Full paper C3

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** 37% as a fraction.

.....

(1)

(Total for Question 1 is 1 mark)

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2 **Change** 600 centimetres to metres.

..... metres

(1)

(Total for Question 2 is 1 mark)

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3 **Write down** the value of the 5 in the number 45 216

.....

(1)

(Total for Question 3 is 1 mark)

---

4 **Simplify** $6b + b - 3b$

.....

(1)

(Total for Question 4 is 1 mark)

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5 **Write** the following fractions in order of size.
Start with the smallest fraction.

$$\frac{3}{4} \quad \frac{1}{3} \quad \frac{1}{5}$$

.....

(1)

(Total for Question 5 is 1 mark)

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6 A map has a scale of 1 cm represents 5 km.
On the map, the distance from town P to town Q is 7 cm.

> **Remember** Real distance = map distance × scale. 100 cm = 1 m, 1000 m = 1 km (100 000 cm = 1 km).

(a) **Work out** the real distance, in km, from town P to town Q.

..... km

(2)

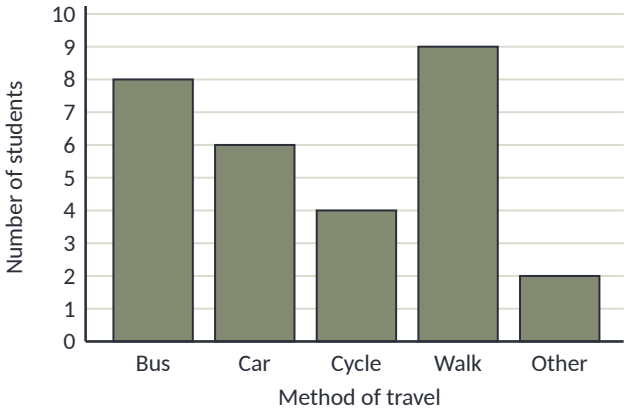
(b) The real length of a road is 12 km.
Work out the length of the road on the map.
Give the units of your answer.

.....

(2)

(Total for Question 6 is 4 marks)

7 Sam asks some students how they travel to school.
The chart shows his results.



(a) **Write down** which method of travel is the mode.

.....

(1)

(b) More students walk to school than come by bus.
How many more?

.....

(1)

(Total for Question 7 is 2 marks)

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8 Tara was born in 1996
There was an election in the year of Tara's 21st birthday.
There is an election every 4 years.
Will there be an election in 2030?
You must show how you get your answer.

> **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 8 is 3 marks)

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9 Ben is going on an activity holiday.
The cost of bike hire is £18 per day.
The cost of a park pass is £12 per day.
The cost of climbing lessons is £21.50 per hour.
Ben will pay for
bike hire for 6 days
a park pass for 5 days
climbing lessons for 7 hours.
Ben has £350
Show that Ben has enough money to pay for the total cost of the bike hire, the park pass and the climbing lessons.

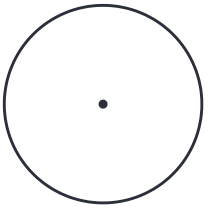
> **Remember** Write down each cost or amount as you work it out, then add them up. Write money with 2 decimal places (£4.50). 100p = £1.

(3)

(Total for Question 9 is 3 marks)

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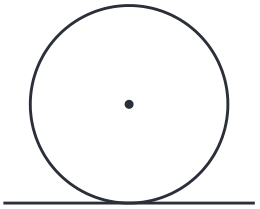
10 Here is a circle.



(a) On the diagram above, draw a diameter of the circle.

(1)

(b) Here is another circle.



Write down the mathematical name for the straight line that touches this circle.

.....

(1)

(Total for Question 10 is 2 marks)

---

11 There are 6 episodes in a TV series.
Each episode lasts 50 minutes.
Work out the total time that the 6 episodes last.
Give your answer in hours.

..... hours

(2)

(Total for Question 11 is 2 marks)

---

12 **Write down** three prime numbers that are between 40 and 60

(2)

(Total for Question 12 is 2 marks)

---

13 Kate asks students in Year 10 and Year 11 to name their favourite sport from football or tennis or swimming.
The two-way table shows information about her results.

	Football	Tennis	Swimming	Total
Year 10	28		31	
Year 11		39		104
Total			58	190

Complete the two-way table.

> **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 13 is 3 marks)

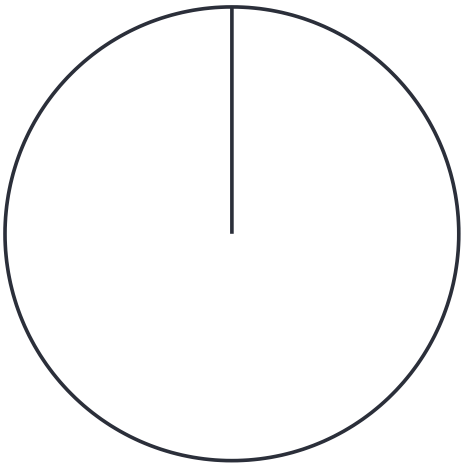
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14 ✎ Complete this question on paper (printed at actual size)

The table gives information about the drinks people ordered in a café.

Drink	Number of people
Juice	20
Water	25
Milk	45

Draw an accurate pie chart for this information.



> **Remember** Angle for each = frequency × (360 ÷ total). The angles must add up to 360°.

(3)

(Total for Question 14 is 3 marks)

15 Which is greater

35% of 64 **or** 15% of 150?

You must show all your working.

> **Remember** Fraction of an amount: ÷ by the bottom, × by the top. Percentage: 10% = ÷ 10, 1% = ÷ 100, or use a multiplier (35% = 0.35).

(3)

(Total for Question 15 is 3 marks)

16

Remember Collect like terms: the same letter (and power) together. Watch the sign in front of each term.

(a) **Simplify** $n \times n \times n$

.....

(1)

(b) In a quiz, a team gets

4 points for each correct answer
1 point for each half-correct answer
0 points for each wrong answer.

Team Blue gets x correct answers and y half-correct answers.
Write down an expression, **in terms of x and y**, for the total number of points Team Blue gets.

.....

(2)

(Total for Question 16 is 3 marks)

17 Here are the ingredients needed to make 12 flapjacks.

Ingredients for 12 flapjacks
150 g of oats
90 g of butter
60 g of syrup

Ola wants to make 18 flapjacks.
How much of each ingredient will Ola need?

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

oats ..... g

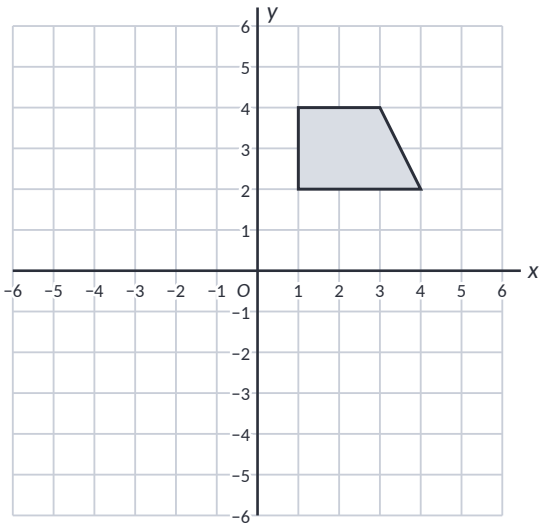
butter ..... g

syrup ..... g

(3)

(Total for Question 17 is 3 marks)

18

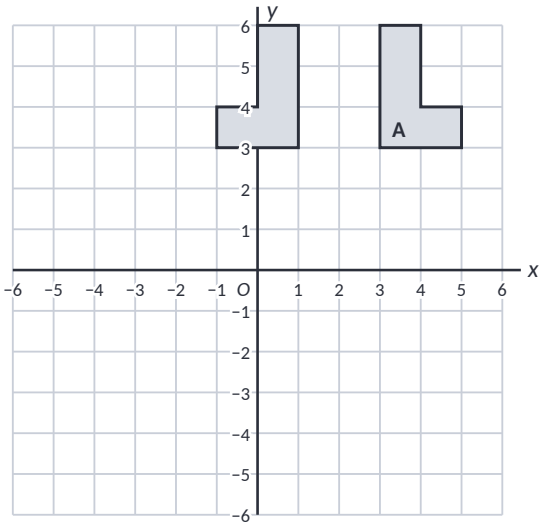


Remember Each point moves to the same distance on the other side of the mirror line. x = a is vertical, y = a is horizontal.

(a) On the grid above, rotate the shaded shape 180° about (0, 0)

(2)

(b)



Leo was asked to

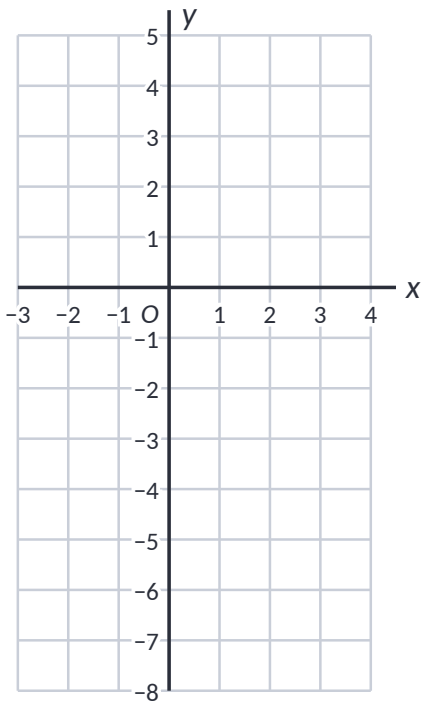
'Reflect shape **A** in the line with equation $y = 2$'

Leo's answer is shown on the grid.
His answer is wrong.
Explain why.

(1)

(Total for Question 18 is 3 marks)

19 On the grid below, draw the graph of $y = 2x - 3$ for values of x from -2 to 3

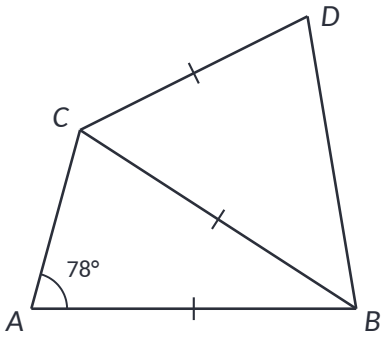


Remember y = mx + c: m is the gradient (up ÷ across), c is where the line crosses the y-axis.

(3)

(Total for Question 19 is 3 marks)

20 *ABC* and *BCD* are isosceles triangles.



AB = *BC* = *CD*

Angle *CAB* = 78°

Angle *BCD* = 4 × angle *ABC*

Find

the size of angle *ABC* : the size of angle *CBD*

Give your answer in the form 1 : *n*

You must show all your working.

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

.....

(5)

(Total for Question 20 is 5 marks)

21 **(a)** **Factorise** $8x - 20$

.....

(1)

(b) **Factorise** $p^2 + 7p$

.....

(1)

(Total for Question 21 is 2 marks)

22 **Find** the highest common factor (HCF) of 84 and 126

.....

(2)

(Total for Question 22 is 2 marks)

23

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

(a) **Write** 6.2×10^3 as an ordinary number.

.....

(1)

(b) **Write** 8.1×10^{-4} as an ordinary number.

.....

(1)

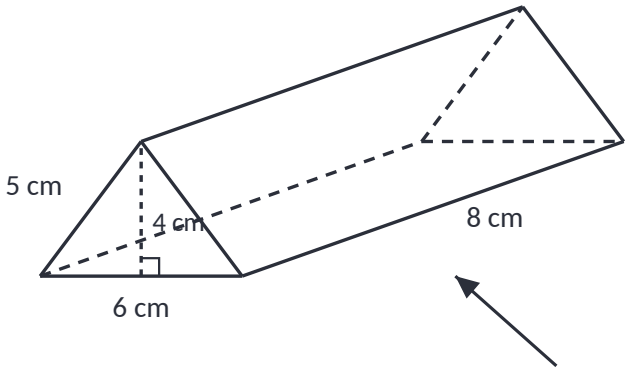
(c) **Calculate** the value of $3.6 \times 10^5 + 4.8 \times 10^6$
Give your answer in standard form.

.....

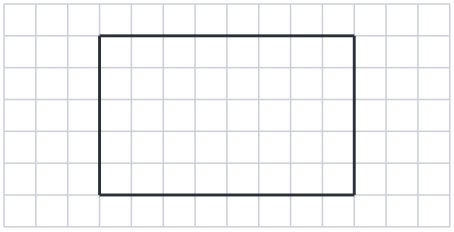
(2)

(Total for Question 23 is 4 marks)

24 The diagram shows a solid triangular prism.



Ravi is trying to draw the side elevation of the solid prism from the direction of the arrow.
Here is his answer on a centimetre grid.



Remember Plan = view from above. Front elevation = view from the front. Side elevation = view from the side.

(a) **Explain why** Ravi's side elevation is not correct.

(1)

(b) On the centimetre grid below, draw a plan of the solid prism.

(2)

(Total for Question 24 is 3 marks)

25 A company has 18 000 workers.
The number of workers increases at a rate of 5% per year for 3 years.
Calculate the total number of workers at the end of the 3 years.

> **Remember** Use a multiplier: amount × (1 + rate)^n, e.g. 3% for 4 years → × 1.03^4. Interest = final amount − original.

.....

(4)

(Total for Question 25 is 4 marks)

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26 Jade has two identical jars.
She puts 450 grams of rice into one of the jars.
The rice fills the jar completely.
The density of the rice is 0.75 g/cm^3
Jade puts 450 grams of sugar into the other jar.
The sugar does **not** fill the jar completely.
The volume of the space in the jar that is **not** filled with sugar is 240 cm^3
Work out the density of the sugar.
You must show all your working.

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

..... g/cm^3

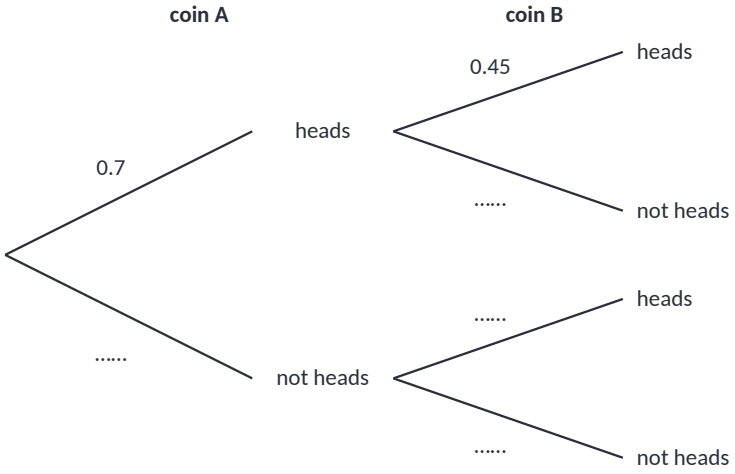
(4)

(Total for Question 26 is 4 marks)

27 Asha has two biased coins, coin **A** and coin **B**.
She is going to throw both coins.
The probability that coin **A** will land on heads is 0.7
The probability that coin **B** will land on heads is 0.45

> **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) Asha throws coin **A** once and she throws coin **B** once.
Work out the probability that both coins land on heads.

.....

(2)

(Total for Question 27 is 4 marks)

28 A paddling pool is in the shape of a cylinder.
The pool has radius 120 cm.
The pool has depth 40 cm.
The pool is empty.
It is then filled with water at a rate of 300 cm^3 per second.
Work out the number of minutes it takes to fill the pool completely.
Give your answer **correct to the nearest minute**.
You must show all your working.

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

..... minutes

(4)

(Total for Question 28 is 4 marks)

29

> **Remember** Put the numbers in place of the letters, using brackets for negatives. Then follow BIDMAS.

(a) $w = 30 - t^2$
Calculate the value of w when $t = -4$

$w =$ .....

(2)

(b) $q = \frac{k+7}{4}$
Make *k* the subject of the formula.

.....

(2)

(Total for Question 29 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

C3 mark scheme

Q		Answer	Mark	Notes
1		$\frac{37}{100}$	B1	
2		6	B1	
3		5000	B1	
4		$4b$	B1	
5		$\frac{1}{5}, \frac{1}{3}, \frac{3}{4}$	B1	
6	(a)	35	M1 A1	M1 for 7×5 A1 cao
	(b)	2.4 cm	M1 A1	M1 for $12 \div 5$ A1 for 2.4 cm
7	(a)	Walk	B1	
	(b)	1	B1	
8		No: elections in 2017, 2021, 2025, 2029, 2033	M1 M1 C1	M1 for 1996 + 21 (= 2017) M1 for adding 4s to reach 2029 or 2033 C1 No with correct working
9		Total cost £318.50, which is less than £350	M1 M1 C1	M1 for two of 108, 60, 150.50 M1 for 108 + 60 + 150.50 C1 318.50 and a correct conclusion
10	(a)	A straight line through the centre from edge to edge	B1	
	(b)	tangent	B1	
11		5	M1 A1	M1 for 6×50 (= 300) A1 cao
12		Three of 41, 43, 47, 53, 59	B2	B2 (B1 for two correct)

Mark scheme continues ►

Q		Answer	Mark	Notes
13		Year 10: 28, 27, 31, 86 Year 11: 38, 39, 27, 104 Total: 66, 66, 58, 190	B3	B3 all correct (B2 for 5 or 6 correct, B1 for 3 or 4 correct)
14		Juice 80°, Water 100°, Milk 180°, labelled	M1 A1 B1	M1 for 360 ÷ 90 (= 4) A1 for all angles correct B1 for a correctly drawn and labelled pie chart
15		15% of 150 (22.5 compared with 22.4)	M1 A1 C1	M1 for 0.35 × 64 or 0.15 × 150 A1 for 22.4 and 22.5 C1 for 15% of 150
16	(a)	n^3	B1	
	(b)	$4x + y$	B2	B2 (B1 for $4x$ or $+ y$)
17		oats 225 g, butter 135 g, syrup 90 g	M1 A2	M1 for 18 ÷ 12 (= 1.5) or a correct method for one ingredient A2 all correct (A1 for two correct)
18	(a)	Shape at (−1, −2), (−4, −2), (−3, −4), (−1, −4)	B2	B2 (B1 for a 180° rotation about another point or a 90° rotation about (0, 0))
	(b)	He reflected in the line $x = 2$ (a vertical line); $y = 2$ is a horizontal line	C1	C1
19		Straight line from (−2, −7) to (3, 3)	M1 M1 A1	M1 for at least 2 correct points calculated or plotted M1 for at least 3 correct points plotted A1 for a correct line from $x = -2$ to $x = 3$
20		1 : 1.75	M1 M1 M1 M1 A1	M1 for angle $BCA = 78°$ M1 for angle $ABC = 180 - 2 \times 78$ (= 24) M1 for angle $BCD = 96$ M1 for angle $CBD = (180 - 96) \div 2$ (= 42) A1 for 1 : 1.75
21	(a)	$4(2x - 5)$	B1	
	(b)	$p(p + 7)$	B1	
22		42	M1 A1	M1 for prime factors of both or listing factors A1 cao

Mark scheme continues ►

Q		Answer	Mark	Notes
23	(a)	6200	B1	
	(b)	0.00081	B1	
	(c)	5.16×10^6	M1 A1	M1 for 5 160 000 A1 cao
24	(a)	The height should be 4 cm (the height of the prism), not 5 cm (the sloping edge)	C1	C1
	(b)	8 cm by 6 cm rectangle with a line along its length through the middle	B2	B2 (B1 for an 8 by 6 rectangle)
25		20 837	M1 M1 M1 A1	M1 for 18 000 × 1.05 (= 18 900) M1 for a second year (= 19 845) M1 for $18\,000 \times 1.05^3$ A1 for 20 837 or 20 838
26		1.25	M1 M1 M1 A1	M1 for 450 ÷ 0.75 (= 600) M1 for 600 − 240 (= 360) M1 for 450 ÷ 360 A1 cao
27	(a)	0.3; 0.55; 0.45, 0.55	B2	B2 all correct (B1 for 0.3 or 0.55 correct)
	(b)	0.315	M1 A1	M1 for 0.7 × 0.45 A1 cao
28		101	M1 M1 M1 A1	M1 for $\pi \times 120^2 \times 40$ (= 1 809 557…) M1 for ÷ 300 (= 6031.8… seconds) M1 for ÷ 60 A1 for 101
29	(a)	14	M1 A1	M1 for $30 - (-4)^2$ A1 cao
	(b)	$k = 4q - 7$	M1 A1	M1 for $4q = k + 7$ A1 oe

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

Score ____ / 80