Full paper F3

Paper 3 style · Calculator · Foundation

80 marks
1 hour 30 minutes

Name	Date	Score / 80

Answer ALL questions. Write your answers in the spaces provided. You must write down all the stages in your working. You may use a calculator. Diagrams are **NOT** accurately drawn unless it says so.

Help on the longer questions

Underlined words tell you what the question wants.

Remember reminds you of a fact you need.

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

0.62 0.6 0.67 0.607

.....

(1)

(Total for Question 1 is 1 mark)

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2 **Write down** the value of the 4 in the number 24 517

.....

(1)

(Total for Question 2 is 1 mark)

---

3 **Write** $\frac{3}{5}$ as a decimal.

.....

(1)

(Total for Question 3 is 1 mark)

---

4 **Write** 27.4949 **correct to the nearest whole number**.

.....

(1)

(Total for Question 4 is 1 mark)

---

5 Here is a list of numbers.

7 13 20 26 31

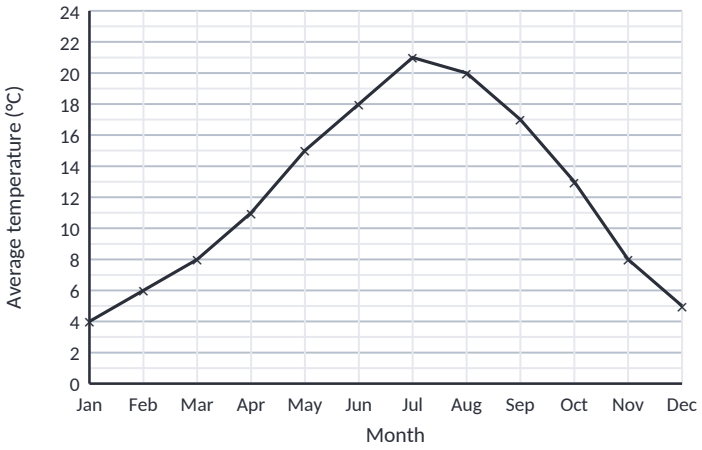
From the list, write down a multiple of 4

.....

(1)

(Total for Question 5 is 1 mark)

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



(a) For how many months was the average monthly temperature greater than 12 °C?

.....

(1)

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

(1)

(Total for Question 6 is 2 marks)

7 240 cakes were sold at a fair.

$\frac{3}{8}$ of these cakes were large cakes.

The rest of the cakes were small cakes.

All the large cakes were sold for £1.50 each.

All the small cakes were sold for 80p each.

Work out the total amount of money for which the 240 cakes were sold.

Give your answer in pounds.

> **Remember** Write down each cost or amount as you work it out, then add them up. Write money with 2 decimal places (£4.50). 100p = £1.

£ .....

(3)

(Total for Question 7 is 3 marks)

8 Four students play a game.

The table shows the number of points each student has.

Student	Asha	Ben	Cleo	Dan
Number of points	156	132	58	26

> **Remember** Mean = total ÷ how many. Median = middle value when in order. Mode = most common. Range = biggest − smallest.

(a) Ben has more points than Dan.
How many more?

.....

(1)

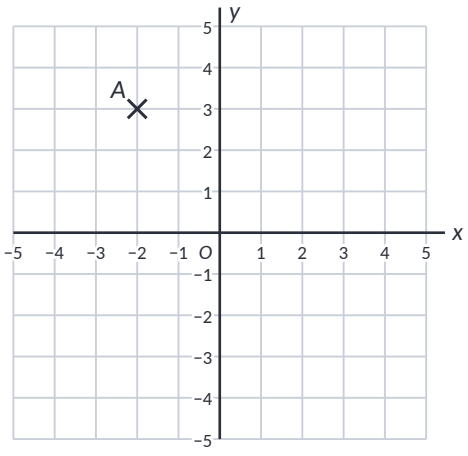
(b) **Work out** the mean number of points.

.....

(2)

(Total for Question 8 is 3 marks)

9



Remember (x, y): go along first, then up. Midpoint: add the x values and halve, add the y values and halve.

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

(1)

(b) On the grid, mark with a cross (×) the point (2, −1)
Label this point *B*.

(1)

(c) On the grid, draw the line with equation $y = -2$

(1)

(Total for Question 9 is 3 marks)

---

10 Here are the first three terms of a sequence.

30 24 19

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

(1)

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

(1)

(Total for Question 10 is 2 marks)

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11 Here is a cuboid.

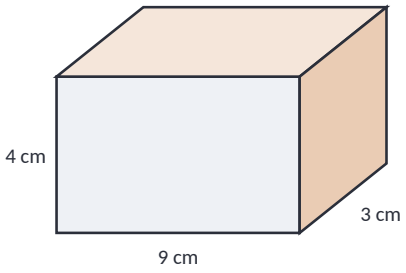


Diagram NOT accurately drawn

Work out the volume of the cuboid.

..... cm^3

(2)

(Total for Question 11 is 2 marks)

12 Ann, Ben and Cal each have a number of marbles.
The number of marbles that Ben has is 4 times the number of marbles that Ann has.
The number of marbles that Cal has is half the number of marbles that Ben has.
Write down the ratio

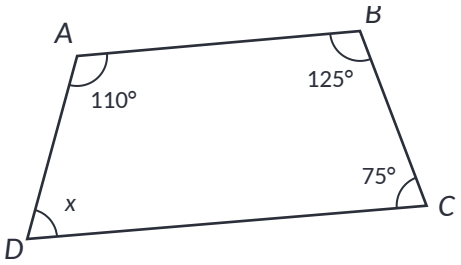
number of marbles Ann has : number of marbles Ben has : number of marbles Cal has

.....

(2)

(Total for Question 12 is 2 marks)

13 *ABCD* is a quadrilateral.



Remember Straight line = 180°. Around a point = 360°. Triangle = 180°. Quadrilateral = 360°. Isosceles: two equal base angles. Write the reason for each angle.

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

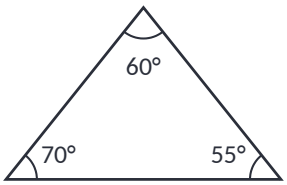
.....°

(1)

(b) **Give a reason for your answer**.

(1)

(c) The diagram below shows a triangle.

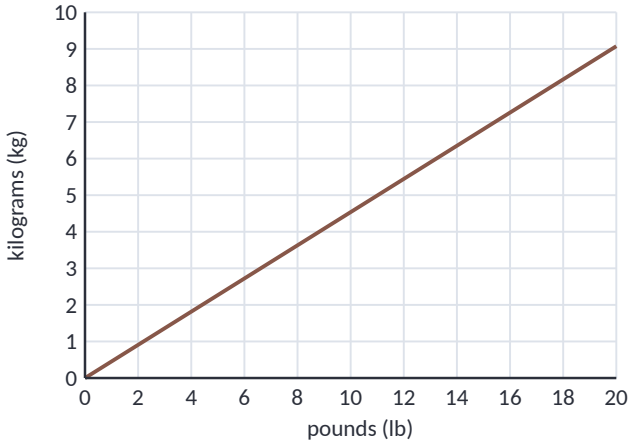


The diagram is wrong.
Explain why.

(1)

(Total for Question 13 is 3 marks)

14 You can use this graph to change between pounds (lb) and kilograms (kg).



Remember Go across from one axis to the line, then down (or across) to read the other value. For a big value, use a smaller one and multiply.

(a) **Change** 6 kg to pounds.

..... lb

(1)

(b) **Change** 50 pounds to kilograms.

..... kg

(2)

(Total for Question 14 is 3 marks)

15 1.5 kg of apples and 3 kg of pears cost a total of £6.45
2 kg of pears cost £2.70
Amy has £5
She wants to buy 3 kg of apples.
Does Amy have enough money to buy 3 kg of apples?
You must show how you get your answer.

Remember Write down each cost or amount as you work it out, then add them up. Write money with 2 decimal places (£4.50). 100p = £1.

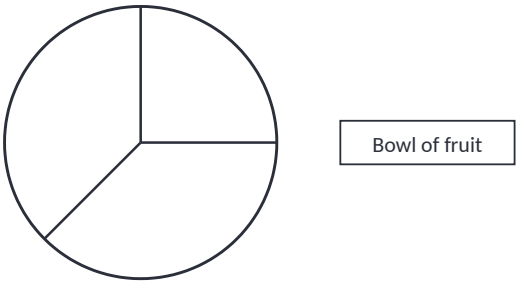
(5)

(Total for Question 15 is 5 marks)

16 There are three different types of fruit in a bowl.
The table gives the number of each type of fruit.

Type of fruit	Number of pieces
Apples	80
Pears	120
Plums	100

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



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

(2)

(Total for Question 16 is 2 marks)

17

Remember Look at the next digit: 5 or more rounds up.

(a) **Write** 64 238 **correct to 3 significant figures**.

.....

(1)

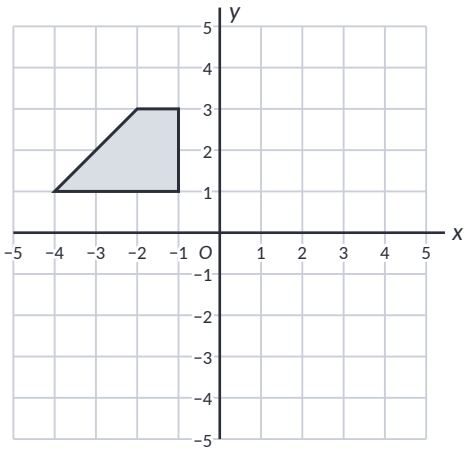
(b) **Work out** $\frac{(4.6 + 2.9) \times 3.2}{6.1 - 3.7}$

.....

(2)

(Total for Question 17 is 3 marks)

18

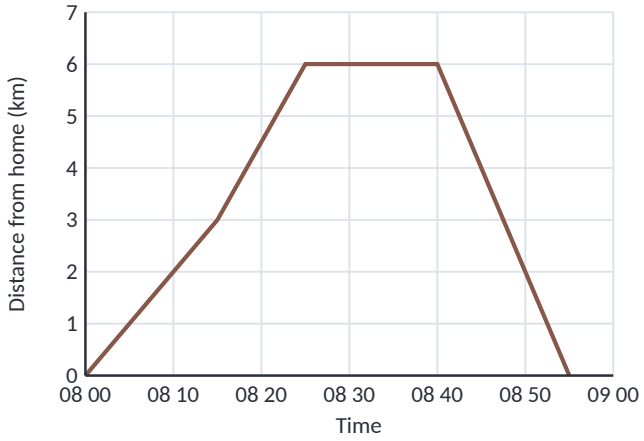


Rotate the shaded shape 90° clockwise about (0, 0)

(2)

(Total for Question 18 is 2 marks)

19 Zac cycles to his friend's house.
He stays at his friend's house for a number of minutes.
Then he cycles home.
Here is the travel graph for his journey.



Remember A flat line means stopped. Steeper line = faster. Speed = distance ÷ time.

(a) For how many minutes did Zac stay at his friend's house?

..... minutes
(1)

(b) How far is Zac from his home at 08 50?

..... km
(1)

(c) **Work out** Zac's speed, in km/h, for the first 15 minutes of his journey.

..... km/h
(2)

(Total for Question 19 is 4 marks)

20 Here is a list of ingredients for making 12 muffins.

Ingredients for 12 muffins
90 g butter
300 g flour
60 g sugar
2 eggs

Tom has

200 g butter
1 kg flour
100 g sugar
6 eggs

Tom wants to make 30 muffins.
He has not got enough of some of the ingredients.
Work out how much more of each of these ingredients he needs.

> **Remember** Find the value for 1 first (÷), then multiply. Inverse proportion: more workers → less time (× then ÷).

(4)

(Total for Question 20 is 4 marks)

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21 **Make *b* the subject** of the formula $q = 4b + 7$

.....

(2)

(Total for Question 21 is 2 marks)

---

22 Ella has been asked to divide 140 in the ratio 2 : 5
Here is her working.

$$140 \div 2 = 70 \qquad 140 \div 5 = 28$$

Ella's working is not correct.
Describe what Ella has done wrong.

(1)

(Total for Question 22 is 1 mark)

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23 180 students chose one sport to play.
Each student chose one sport from football or hockey or netball.
Of the 180 students,

100 are boys and the rest of the students are girls
50 chose hockey
50 of the 92 students who chose football are boys
20 girls chose hockey.

Work out how many boys chose netball.

> **Remember** Rows and columns add up to the totals. Fill in the easy gaps first, then use them to find the rest.

.....

(3)

(Total for Question 23 is 3 marks)

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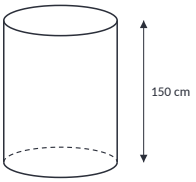
24 Sam has 3 tanks on his farm.
Each tank is a cylinder with diameter 60 cm and height 150 cm.



The 3 tanks are to be filled completely with a mixture of plant food and water.
The plant food has to be mixed with water in the ratio 1 : 80 by volume.
Sam has 20 litres of plant food.
1 litre = 1000 cm^3
Has Sam enough plant food for the 3 tanks?
You must show how you get your answer.

> **Remember** Volume of a cylinder = $\pi \times \text{radius}^2 \times \text{height}$. Use the radius, not the diameter. 1 litre = 1000 cm^3.

(4)

(Total for Question 24 is 4 marks)

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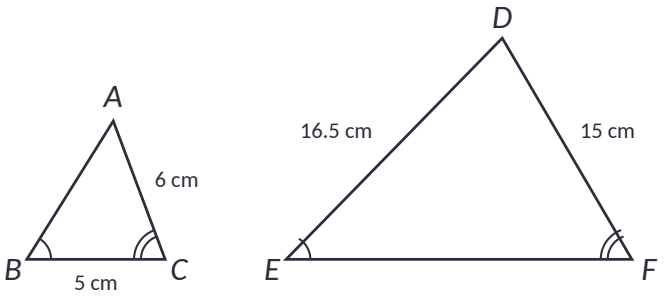
25 Triangle *ABC* and triangle *DEF* are similar.



Remember Similar shapes: find the scale factor (big side ÷ matching small side). Multiply to enlarge, divide to shrink.

(a) **Work out** the length of *EF*.

..... cm

(2)

(b) **Work out** the length of *AB*.

..... cm

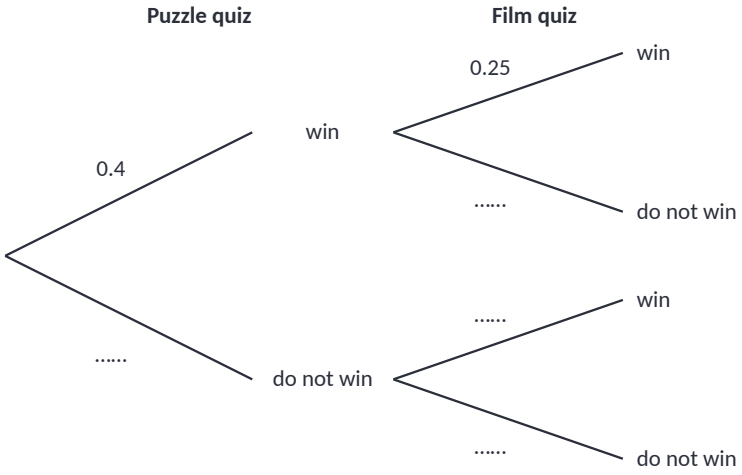
(2)

(Total for Question 25 is 4 marks)

26 One weekend the Patel family is going to do a puzzle quiz and a film quiz.
The probability that the family will win the puzzle quiz is 0.4
The probability that the family will win the film quiz is 0.25

> **Remember** Probabilities add up to 1. P(event) = number of ways it can happen ÷ total number of outcomes. AND means multiply.

(a) **Complete** the probability tree diagram.



(2)

(b) **Work out** the probability that the Patel family will win both the puzzle quiz and the film quiz.

.....

(2)

(Total for Question 26 is 4 marks)

27

> **Remember** Speed = distance ÷ time. Distance = speed × time. Time = distance ÷ speed. Change minutes to hours: ÷ 60 (30 min = 0.5 h).

(a) **Change** 6000 cm^3 to m^3

..... m^3

(1)

(b) **Change** a speed of 144 km per hour to metres per second.

..... metres per second

(3)

(Total for Question 27 is 4 marks)

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28 There are 40 women and 10 men at a club.
The mean height of all 50 people is 164 cm.
The mean height of the 10 men is 176 cm.
Work out the mean height of the 40 women.

> **Remember** Mean = total ÷ how many. Median = middle value when in order. Mode = most common. Range = biggest − smallest.

..... cm

(3)

(Total for Question 28 is 3 marks)

29

> **Remember** $A \times 10^n$ where A is between 1 and 10. Big numbers: positive power. Small numbers: negative power.

(a) **Write** 3.08×10^{-5} as an ordinary number.

.....

(1)

(b) **Work out** $\dfrac{3.6 \times 10^5 \times 2.5 \times 10^{-2}}{4.5 \times 10^{-3}}$

Give your answer in standard form.

.....

(2)

(Total for Question 29 is 3 marks)

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30 $\mathbf{a} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -2 \\ 4 \end{pmatrix}$ $\mathbf{c} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$

Work out as a column vector

Remember Top number: right (+) or left (−). Bottom number: up (+) or down (−).

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

$\begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$

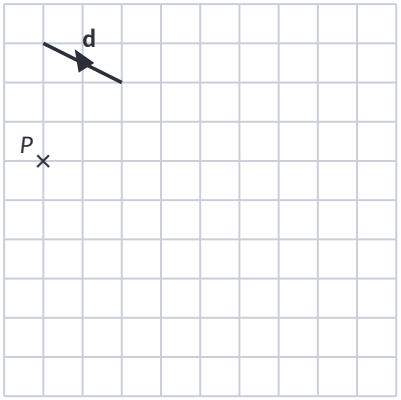
(1)

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

$\begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$

(2)

(c) The vector **d** is drawn on the grid.



From the point *P*, draw the vector 3**d**.

(1)

(Total for Question 30 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

F3 mark scheme

Q		Answer	Mark	Notes
1		0.6, 0.607, 0.62, 0.67	B1	
2		4000	B1	
3		0.6	B1	
4		27	B1	
5		20	B1	
6	(a)	6	B1	
	(b)	March and November	B1	
7		255	M1 M1 A1	M1 for $\frac{3}{8} \times 240$ (= 90) M1 for 90 × 1.50 + 150 × 0.80 A1 cao
8	(a)	106	B1	
	(b)	93	M1 A1	M1 for 372 ÷ 4 A1 cao
9	(a)	(−2, 3)	B1	
	(b)	Cross at (2, −1) labelled B	B1	
	(c)	Horizontal line through $y = -2$	B1	
10	(a)	e.g. 15, 12	B1	
	(b)	e.g. subtract 6, then 5, then 4, then 3 (subtract one less each time)	B1	B1 for a rule consistent with their numbers
11		108	M1 A1	M1 for 9 × 3 × 4 A1 cao

Mark scheme continues ►

Q		Answer	Mark	Notes
12		1 : 4 : 2	M1 A1	M1 for two parts correct A1 cao
13	(a)	50	B1	
	(b)	Angles in a quadrilateral add up to 360°	C1	C1
	(c)	The angles add up to 185°, but angles in a triangle add up to 180°	C1	C1
14	(a)	13.2	B1	B1 for 13 to 13.4
	(b)	22.7	M1 A1	M1 for a correct reading multiplied, e.g. 10 lb = 4.5 kg, × 5 A1 for 22 to 23.5
15		Yes: 3 kg of apples cost £4.80	M1 M1 M1 A1 C1	M1 for 2.70 ÷ 2 (= 1.35) M1 for 3 × 1.35 (= 4.05) M1 for (6.45 − 4.05) ÷ 1.5 (= 1.60) A1 for 4.80 C1 Yes with 4.80
16		e.g. the sectors are not labelled; the two large sectors look equal but pears and plums are not equal; the angles are wrong (should be 96°, 144°, 120°)	C2	C1 for each different correct point
17	(a)	64 200	B1	
	(b)	10	M1 A1	M1 for 24 or 2.4 A1 cao
18		Shape at (1, 4), (1, 1), (3, 1), (3, 2)	B2	B2 (B1 for a 90° anticlockwise rotation about (0, 0) or a 90° clockwise rotation about another point)
19	(a)	15	B1	
	(b)	2	B1	
	(c)	12	M1 A1	M1 for 3 ÷ 0.25 or 3 × 4 A1 cao

Mark scheme continues ►

Q		Answer	Mark	Notes
20		25 g more butter and 50 g more sugar	M1 M1 A1 A1	M1 for 30 ÷ 12 (= 2.5) M1 for 225 g butter, 750 g flour, 150 g sugar, 5 eggs A1 for 25 g butter A1 for 50 g sugar
21		$b = \frac{q - 7}{4}$	M1 A1	M1 for $q - 7 = 4b$ A1 oe
22		She should divide 140 by 7 (the total number of parts), then multiply by 2 and by 5	C1	C1
23		20	M1 M1 A1	M1 for boys who chose hockey = 50 − 20 (= 30) M1 for 100 − 50 − 30 A1 cao
24		Yes: he needs about 15.7 litres	M1 M1 M1 C1	M1 for $\pi \times 30^2 \times 150$ (= 424 115...) M1 for × 3 and ÷ 1000 (= 1272.3 litres) M1 for ÷ 81 (= 15.7) C1 Yes with correct figures
25	(a)	12.5	M1 A1	M1 for 15 ÷ 6 (= 2.5) A1 cao
	(b)	6.6	M1 A1	M1 for 16.5 ÷ 2.5 A1 cao
26	(a)	0.6; 0.75; 0.25, 0.75	B2	B2 all correct (B1 for 0.6 or 0.75 correct)
	(b)	0.1	M1 A1	M1 for 0.4 × 0.25 A1 cao
27	(a)	0.006	B1	
	(b)	40	M1 M1 A1	M1 for 144 × 1000 (= 144 000) M1 for ÷ 3600 A1 cao
28		161	M1 M1 A1	M1 for 50 × 164 (= 8200) or 10 × 176 (= 1760) M1 for (8200 − 1760) ÷ 40 A1 cao
29	(a)	0.0000308	B1	
	(b)	2×10^6	M1 A1	M1 for 9000 or 2 000 000 A1 cao

Mark scheme continues ►

Q		Answer	Mark	Notes
30	(a)	$\begin{pmatrix}1\\5\end{pmatrix}$	B1	
	(b)	$\begin{pmatrix}1\\0\end{pmatrix}$	M1 A1	M1 for $\begin{pmatrix}6\\2\end{pmatrix}$ A1 cao
	(c)	Line from P, 6 right and 3 down, with an arrow	B1	B1

B1 = mark for a correct answer · **M1** = method mark · **A1** = accurate answer after M1 · **C1** = reason · **cao** = correct answer only

Score ____ / 80