

$$\frac{c^3d^4}{c^2d} = \frac{c^3}{c^2} \times \frac{d^4}{d^1} = c^{3-2} \times d^{4-1} = (c^1)(d^3) = cd^3$$

①

$$\frac{cd^3}{(2)}$$

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

$$\begin{array}{l} \frac{5x}{2} > 7 \\ \times 2 \quad \left(\right) \quad \times 2 \end{array}$$

$$5x > 14$$

①

$$\begin{array}{l} 5x > 14 \\ \div 5 \quad \left(\right) \quad \div 5 \end{array}$$

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

①

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

(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.

$$\text{Speed} = \frac{\text{distance}}{\text{time}} \quad \therefore \text{time} = \frac{\text{distance}}{\text{Speed}}$$

$$\text{time}_1 = \frac{30}{24} = 1.25 \text{ hours}$$

①

$$\text{time}_2 = \frac{12}{8} = 1.5 \text{ hours}$$

$$\text{Total time} = 1.25 + 1.5 = 2.75 \text{ hours} \quad \text{①}$$

$$2.75 \text{ hours} = 2 \text{ hours and } 0.75 \text{ hours.}$$

$$\begin{array}{l} \times 0.75 \left(\begin{array}{l} 1 \text{ hour} = 60 \text{ minutes} \\ 0.75 \text{ hours} = 45 \text{ minutes} \end{array} \right) \times 0.75 \end{array}$$

$$\therefore 2.75 \text{ hours} = 2 \text{ hours and } 45 \text{ minutes.} \quad \text{①}$$

..... 2 hours 45 minutes

(Total for Question 24 is 3 marks)



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

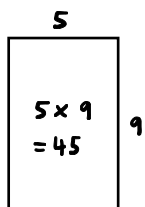
Grass seed is sold in 2 kg boxes.

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

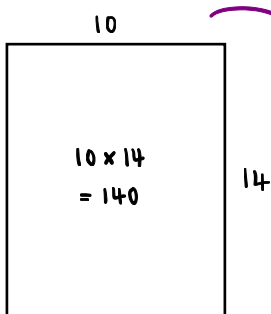
She has 5 boxes of grass seed.

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

You must show all your working.



Covers an area of 45 m^2
Requires 3 kg of grass seed.



Covers an area of 140 m^2
Requires 9.3 kg of grass seed.

$$\begin{aligned} 45 \text{ m}^2 &= 3 \text{ kg} \\ \times \frac{140}{45} & \quad \quad \quad \times \frac{140}{45} \\ \hline 140 \text{ m}^2 &= 9.333... \text{ kg} \end{aligned}$$

Maisie has 5 boxes. How much is this in kg?

$$\begin{aligned} 1 \text{ box} &= 2 \text{ kg} \\ \times 5 & \quad \quad \quad \times 5 \\ \hline 5 \text{ boxes} &= 10 \text{ kg} \end{aligned}$$

Maisie has 10 kg of seed but only needs 9.3 kg.
 $10 \text{ kg} > 9.3 \text{ kg} \therefore$ Maisie has enough.

(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. Maisie only has 9 kg of grass seed, but she needs 9.3 kg.

She no longer has enough grass seed to make her lawn.

(1)

(Total for Question 26 is 5 marks)

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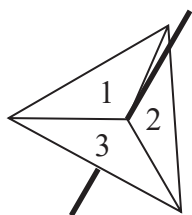
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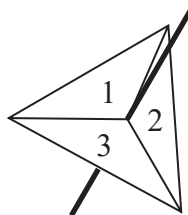


27 Amanda has two fair 3-sided spinners.

equally likely to land on 1, 2, or 3.



Spinner A

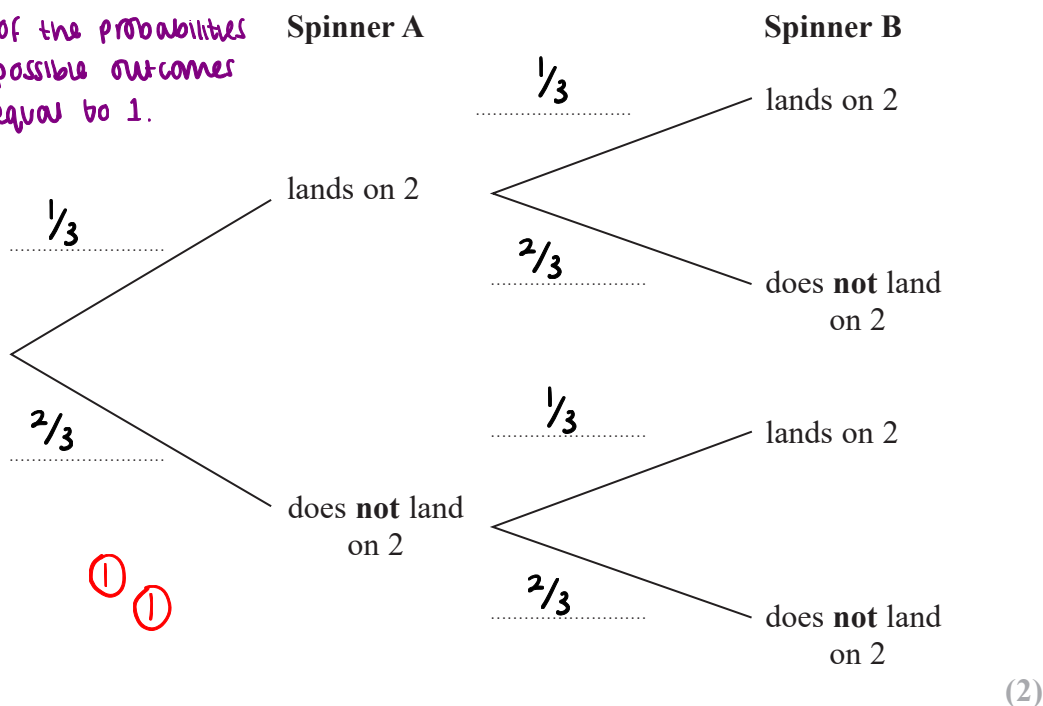


Spinner B

Amanda spins each spinner once.

(a) Complete the probability tree diagram.

The sum of the probabilities of all possible outcomes is equal to 1.



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

and = multiply.

$$P(\text{A lands on 2}) = \frac{1}{3}$$

$$P(\text{B does not land on 2}) = \frac{2}{3}$$

$$\therefore P(\text{A lands on 2 and B does not land on 2})$$

$$= \frac{1}{3} \times \frac{2}{3} = \frac{2}{9}$$

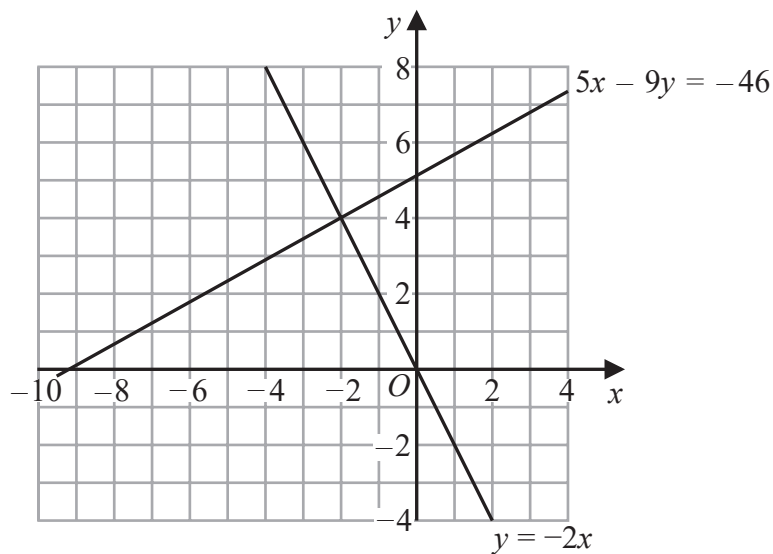
1

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 solution is the point at which these two lines intersect.

①

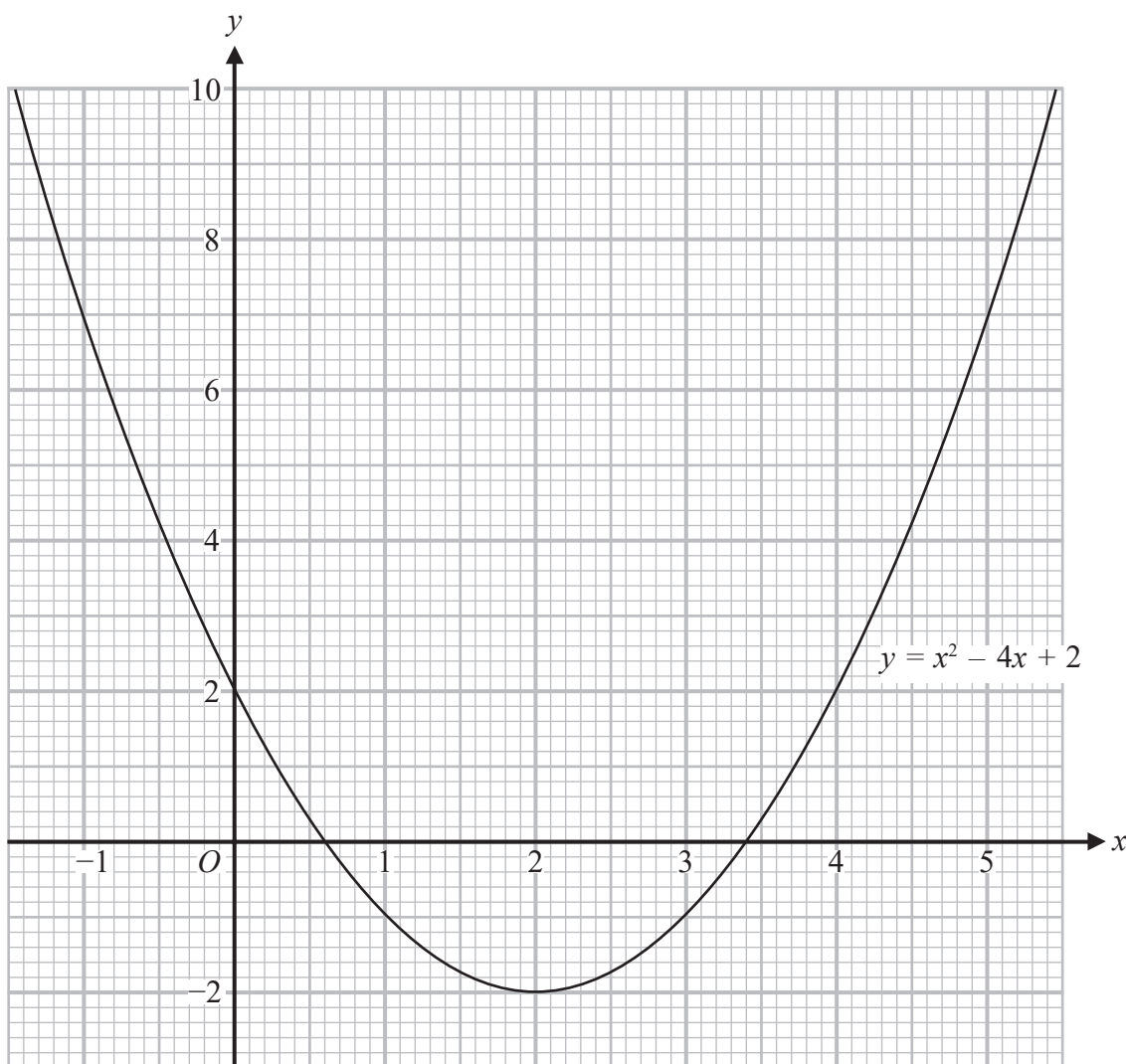
$$\begin{aligned} x &= \underline{-2} \\ y &= \underline{4} \end{aligned} \quad (1)$$

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

Points at which the curve touches the x-axis

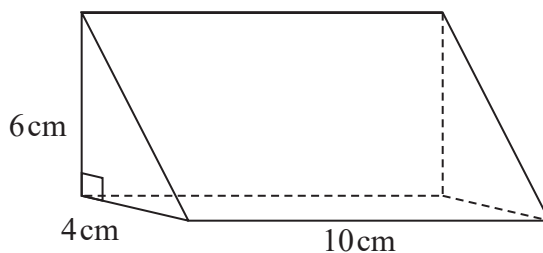
① (0.6, 0) and (3.4, 0) ①

(2)

(Total for Question 28 is 3 marks)



29 The diagram shows a solid triangular prism.



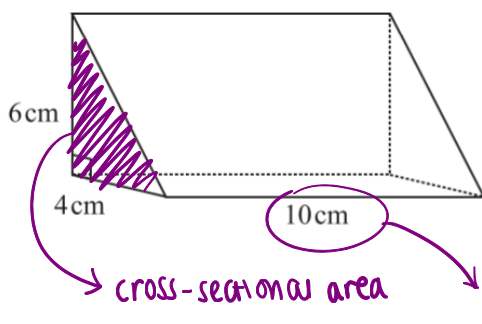
The prism is made from wood with a density of 0.8 g/cm³

Work out the mass of this prism.

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

Find the volume of the prism:

$$\text{volume} = (\text{cross-sectional area}) \times \text{length.}$$



$$\begin{aligned} \text{cross-sectional area} &= \frac{\text{base} \times \text{height}}{2} \\ &= \frac{4 \times 6}{2} = 12 \text{ cm}^2 \end{aligned}$$

①

$$\therefore \text{volume} = 12 \text{ cm}^2 \times 10 \text{ cm} = 120 \text{ cm}^3$$

Find the mass of the prism:

$$\text{Density} = \frac{\text{mass}}{\text{volume}} \quad \therefore \quad 0.8 = \frac{\text{mass}}{120}$$

①

$$\text{Mass} = 0.8 \times 120 = \underline{\underline{96 \text{ g.}}}$$

①

96 g

(Total for Question 29 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

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