

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

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Pearson Edexcel Level 1/Level 2 GCSE (9–1)

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, Formulae Sheet (enclosed). 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.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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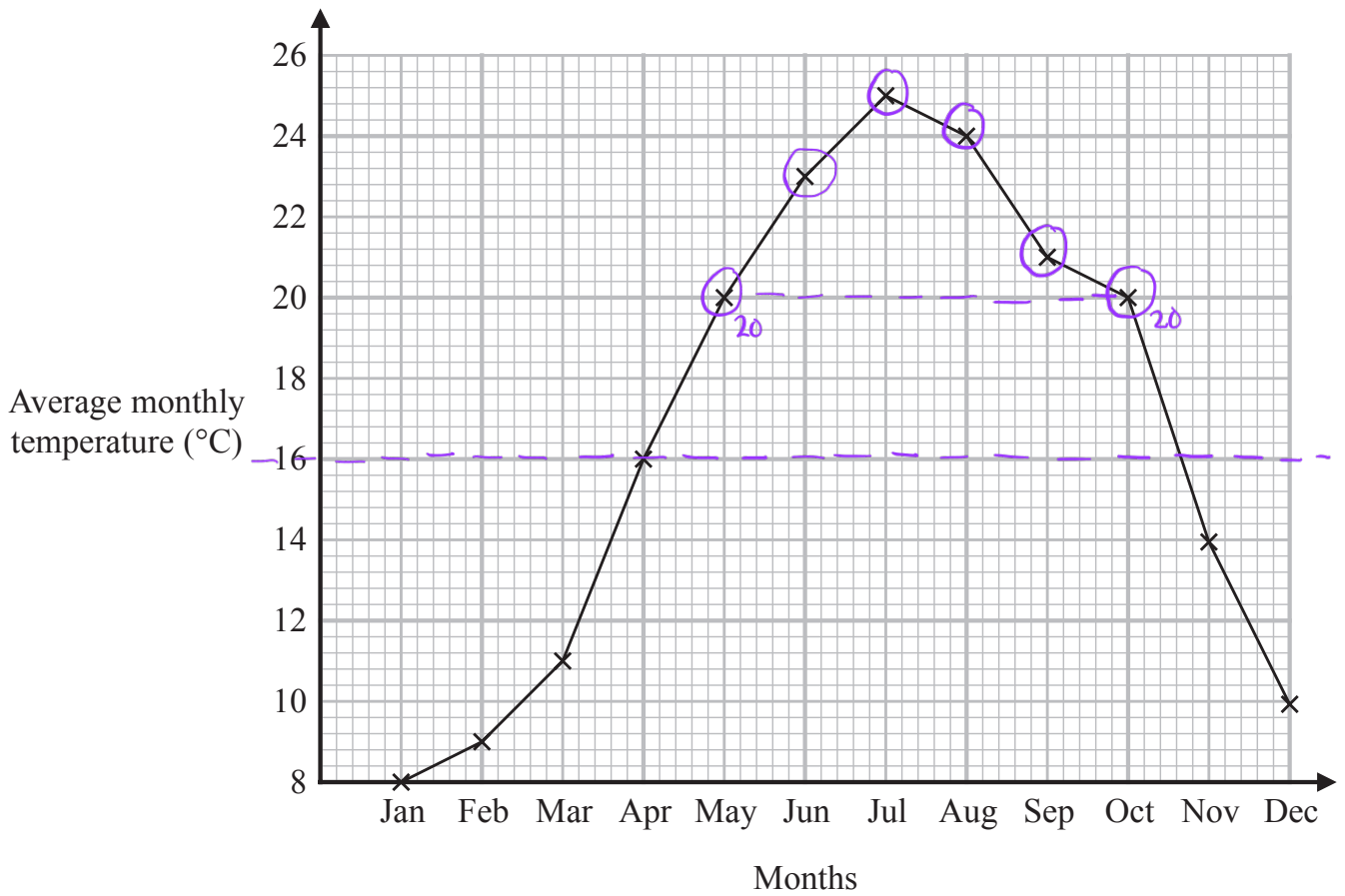


P 6 8 7 2 4 A 0 1 2 4



Pearson

6 The graph shows information about the average monthly temperature, in °C, in Amman.



(a) For how many months was the average monthly temperature greater than 16°C?

6 (1)

(b) Write down the two months that had the same average monthly temperature.

May and October (1)

(Total for Question 6 is 2 marks)

7 208 bars of chocolate were sold from a shop.

$\frac{1}{4}$ of these bars of chocolate were large bars.

The rest of the bars of chocolate were small bars.

All the large bars of chocolate were sold for £1 each.

All the small bars of chocolate were sold for 60p each.

Work out the total amount of money for which the 208 bars of chocolate were sold.

Give your answer in pounds.

Finding the number of large bars :

$$\frac{1}{4} \times 208 = 52 \text{ (1)}$$

$$\begin{array}{c} \times 100 \\ \curvearrowright \\ \text{£ } 1 = 100 \text{ p} \\ \curvearrowleft \\ \div 100 \end{array}$$

Finding the number of small bars :

$$208 - 52 = 156$$

Finding the total amount of money which 208 bars are sold for :

$$52 (1) + 156 \left(\frac{60}{100} \right)$$

$$= 52 + 93.6 \text{ (1)}$$

$$= 145.6 \text{ (1)}$$

£ 145.60

(Total for Question 7 is 3 marks)

- 8 Four students play a game.
The table shows the number of points each student has.

Student	Ali	Barbara	Calliope	Danesh
Number of points	143	121	45	19

Barbara has more points than Danesh.

- (a) How many more?

Finding difference between Barbara's points and Danesh's

$$121 - 19 = 102$$

102 (1)

(1)

- (b) Work out the mean number of points. Mean = $\frac{\text{Total number of points}}{\text{Number of students}}$

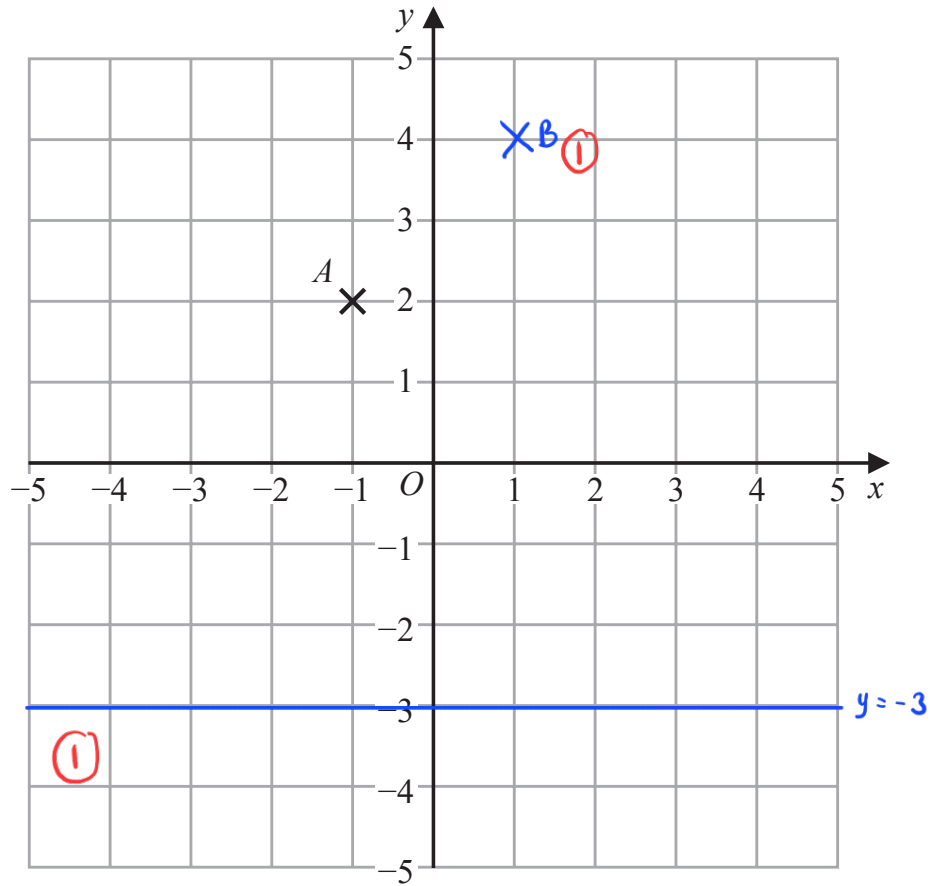
$$\text{Mean} = \frac{143 + 121 + 45 + 19}{4} \quad (1)$$

82

$$= \frac{328}{4} = 82 \quad (1)$$

(2)

(Total for Question 8 is 3 marks)



(a) Write down the coordinates of point A .

(..... -1 2 )
(1)

(b) On the grid, mark with a cross (\times) the point $(1, 4)$
Label this point B .

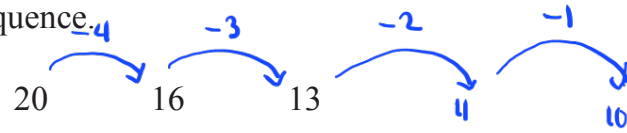
(1)

(c) On the grid, draw the line with equation $y = -3$

(1)

(Total for Question 9 is 3 marks)

10 Here are the first three terms of a sequence.



(i) Write down two numbers that could be the 4th and 5th terms of this sequence.

..... 11, 10 (1)

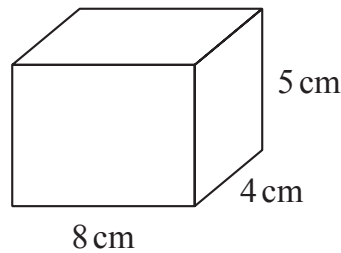
(ii) Write down the rule you used to get your numbers.

The difference goes down by 1 each time. (-4, -3, -2, -1)

..... (1)

(Total for Question 10 is 2 marks)

11 Here is a cuboid.



Work out the volume of the cuboid.

volume of cuboid =

length x width x height

$$\begin{aligned} \text{Volume} &= 8 \times 5 \times 4 \text{ (1)} \\ &= 160 \text{ cm}^3 \end{aligned}$$

..... 160 (1) cm³

(Total for Question 11 is 2 marks)

12 Amol, Gemma and Harry each have a number of sweets.

The number of sweets that Gemma has is 6 times the number of sweets that Amol has.
The number of sweets that Harry has is half the number of sweets that Gemma has.

Write down the ratio

the number of sweets that Amol has : the number of sweets that Gemma has : the number of sweets that Harry has

Finding ratio of sweets of Gemma to Amol and Harry :

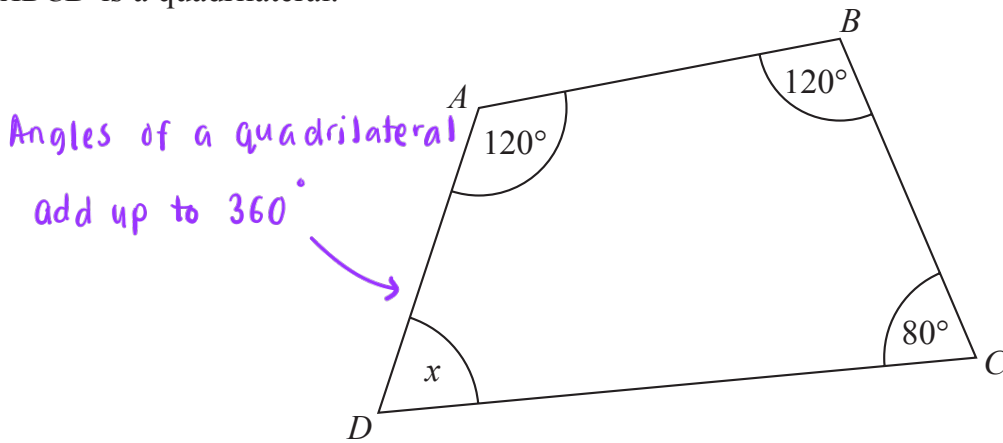
$$\begin{array}{l} \text{Gemma : Amol : Harry} \\ 6 : 1 : \frac{6}{2} = 3 \quad \textcircled{1} \end{array}$$

$$\begin{array}{l} \text{Amol : Gemma : Harry} \\ 1 : 6 : 3 \quad \textcircled{1} \end{array}$$

$$1 : 6 : 3$$

(Total for Question 12 is 2 marks)

13 $ABCD$ is a quadrilateral.



(a) (i) Work out the size of angle x .

$$\begin{aligned}x &= 360^\circ - 120^\circ - 120^\circ - 80^\circ \\ &= 40^\circ\end{aligned}$$

40 (1)

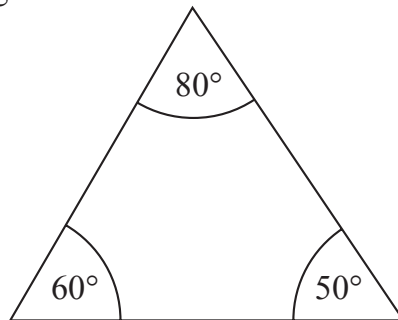
(1)

(ii) Give a reason for your answer.

Angles in a quadrilateral add up to 360° . (1)

(1)

The diagram below shows a triangle.



The diagram is wrong.

(b) Explain why.

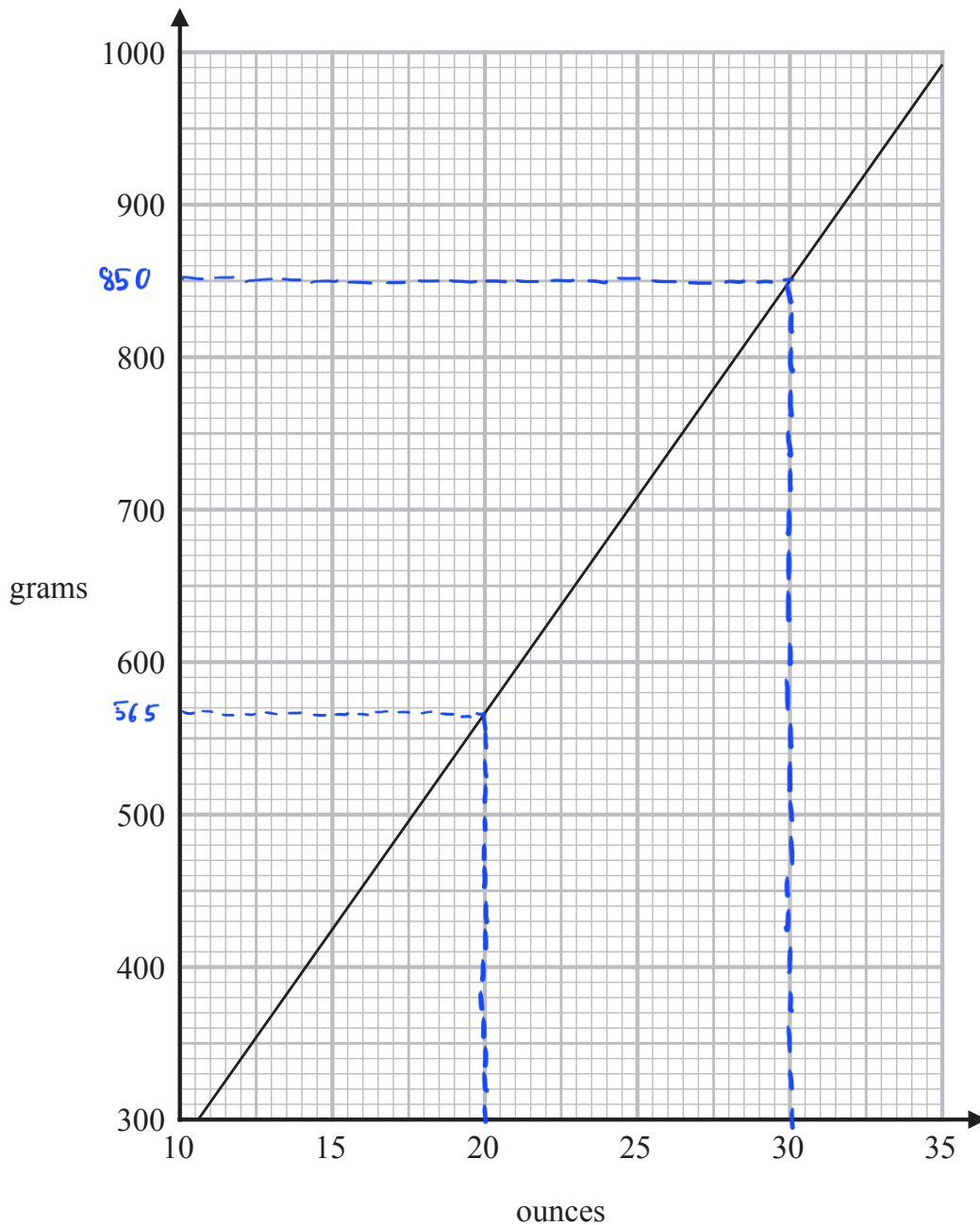
$$\text{Total angle} = 80^\circ + 60^\circ + 50^\circ = 190^\circ$$

Angle in a triangle only adds up to 180° . (1)

(1)

(Total for Question 13 is 3 marks)

14 You can use this graph to change between ounces and grams.



(a) Change 850 grams to ounces.

Tips: Look for the intersection of the line for the change

30 (1) ounces
(1)

(b) Change 80 ounces to grams.

Finding scale factor:

$$\frac{80 \text{ ounces}}{20 \text{ ounces}} = 4 \quad (1)$$

2260 grams
(2)

$$4 \times 565 \text{ g} = 2260 \text{ g} \quad (1)$$

(Total for Question 14 is 3 marks)

- 15 2.5 kg of onions and 2 kg of carrots cost a total of £2.36
3 kg of carrots cost £1.74

Stuart has £2

He wants to buy 4 kg of onions.

Does Stuart have enough money to buy 4 kg of onions?

You must show how you get your answer.

Finding the cost of 1 kg of onions :

$$\text{Cost of 1 kg of carrots} : \frac{\pounds 1.74}{3} = \pounds 0.58 \quad (1)$$

$$2.5 \text{ kg of onion} + 2 \text{ kg of carrots} = \pounds 2.36$$

$$\begin{aligned} 2.5 \text{ kg of onion} &= \pounds 2.36 - 2(\pounds 0.58) \\ &= \pounds 1.2 \quad (1) \end{aligned}$$

$$1 \text{ kg of onion} = \frac{\pounds 1.2}{2.5} = \pounds 0.48 \quad (1)$$

Finding cost to buy 4 kg of onions :

$$4 \times \pounds 0.48 = \pounds 1.92 \quad (1)$$

\therefore Yes, Stuart has 8 p left. (1)

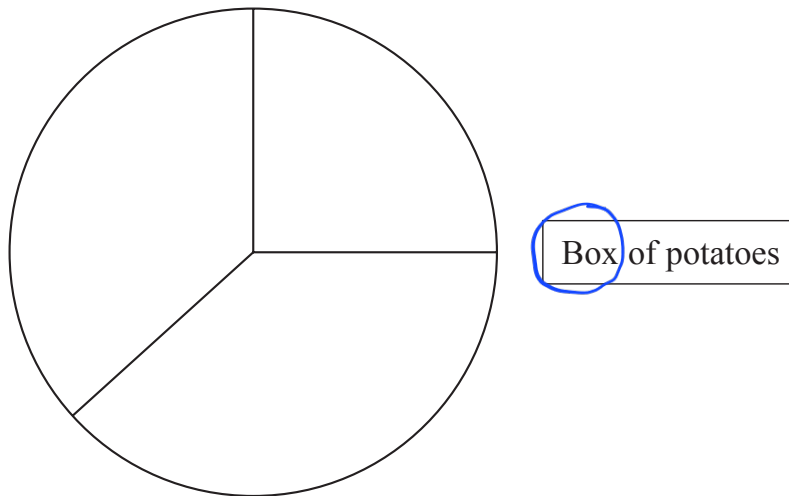
(Total for Question 15 is 5 marks)

16 There are three different types of potato in a box.

The table gives the number of each type of potato.

Type of potato	Number of potatoes
Jersey Royal	90
Charlotte	105
Maris Piper	105

Salim draws this pie chart for the information in the table.



Write down two different things that are wrong or misleading with this pie chart.

1 Label in the table does not match label with the pie chart. ①

2 Angles are drawn inaccurately ①

(Total for Question 16 is 2 marks)

17 (a) Write 87569 correct to 3 significant figures.

87600

87600 (1)

(1)

↖ solve bracket first

(b) Work out $\frac{(3.2 + 3.7) \times 4.9}{5.3 - 2.8}$

Give your answer as a decimal.

$$\frac{(3.2 + 3.7) \times 4.9}{5.3 - 2.8} = \frac{6.9 \times 4.9}{2.5}$$

$$= \frac{33.81}{2.5} \text{ (1)}$$

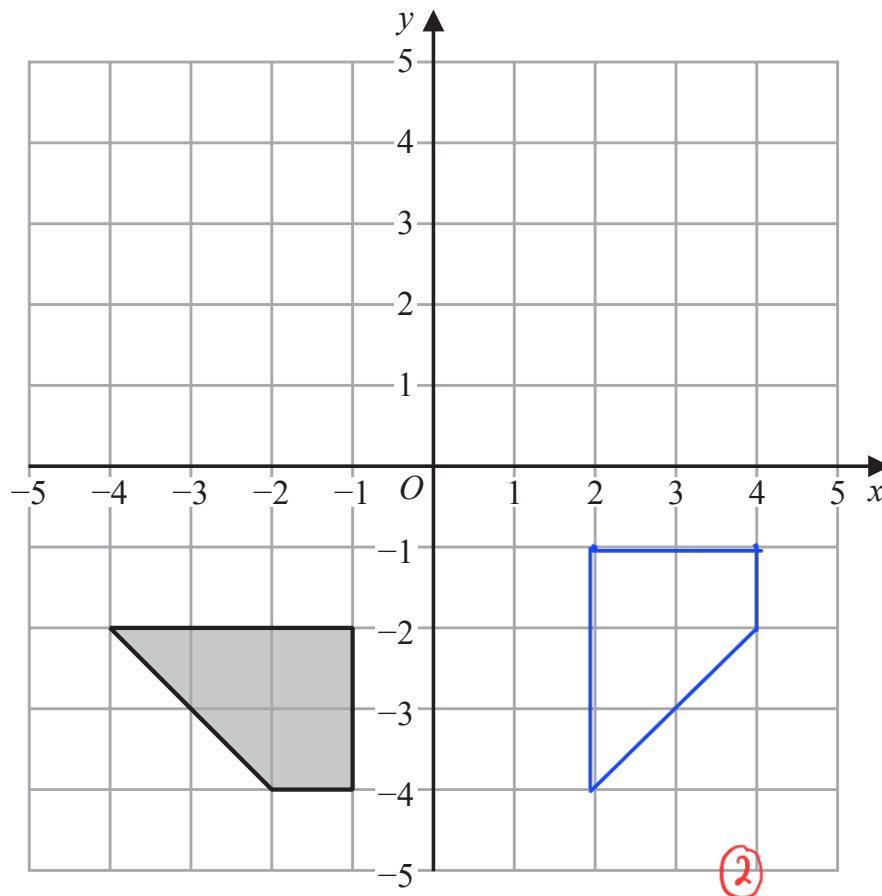
13.524

(2)

$$= 13.524 \text{ (1)}$$

(Total for Question 17 is 3 marks)

18

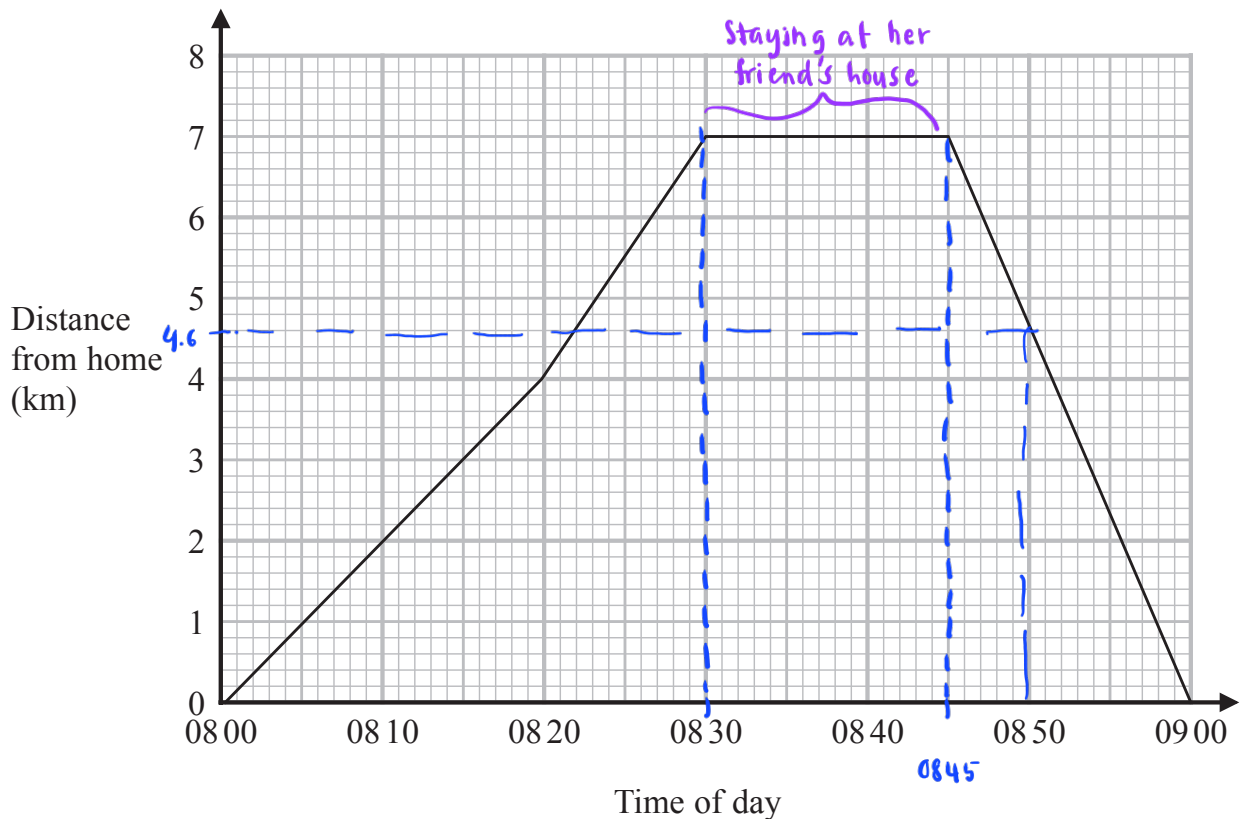


Rotate the shaded shape 90° anticlockwise about $(0,0)$

(Total for Question 18 is 2 marks)

- 19 Carly cycles to her friend's house.
She stays at her friend's house for a number of minutes.
Then she cycles home.

Here is the travel graph for her journey.



- (a) For how many minutes did Carly stay at her friend's house?

Tip: Look at section of the graph where the distance is unchanged.

$$0845 - 0830 = 15 \text{ minutes}$$

15 (1) minutes
(1)

- (b) How far is Carly from her home at 0850?

4.6 (1) km
(1)

- (c) Work out Carly's speed, in km/h, for the first 20 minutes of her journey.

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

$$= \frac{4 \text{ km}}{20 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hour}} = 12 \text{ km/h} \quad (1)$$

12 km/h
(2)

(Total for Question 19 is 4 marks)

20 Here is a list of ingredients for making 10 scones.

Ingredients for 10 scones

80 g butter
350 g self-raising flour
30 g sugar
2 eggs

Martin has

100 g butter
1 kg self-raising flour
50 g sugar
4 eggs

Martin wants to make 25 scones.

He has not got enough of some of the ingredients.

Work out how much more of each of these ingredients he needs.

Finding scale factors of the Scone :

$$\frac{25}{10} = 2.5$$

To make 25 scones, she needs :

$$\text{Butter} : 80 \text{ g} \times 2.5 = 200 \text{ g} \quad (1)$$

$$\text{Self raising flour} : 350 \text{ g} \times 2.5 = 875 \text{ g} \quad (1)$$

$$\text{Sugar} : 30 \text{ g} \times 2.5 = 75 \text{ g}$$

$$\text{Egg} : 2 \times 2.5 = 5 \text{ eggs}$$

Finding the amount of ingredients she needs more :

$$\text{Butter} : 200 - 100 = 100 \text{ g} \quad (1)$$

$$\text{Sugar} : 75 - 50 = 25 \text{ g}$$

$$\text{Egg} : 5 - 4 = 1 \text{ egg} \quad (1)$$

Self raising flour is enough

(Total for Question 20 is 4 marks)

21 Make a the subject of the formula $p = 3a - 9$

$$p = 3a - 9$$

$$p + 9 = 3a - 9 + 9 \quad \textcircled{1} \quad \text{— add 9 to both sides to eliminate the one on a term side}$$

$$\frac{p+9}{3} = \frac{3a}{3} \quad \text{— divide both sides by 3 to isolate the a term}$$

$$a = \frac{p+9}{3} \quad \textcircled{1}$$

$$a = \frac{p+9}{3}$$

(Total for Question 21 is 2 marks)

22 Rob has been asked to divide 120 in the ratio 3:5

Here is his working.

$$120 \div 3 = 40$$

$$120 \div 5 = 24$$

Rob's working is not correct.

Describe what Rob has done wrong.

Rob should divide by 8 as $3+5 = 8$. $\textcircled{1}$

(Total for Question 22 is 1 mark)

- 23 200 students chose one language to study.
Each student chose one language from French or Spanish or German.

Of the 200 students,

90 are boys and the rest of the students are girls
70 chose Spanish
60 of the 104 students who chose French are boys
18 girls chose German.

Work out how many boys chose Spanish.

	French	Spanish	German	Total
Girls	(44)	(48)	18	(110)
Boys	60	(22)	(8)	90
Total	104	70	(26)	200

Finding total choosing German :

$$G = 200 - 104 - 70 = 26 \text{ (1)}$$

Finding boys choosing German :

$$\text{Boys} : 26 - 18 = 8$$

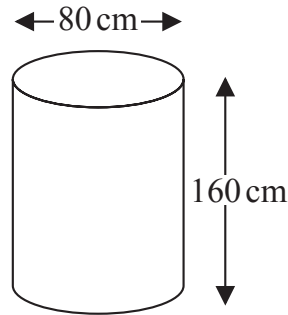
Finding boys choosing Spanish :

$$\text{Spanish} : 90 - 60 - 8 = 22 \text{ (1)}$$

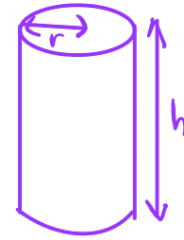
22

(Total for Question 23 is 3 marks)

- 24 Karina has 4 tanks on her tractor.
Each tank is a cylinder with diameter 80 cm and height 160 cm.



Volume of cylinder : $\pi \times r^2 \times h$



The 4 tanks are to be filled completely with a mixture of fertiliser and water.

The fertiliser has to be mixed with water in the ratio 1 : 100 by volume.
Karina has 32 litres of fertiliser.

$$1 \text{ litre} = 1000 \text{ cm}^3$$

Has Karina enough fertiliser for the 4 tanks?
You must show how you get your answer.

Finding volume of a tank :

$$\pi \times r^2 \times h = \pi \times 40^2 \times 160 = 256\,000 \pi \quad (1)$$

Finding volume of 4 tanks :

$$4 \times 256\,000 \pi = 1\,024\,000 \pi \quad (1)$$

Finding the amount of mixture for 1 tank :

$$\frac{256\,000 \pi}{(100+1)} = \frac{256\,000 \pi}{101} = 7962.8 \text{ cm}^3$$

$$4 \text{ tanks} : 7962.8 \times 4 = 31851.4 \text{ cm}^3 \quad (1)$$

Fertiliser Karina has :

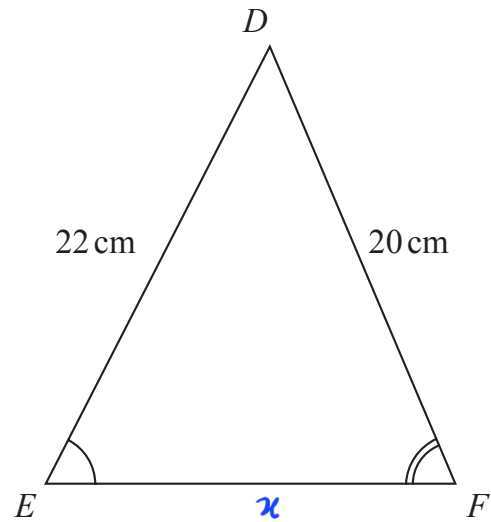
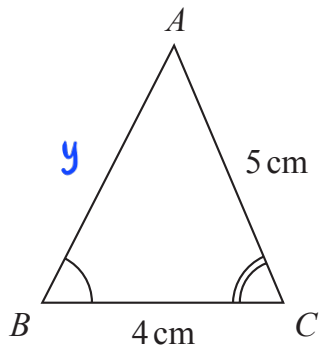
$$32 \times 1000 \text{ cm}^3 = 32000 \text{ cm}^3$$

Yes. Karina has 32000 cm^3 to fill in 31851.4 cm^3 of tank.

(1)

(Total for Question 24 is 4 marks)

25 Triangle ABC and triangle DEF are similar.



(a) Work out the length of EF .

Finding scale factor :

$$\frac{DF}{AC} = \frac{20\text{ cm}}{5\text{ cm}} = 4 \quad (1)$$

$$\frac{EF}{BC} = \frac{x}{4\text{ cm}} = 4$$

$$x = 4\text{ cm} \times 4 = 16\text{ cm} \quad (1)$$

$$\begin{array}{r} 16 \\ \text{.....} \\ (2) \end{array} \text{ cm}$$

(b) Work out the length of AB .

$$\frac{AB}{DE} = \frac{y}{22\text{ cm}} = \frac{1}{4}$$

$$y = \frac{1}{4} \times 22\text{ cm} \quad (1)$$

$$= 5.5\text{ cm} \quad (1)$$

$$\begin{array}{r} 5.5 \\ \text{.....} \\ (2) \end{array} \text{ cm}$$

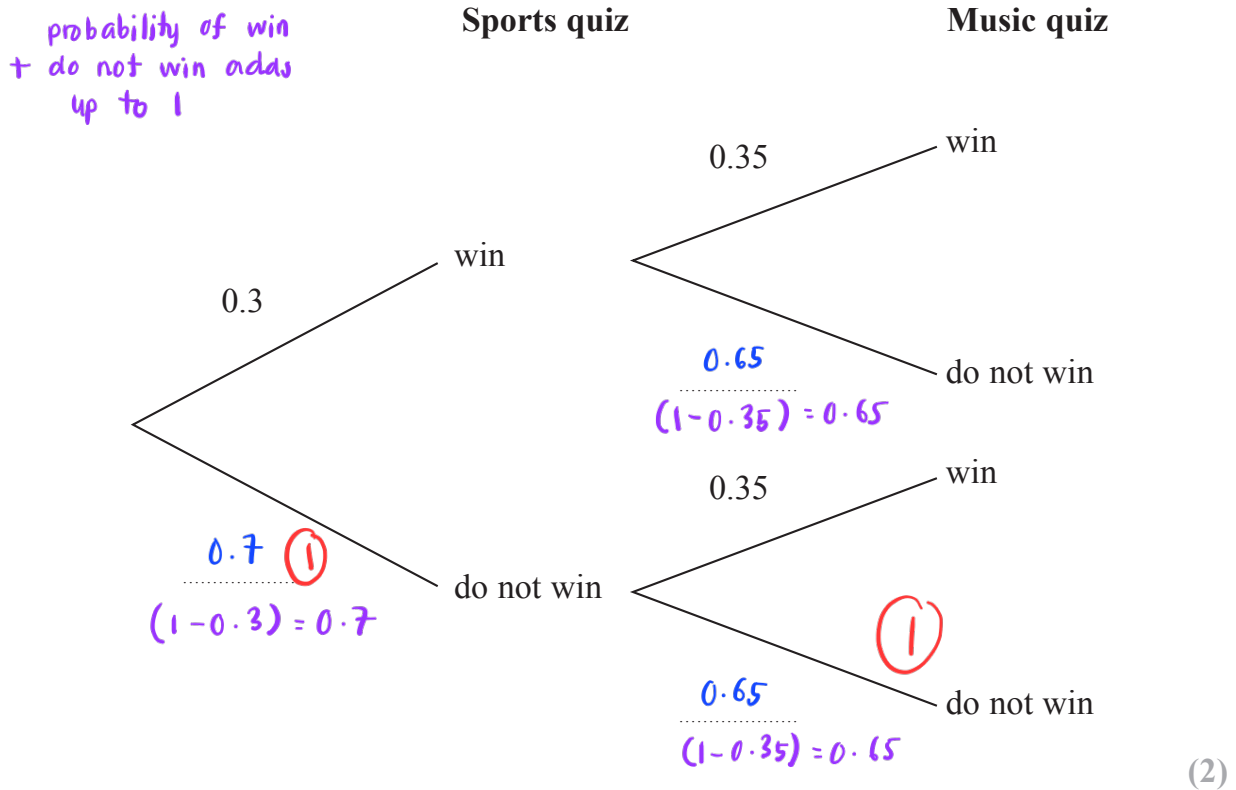
(Total for Question 25 is 4 marks)

26 One weekend the Keddie family is going to do a sports quiz and a music quiz.

The probability that the family will win the sports quiz is 0.3

The probability that the family will win the music quiz is 0.35

(a) Complete the probability tree diagram.



(b) Work out the probability that the Keddie family will win both the sports quiz and the music quiz.

$$P(\text{win sports}) = 0.3$$

$$P(\text{win music}) = 0.35$$

$$P(\text{win both}) = 0.3 \times 0.35 \quad (1)$$

$$= 0.105 \quad (1)$$

if $P(A)$ 'AND' $P(B)$ = we multiply
if $P(A)$ 'OR' $P(B)$ = we add up

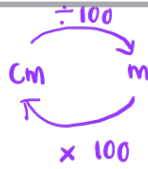
$$0.105$$

(2)

(Total for Question 26 is 4 marks)

27 (a) Change 8000 cm^3 to m^3

$$\frac{8000 \text{ cm}^3}{(100 \text{ cm})^3} = \frac{8000 \text{ cm}^3}{1000000 \text{ cm}^3} = 8 \times 10^{-3} \text{ m}^3$$



..... 8×10^{-3} (1) m^3
(1)

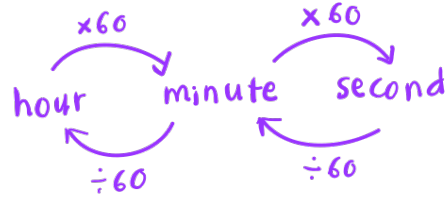
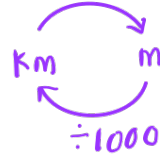
(b) Change a speed of 180 km per hour to metres per second. $\times 1000$

$$180 \frac{\text{km}}{\text{h}} \times \frac{1000 \text{ m}}{1 \text{ km}} \quad (1)$$

$$= 180000 \frac{\text{m}}{\text{h}} \times \frac{1 \text{ h}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ s}}$$

$$= \frac{180000 \text{ m}}{60 \times 60 \text{ s}}$$

$$= \frac{180000 \text{ m}}{3600 \text{ s}} = 50 \text{ m/s} \quad (1)$$



..... 50 metres per second
(3)

(Total for Question 27 is 4 marks)

28 There are 30 women and 20 men at a gym.

The mean height of all 50 people is 167.6 cm

The mean height of the 20 men is 182 cm

Work out the mean height of the 30 women.

Finding the total height of 50 people :

$$167.6 \text{ cm} \times 50 = 8380 \text{ cm} \quad (1)$$

Finding the total height of 20 men :

$$182 \text{ cm} \times 20 = 3640 \text{ cm}$$

Finding mean height of 30 women :

$$\frac{8380 - 3640}{30} = 158 \text{ cm} \quad (1)$$

..... 158 cm

(Total for Question 28 is 3 marks)

29 (a) Write 6.75×10^{-4} as an ordinary number.

$$\frac{6.75}{10\,000} = 0.000675$$

$$0.000675 \quad (1)$$

(b) Work out $\frac{2.56 \times 10^6 \times 4.12 \times 10^{-3}}{1.6 \times 10^{-2}}$

Give your answer in standard form.

$$\frac{2.56 \times 4.12}{1.6} \times (10^{6-3-(-2)}) \quad (1)$$

– Separate the number parts
to the power parts.
Do the operations separately.

$$= 6.592 \times 10^5 \quad (1)$$

$$6.592 \times 10^5$$

(2)

(Total for Question 29 is 3 marks)

30 $\mathbf{a} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$ $\mathbf{c} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$

(a) Work out $\mathbf{a} + \mathbf{b}$ as a column vector

(i) $\mathbf{a} + \mathbf{b}$

$$\begin{pmatrix} 2 \\ 3 \end{pmatrix} + \begin{pmatrix} -1 \\ 2 \end{pmatrix} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 5 \end{pmatrix}$$

(1)

(ii) $2\mathbf{a} - \mathbf{c}$

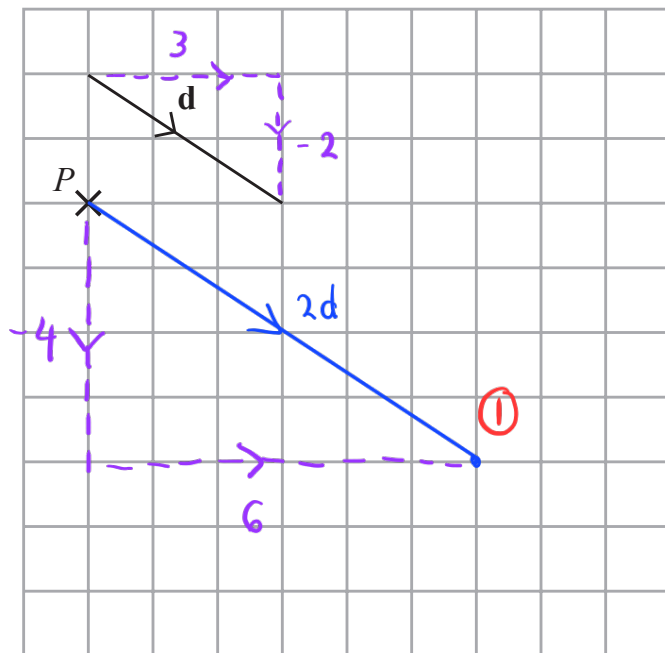
multiply inside

$$2 \begin{pmatrix} 2 \\ 3 \end{pmatrix} - \begin{pmatrix} 4 \\ 1 \end{pmatrix} = \begin{pmatrix} 4 \\ 6 \end{pmatrix} - \begin{pmatrix} 4 \\ 1 \end{pmatrix} = \begin{pmatrix} 0 \\ 5 \end{pmatrix}$$

$$\begin{pmatrix} 0 \\ 5 \end{pmatrix}$$

(2)

The vector \mathbf{d} is drawn on the grid.



$$\mathbf{d} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$$

$$2\mathbf{d} = \begin{pmatrix} 6 \\ -4 \end{pmatrix}$$

(b) From the point P , draw the vector $2\mathbf{d}$

(1)

(Total for Question 30 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

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