Full paper D3

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** 45% as a decimal.

.....

(1)

(Total for Question 1 is 1 mark)

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2 **Write** 6347 **correct to the nearest hundred**.

.....

(1)

(Total for Question 2 is 1 mark)

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3 **Write down** a number that is less than −8

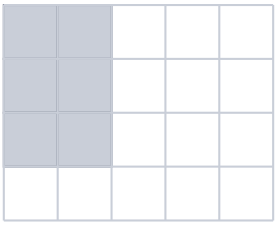
.....

(1)

(Total for Question 3 is 1 mark)

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4 Here is a grid of squares.



What fraction of the grid is shaded?

.....

(1)

(Total for Question 4 is 1 mark)

Turn over ►

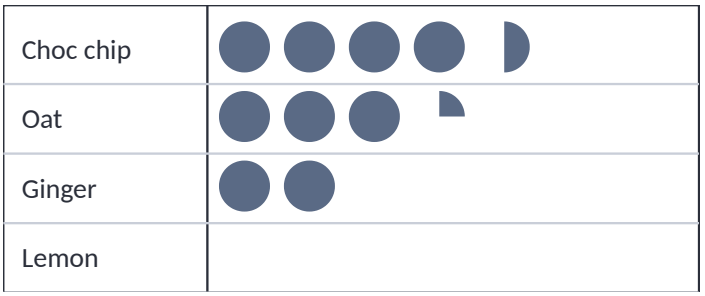
5 **Write down** the value of the 7 in the number 34.172

.....

(1)

(Total for Question 5 is 1 mark)

6 The pictogram shows information about the number of choc chip, oat and ginger biscuits sold by Year 7 at a school fair.



Key: ● represents 8 biscuits

Remember Check the key: what does one symbol stand for? A part symbol is a fraction of that.

(a) 14 lemon biscuits were sold by Year 7
Use this information to complete the pictogram.

(1)

(b) At the fair, Year 8 sold a total of 95 biscuits.
Which Year sold more biscuits at the fair, Year 7 or Year 8?
You must show how you get your answer.

(3)

(Total for Question 6 is 4 marks)

7 Ravi is swimming lengths of a swimming pool.
Each length of the pool is 20 m.
Ravi has swum 145 lengths of the pool.
He wants to swim a total distance of 4500 m.
Calculate how many more lengths Ravi needs to swim.

> **Remember** Line up the digits. To divide by a decimal, multiply both numbers by 10 (or 100) first. Check with an estimate.

.....

(3)

(Total for Question 7 is 3 marks)

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8 Here are the first four terms of a number sequence.

88 81 74 67

> **Remember** Find the difference between terms. nth term = difference × n + (first term − difference).

(a) **Explain** how to work out the next number of the sequence.

(1)

(b) **Work out** the difference between the 5th term and the 7th term of the sequence.

.....

(2)

(c) **Explain why** 30 is **not** a number in this sequence.

(1)

(Total for Question 8 is 4 marks)

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9 Asha buys a 15 kilogram bag of cat food.
Asha's cat has 2 meals a day.
She gives her cat 85 grams of cat food for each of these meals.
How many complete weeks will the bag of cat food last?
You must show all your working.

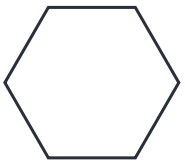
> **Remember** 1 kg = 1000 g. 1 litre = 1000 ml. 1 m = 100 cm. 1 cm = 10 mm. 1 km = 1000 m.

.....

(5)

(Total for Question 9 is 5 marks)

10 Here is a polygon.



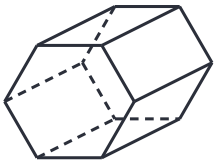
> **Remember** Count the sides and look for equal sides, parallel sides and right angles.

(a) **Write down** the mathematical name of this polygon.

.....

(1)

(b) Here is a prism.



Each edge of the prism has a length of 6.5 cm.
Work out the total length of the edges of the prism.

..... cm

(2)

(Total for Question 10 is 3 marks)

11 There are only red counters, blue counters and green counters in a bag.

number of red counters : number of blue counters : number of green counters = 3 : 8 : 9

What fraction of the counters in the bag are green counters?

.....

(2)

(Total for Question 11 is 2 marks)

12 A film lasted $2\frac{3}{4}$ hours.

The film finished at 16 25

At what time did the film start?

.....

(2)

(Total for Question 12 is 2 marks)

13 **(a)** **Simplify** $9k^2 + 5k^2 - 3k^2$

.....

(1)

(b) **Simplify** $(12m + 8m) \div 4$

.....

(1)

(Total for Question 13 is 2 marks)

14 **Write** the following numbers in order of size.

Start with the smallest number.

$\frac{5}{8}$ 0.62 63% $\frac{7}{11}$ 0.615

.....

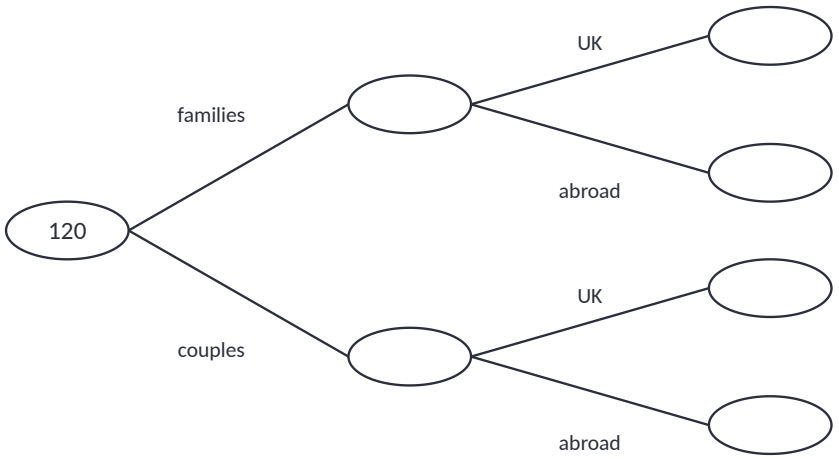
(2)

(Total for Question 14 is 2 marks)

15 A travel agent sold 120 holidays in May.
Each of these holidays was in the UK or was abroad.
70 of the 120 holidays were sold to families.
The rest of the holidays were sold to couples.
13 of the 24 holidays abroad were sold to couples.

> **Remember** Each pair of branches adds up to the number before it. Fill in the numbers you are given first.

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



(3)

(b) One of the holidays sold to a family is chosen at random.
Find the probability that this holiday was **not** abroad.

.....

(2)

(Total for Question 15 is 5 marks)

16 **Solve** $\frac{x}{5} + 7 = 3$

$x =$ .....

(2)

(Total for Question 16 is 2 marks)

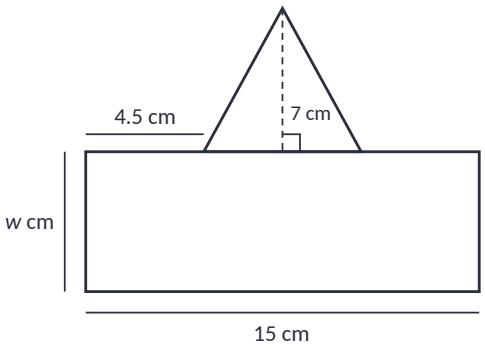
17 Callum works 35 hours a week in the UK.
He is paid £521.50 per week.
Callum applies for a job in Canada.
The rate of pay is 25.80 Canadian dollars per hour.
£1 = 1.72 Canadian dollars
Callum thinks the rate of pay in Canada is greater than the rate of pay in the UK.
Is Callum correct?
You must show how you get your answer.

> **Remember** £ to another currency: multiply by the rate. Another currency to £: divide by the rate.

(3)

(Total for Question 17 is 3 marks)

18 Here is a shape made from a rectangle and a triangle.



The shape has exactly one line of symmetry.
The area of the rectangle is 4 times the area of the triangle.
The width of the rectangle is w cm.
Work out the value of w.
You must show all your working.

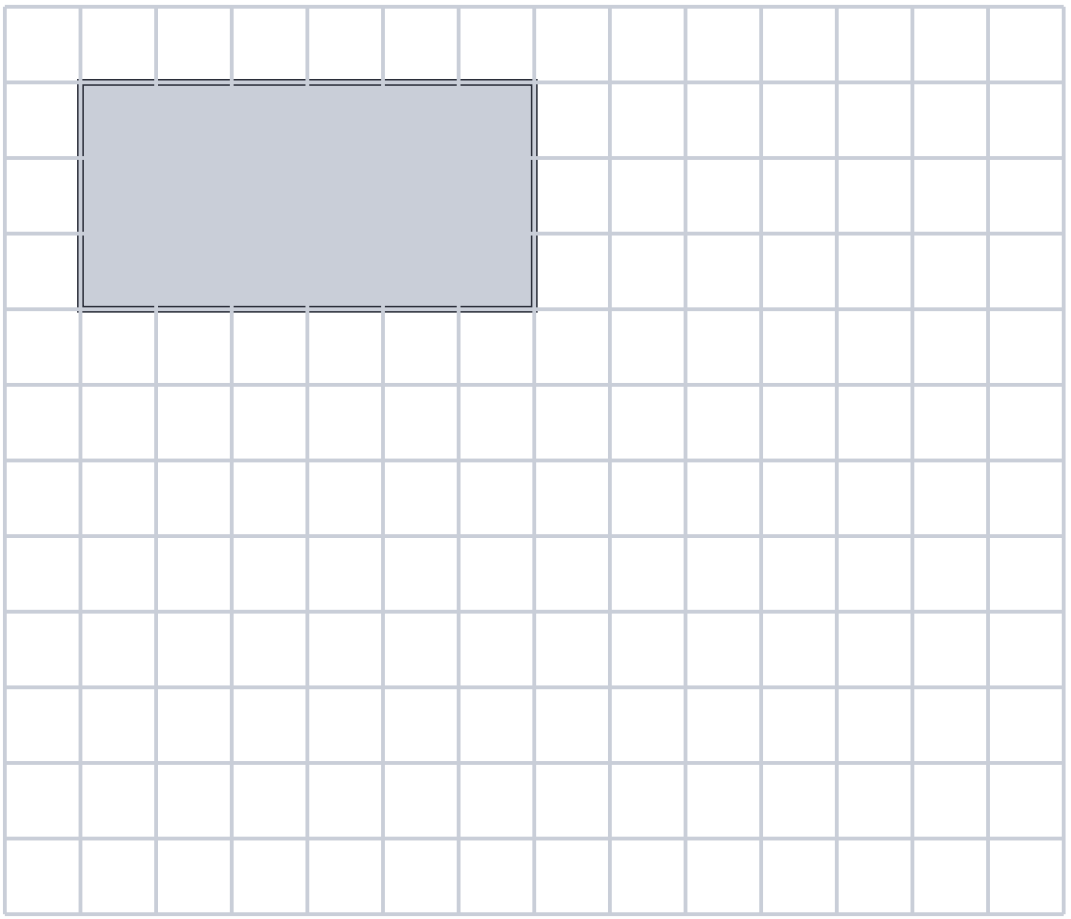
> **Remember** Triangle = ½ × base × height. Trapezium = ½ × (a + b) × height. Use the perpendicular height.

w = ...

(5)

(Total for Question 18 is 5 marks)

19 The front elevation of a cuboid is shown on the centimetre grid below.



The volume of the cuboid is 90 cm^3

On the grid, draw the plan of the cuboid.

> **Remember** Volume of a cuboid = length × width × height. Make all the units the same first (1 m = 100 cm).

(3)

(Total for Question 19 is 3 marks)

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20 **(a)** **Write** 372 000 **in standard form**.

.....

(1)

(b) **Write** 6.208×10^{-3} as an ordinary number.

.....

(1)

(Total for Question 20 is 2 marks)

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21 Here is a biased spinner with four sections labelled A, B, C and D.
The table shows the probabilities that when the spinner is spun it will land on A, on B, on C and on D.

Letter	A	B	C	D
Probability	0.35	0.18	0.29	0.18

Leo will spin the spinner 300 times.
Work out an estimate for the number of times the spinner will land on C.

.....

(2)

(Total for Question 21 is 2 marks)

22 Omar works at a weather station.
The table gives information about the temperature, T °C, at midday for each of 40 cities on Monday.

Temperature (T °C)	Frequency
$5 < T \leqslant 10$	3
$10 < T \leqslant 15$	9
$15 < T \leqslant 20$	14
$20 < T \leqslant 25$	10
$25 < T \leqslant 30$	4

Remember Mean from a table = total of (value × frequency) ÷ total frequency. For groups, use the midpoint of each group.

(a) **Calculate** an estimate for the mean temperature.

.....°C

(3)

(b) Omar says,

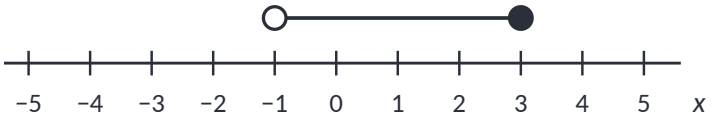
"The median temperature is 17.5 °C because 17.5 is the middle number in the middle group."

Is Omar correct?
Give a reason for your answer.

(1)

(Total for Question 22 is 4 marks)

23 Jenna is asked to show the inequality $-2 \leqslant x < 3$ on a number line.
Here is her answer.



Remember Solve like an equation. On a number line: ● means "included" ($\leqslant$ or $\geqslant$), ○ means "not included" (< or >).

(a) **Write down** two mistakes Jenna has made.

(2)

(b) **Work out** the greatest integer that satisfies the inequality

$$4y + 5 < 30$$

.....

(2)

(Total for Question 23 is 4 marks)

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24 Mia buys packs of cups and packs of plates.
There are 18 cups in each pack of cups.
There are 12 plates in each pack of plates.
Mia buys exactly the same number of cups and plates.
Work out how many packs of cups and how many packs of plates she could have bought.
You must show all your working.

Remember Use a factor tree. HCF = the primes both numbers share. LCM = the smallest number in both times tables.

..... packs of cups

..... packs of plates

(3)

(Total for Question 24 is 3 marks)

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25 A company orders a large number of mugs from a factory.
It would take 24 hours to make all the mugs using 5 machines.
How many machines are needed to make all the mugs in 8 hours?

.....

(2)

(Total for Question 25 is 2 marks)

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26 Nina travelled by car and by train.
She travelled 162 miles by car at an average speed of 54 miles per hour.
Nina then travelled for 2 hours and 45 minutes by train.
Work out, in hours and minutes, Nina's total travelling time.

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

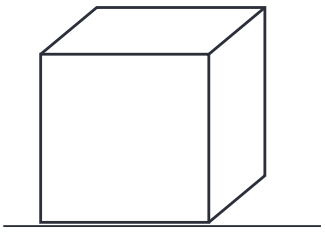
..... hours ..... minutes

(3)

(Total for Question 26 is 3 marks)

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27 The diagram shows a solid cube placed on a horizontal table.



$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The pressure on the table due to the cube is 2.5 newtons/cm^2
The force exerted by the cube on the table is 360 newtons.
Show that the total surface area of the cube is less than 900 cm^2

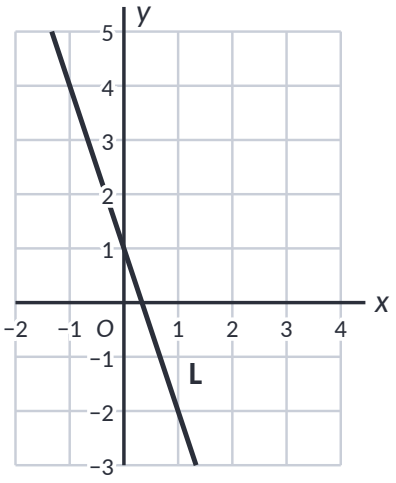
> **Remember** Density = mass ÷ volume. Mass = density × volume. Volume = mass ÷ density. Pressure = force ÷ area.

(3)

(Total for Question 27 is 3 marks)

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28 The line **L** is shown on the grid.



Find an equation for **L**.

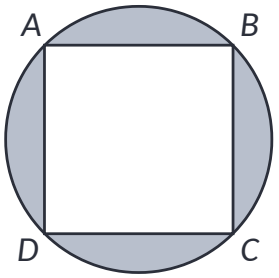
> **Remember** y = mx + c: m is the gradient (up ÷ across), c is where the line crosses the y-axis.

.....

(3)

(Total for Question 28 is 3 marks)

29 *A*, *B*, *C* and *D* are points on a circle such that *ABCD* is a square.



The square *ABCD* has sides of length 4.2 cm.
Calculate the circumference of the circle.
Give your answer **correct to 1 decimal place**.
You must show all your working.

> **Remember** Circumference = π × diameter. Area = π × radius². Radius = half the diameter.

.....cm

(4)

(Total for Question 29 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

D3 mark scheme

Q		Answer	Mark	Notes
1		0.45	B1	
2		6300	B1	
3		Any number less than −8, e.g. −9	B1	
4		$\frac{6}{20}$ oe	B1	
5		$\frac{7}{100}$ or 0.07 or 7 hundredths	B1	
6	(a)	1¾ circles drawn for Lemon	B1	B1
	(b)	Year 8 (Year 7 sold 92)	M1 M1 C1	M1 for two of 36, 26, 16 M1 for 36 + 26 + 16 + 14 (= 92) C1 Year 8 with 92
7		80	M1 M1 A1	M1 for 145 × 20 (= 2900) or 4500 ÷ 20 (= 225) M1 for (4500 − 2900) ÷ 20 or 225 − 145 A1 cao
8	(a)	Subtract 7 from the previous term	B1	B1
	(b)	14	M1 A1	M1 for 60 and 46 or 2 × 7 A1 cao
	(c)	The terms go ..., 39, 32, 25, ... so 30 is missed (88 − 30 = 58 is not a multiple of 7)	C1	C1
9		12	M1 M1 M1 M1 A1	M1 for 15 kg = 15 000 g M1 for 2 × 85 (= 170) or 7 × 170 (= 1190) M1 for 15 000 ÷ 170 (= 88.2...) or 15 000 ÷ 1190 (= 12.6...) M1 for ÷ 7 or a complete method A1 for 12

Mark scheme continues ►

Q		Answer	Mark	Notes
10	(a)	hexagon	B1	
	(b)	117	M1 A1	M1 for 18 edges or 18 × 6.5 A1 cao
11		$\frac{9}{20}$	M1 A1	M1 for 3 + 8 + 9 (= 20) A1 oe
12		13 40	M1 A1	M1 for 2 h 45 min or 165 minutes A1 for 13 40 or 1.40 pm
13	(a)	$11k^2$	B1	
	(b)	$5m$	B1	
14		0.615, 0.62, $\frac{5}{8}$, 63%, $\frac{7}{11}$	M1 A1	M1 for converting to a common form (0.625, 0.63, 0.636...) A1 cao
15	(a)	families 70: UK 59, abroad 11; couples 50: UK 37, abroad 13	B3	B3 all correct (B2 for 4 or 5 correct, B1 for 2 or 3 correct)
	(b)	$\frac{59}{70}$	M1 A1	M1 ft for a denominator of 70 A1 oe
16		−20	M1 A1	M1 for (3 − 7) × 5 A1 cao
17		Yes: £15.00 per hour in Canada compared with £14.90 per hour in the UK	M1 M1 C1	M1 for 521.50 ÷ 35 (= 14.90) M1 for 25.80 ÷ 1.72 (= 15) or 14.90 × 1.72 (= 25.628) C1 Yes with correct comparable figures
18		5.6	M1 M1 M1 M1 A1	M1 for 15 − 2 × 4.5 (= 6) M1 for ½ × 6 × 7 (= 21) M1 for 4 × 21 (= 84) M1 for 84 ÷ 15 A1 cao
19		6 cm by 5 cm rectangle	M1 A1 B1	M1 for 90 ÷ (6 × 3) (= 5) A1 for depth 5 B1 for a 6 by 5 rectangle drawn
20	(a)	3.72×10^5	B1	
	(b)	0.006208	B1	
21		87	M1 A1	M1 for 0.29 × 300 A1 cao

Mark scheme continues ►

Q		Answer	Mark	Notes
22	(a)	**17.9**	M1 M1 A1	M1 for using midpoints (7.5, 12.5, 17.5, 22.5, 27.5) M1 for 715 ÷ 40 A1 for 17.875 or 17.9
	(b)	**No: we only know the median is in the group $15 < T \leqslant 20$, not its exact value**	C1	C1
23	(a)	**1. The line should start at −2, not −1, with a filled circle 2. The circle at 3 should be open, not filled**	C2	C1 for each mistake
	(b)	**6**	M1 A1	M1 for $y < 6.25$ A1 cao
24		**2 packs of cups and 3 packs of plates (or a multiple)**	M1 A1 A1	M1 for listing multiples of 18 and 12 or $18 = 2 \times 3^2$, $12 = 2^2 \times 3$ A1 for 36 A1 for 2 and 3
25		**15**	M1 A1	M1 for 24 × 5 (= 120) or 24 ÷ 8 (= 3) A1 cao
26		**5 hours 45 minutes**	M1 M1 A1	M1 for 162 ÷ 54 (= 3) M1 for 3 h + 2 h 45 min A1 cao
27		**Area of one face = 144 cm², total surface area = 864 cm² < 900**	M1 M1 C1	M1 for 360 ÷ 2.5 (= 144) M1 for 6 × 144 C1 864 and a correct conclusion
28		**$y = -3x + 1$**	M1 M1 A1	M1 for gradient −3 M1 for intercept 1 A1 oe
29		**18.7**	M1 M1 M1 A1	M1 for $4.2^2 + 4.2^2$ (= 35.28) M1 for √35.28 (= 5.939…), the diameter M1 for π × 5.939… A1 for 18.7

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

Score ____ / 80