Full paper E2

Paper 2 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** 4738 **correct to the nearest hundred**.

.....

(1)

(Total for Question 1 is 1 mark)

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2 **Write** 0.3 as a fraction.

.....

(1)

(Total for Question 2 is 1 mark)

---

3 **Change** 6 metres into centimetres.

..... centimetres

(1)

(Total for Question 3 is 1 mark)

---

4 **Simplify** $5 \times 2k$

.....

(1)

(Total for Question 4 is 1 mark)

Turn over ►

5 Here is a list of numbers.

15 30 45 60 75

One of these numbers is a multiple of 20
Which number?

.....

(1)

(Total for Question 5 is 1 mark)

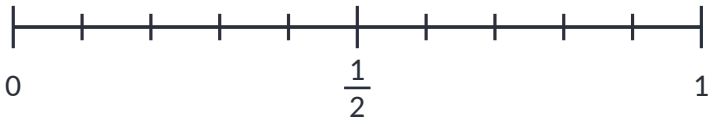
6 Tom has a fair ordinary dice.
He rolls the dice once.

(a) On the probability scale, mark with a cross (×) the probability that Tom gets the number 0



(1)

(b) On the probability scale, mark with a cross (×) the probability that Tom gets a number greater than 2

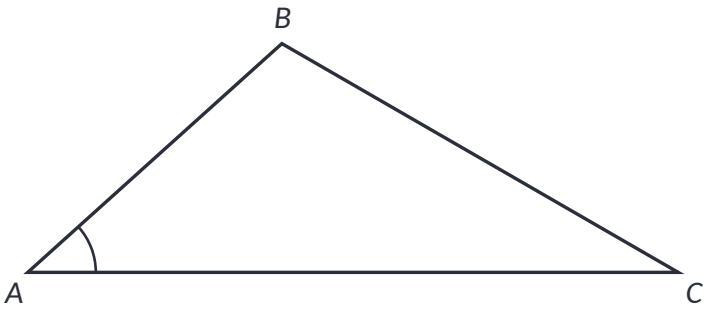


(1)

(Total for Question 6 is 2 marks)

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

Here is a triangle.
The triangle is accurately drawn.



Remember Line up 0 on the ruler. Put the protractor centre on the corner and count from 0°. Acute < 90°, obtuse between 90° and 180°.

(a) **Measure** the length of *AC*.

..... cm

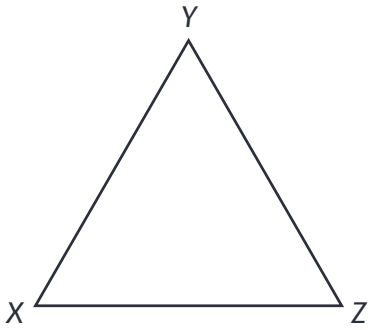
(1)

(b) **Measure** the size of angle *A*.

..... °

(1)

(c) Here is a different triangle.



$XY = YZ = ZX$

Write down the mathematical name of this triangle.

.....

(1)

(Total for Question 7 is 3 marks)

8 The diagram shows three bus stops *P*, *Q* and *R* on a map.



The map has a scale of 1 cm = 5 km.
Work out the real distance from *P* to *R*.

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

..... km

(3)

(Total for Question 8 is 3 marks)

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9 Here are the first five terms of a sequence.

2 8 14 20 26

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

(a) **Write down** the next term of this sequence.

.....

(1)

(b) **Write down** the ratio of the second term to the fourth term.
Give your ratio **in its simplest form**.

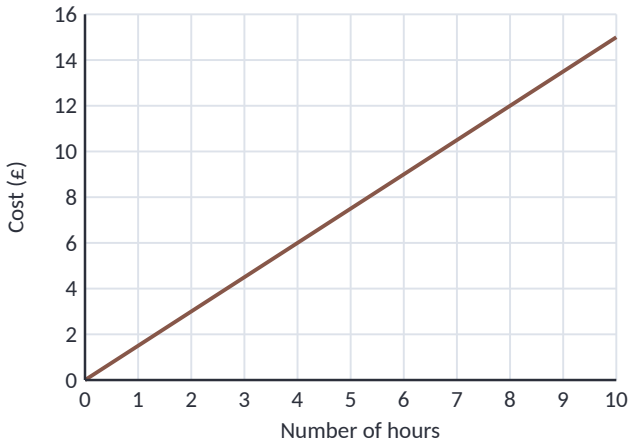
.....

(2)

(Total for Question 9 is 3 marks)

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10 This graph can be used to find the cost of hiring a bike for up to 10 hours.



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) **Use the graph** to find the cost of hiring a bike for 6 hours.

£ .....

(1)

(b) Sam hires a bike at 09 30 in the morning.
When he returns the bike he has to pay £12
At what time does Sam return the bike?

.....

(3)

(Total for Question 10 is 4 marks)

11 The table shows information about the weights of the people in a boat.

Weight	Number of people
50 kg	2
60 kg	3
70 kg	4
80 kg	2
90 kg	1

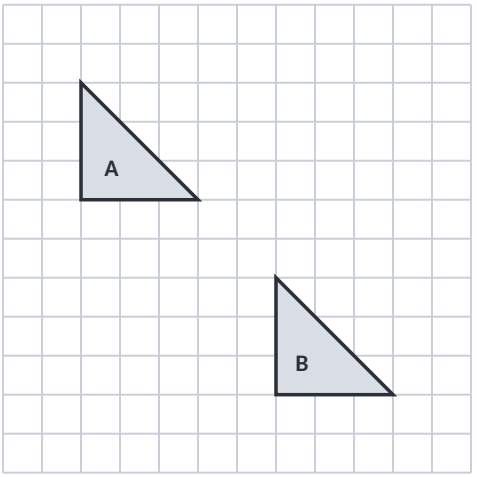
Show that the total weight of the people in the boat is less than 900 kg.

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

(3)

(Total for Question 11 is 3 marks)

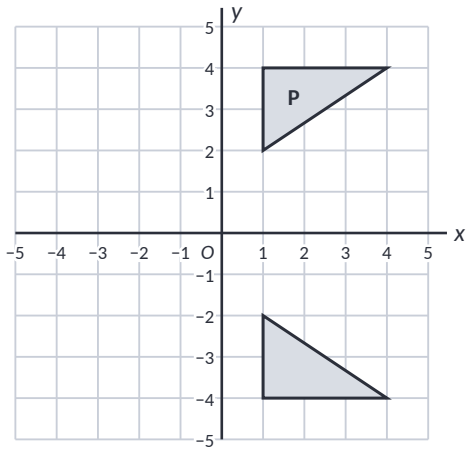
12 Shape **A** is reflected in a mirror line to give shape **B**.



(a) On the grid, draw the mirror line.

(1)

(b) Ben is asked to reflect shape **P** in the *y*-axis.
Here is the diagram Ben draws.



Explain the mistake Ben has made.

(1)

(Total for Question 12 is 2 marks)

13 There are 40 teachers in a school.

This is $\frac{1}{18}$ of the total number of people in the school.

Work out the total number of people in the school.

.....

(2)

(Total for Question 13 is 2 marks)

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14 Packets of biscuits are put into boxes.

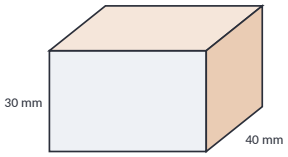


Diagram NOT accurately drawn

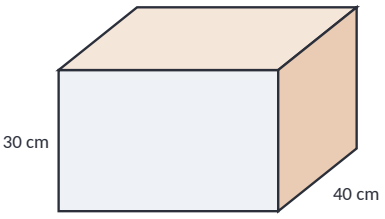


Diagram NOT accurately drawn

Each packet is a cuboid, 50 mm by 40 mm by 30 mm.

Each box is a cuboid, 60 cm by 40 cm by 30 cm.

Work out the greatest number of packets that can be put into each box.

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

.....

(4)

(Total for Question 14 is 4 marks)

---

15 Here is a fair ordinary dice and a fair 10-sided spinner numbered 1 to 10
Kayla throws the dice once and spins the spinner once.
Is Kayla more likely to get

a number less than 3 on the dice
or a number greater than 7 on the spinner?

You must show all your working.

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

(3)

(Total for Question 15 is 3 marks)

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16 Lucy drives at an average speed of 64 km/h for 2 hours 15 minutes.
Work out the distance Lucy drives.

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

..... km

(3)

(Total for Question 16 is 3 marks)

---

17 There are 3 theatres **A**, **B** and **C**.
The mean number of seats per theatre is 410
There are 360 seats in theatre **A**.
There are 290 seats in theatre **B**.
Work out the number of seats in theatre **C**.

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

.....

(4)

(Total for Question 17 is 4 marks)

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18 Mo buys 168 cans of lemonade.
The cans are sold in packs.
There are 8 cans in each pack.
Each pack costs £3.50

> **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.

(a) **Work out** the total cost of the lemonade Mo buys.

£ .....

(3)

(b) Kim buys a box of 18 bottles of water for £8.40
There are 500 ml of water in each bottle.
Work out the cost of 100 ml of water.
Give your answer **correct to the nearest penny**.

..... p

(3)

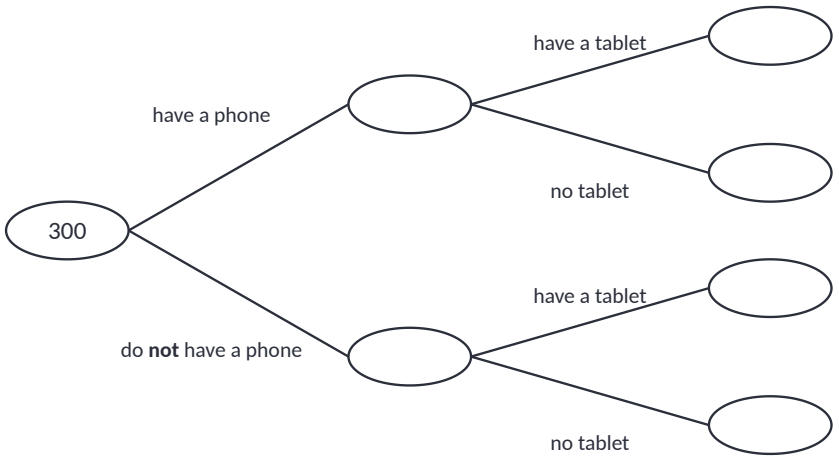
(Total for Question 18 is 6 marks)

19 300 people work at an office.
Of these people

170 have a phone
120 have a tablet
45 of the people who have a tablet do **not** have a phone.

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) What percentage of the 170 people who have a phone also have a tablet?

.....%

(2)

(Total for Question 19 is 5 marks)

20

Remember Use brackets for the top and the bottom of a fraction. Write down every digit on the display.

(a) **Work out** the value of $\frac{30 - \sqrt{52.41}}{5 + 1.8^2}$

Write down all the figures on your calculator display.

.....

(2)

(b) **Work out** the value of the reciprocal of 0.32

.....

(1)

(Total for Question 20 is 3 marks)

21 **Write** 90 as a product of its prime factors.

.....

(2)

(Total for Question 21 is 2 marks)

22 There are 60 counters in a bag.
There are only red counters and blue counters in the bag.

number of red counters : number of blue counters = 1 : 3

Ken has to work out how many red counters are in the bag.
He says,

"There are 20 red counters in the bag because 1 is a third of 3 and 20 is a third of 60"

Is Ken correct?
You must give a reason for your answer.

(1)

(Total for Question 22 is 1 mark)

23 $-3 < n \leqslant 4$

n is an integer.

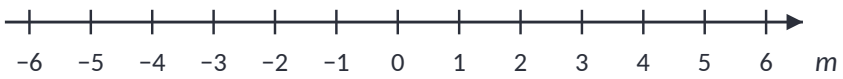
Remember Solve like an equation. On a number line: ● means "included" ($\leqslant$ or $\geqslant$), ○ means "not included" ($<$ or $>$).

(a) **Write down** the least possible value of n.

.....

(1)

(b) On the number line below, show the inequality $-5 \leqslant m < 2$



(2)

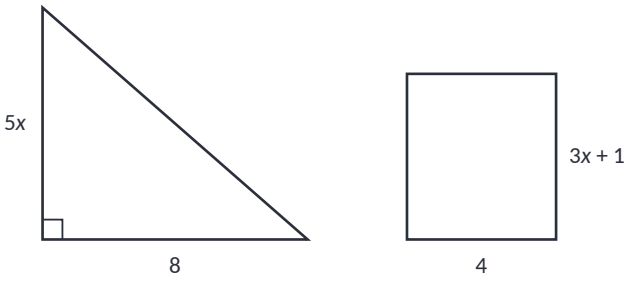
(c) **Solve** $\frac{3}{4}g + 2 < 11$

.....

(3)

(Total for Question 23 is 6 marks)

24 Here is a triangle and a rectangle.



All measurements are in centimetres.

The area of the triangle is 12 cm² greater than the area of the rectangle.

Work out the value of x.

Remember Perimeter: add all the sides. Rectangle area = length × width. Triangle area = ½ × base × height.

$x =$ .....

(4)

(Total for Question 24 is 4 marks)

25 Last year a school recycled 1200 kg of waste.
45% of this waste was paper and plastic.

weight of paper recycled : weight of plastic recycled = 7 : 2

Calculate the weight of plastic the school recycled.

> **Remember** Add the ratio parts to find the total number of parts. One part = amount ÷ total parts. Then multiply.

..... kg

(3)

(Total for Question 25 is 3 marks)

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26 A number, *d*, is rounded **to 1 decimal place**.
The result is 8.4
Complete the error interval for *d*.

(2)

(Total for Question 26 is 2 marks)

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27 Aisha buys a flat with a value of £180 000
The value of Aisha's flat increases by 3.5% each year.
Rob buys a flat with a value of £185 000
The value of Rob's flat increases by 2% each year.
At the end of 2 years, whose flat has the greater value?
You must show how you get your answer.

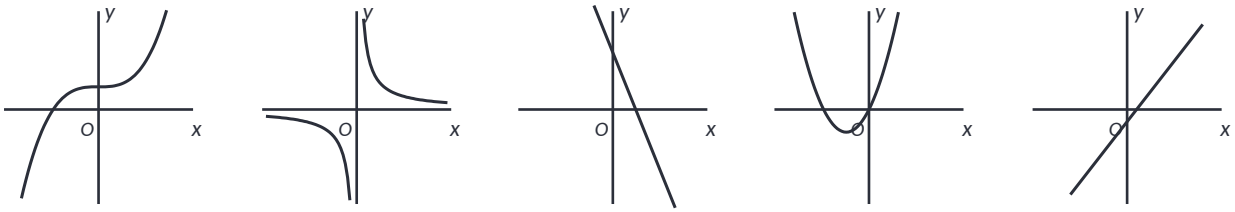
> **Remember** Use a multiplier: amount × (1 + rate)^n, e.g. 3% for 4 years → × 1.03^4. Interest = final amount − original.

(4)

(Total for Question 27 is 4 marks)

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28 Here are five graphs.



A **B** **C** **D** **E**

The table shows the equations of these graphs.

Equation	Graph
$y = x^2 + 2x$	
$y = 2x - 1$	
$y = x^3 + 1$	
$y = \frac{1}{x}$	
$y = 4 - 3x$	

Match the letter of each graph with its equation.

> **Remember** Square first: $(-2)^2 = 4$. Plot each point and join with a smooth curve, not a ruler.

(3)

(Total for Question 28 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

E2 mark scheme

Q		Answer	Mark	Notes
1		4700	B1	
2		$\frac{3}{10}$	B1	
3		600	B1	
4		$10k$	B1	
5		60	B1	
6	(a)	Cross at 0	B1	
	(b)	Cross at $\frac{2}{3}$	B1	
7	(a)	8.6	B1	Accept 8.4 to 8.8
	(b)	42	B1	Accept 40 to 44
	(c)	equilateral	B1	
8		95	M1 M1 A1	M1 for 6 + 13 (= 19) M1 for 19 × 5 A1 cao
9	(a)	32	B1	
	(b)	2 : 5	M1 A1	M1 for 8 : 20 A1 cao
10	(a)	9	B1	
	(b)	17 30	M1 M1 A1	M1 for reading 8 hours at £12 M1 for 09 30 + 8 hours A1 for 17 30 or 5.30 pm
11		Total 810 kg, which is less than 900 kg	M1 M1 C1	M1 for at least 3 products of weight × number M1 for adding all 5 products C1 810 and a conclusion

Mark scheme continues ►

Q		Answer	Mark	Notes
12	(a)	Diagonal line through the grid corners (0, 0), (6, 6) and (12, 12)	B1	B1
	(b)	He reflected the shape in the *x*-axis instead of the *y*-axis	C1	C1
13		720	M1 A1	M1 for 40 × 18 A1 cao
14		1200	M1 M1 M1 A1	M1 for converting to the same units M1 for 600 ÷ 50 (= 12), 400 ÷ 40 (= 10) and 300 ÷ 30 (= 10) M1 for 12 × 10 × 10 A1 cao
15		The dice ($\frac{2}{6}$ = 0.33... compared with $\frac{3}{10}$ = 0.3)	M1 M1 C1	M1 for $\frac{2}{6}$ or $\frac{3}{10}$ M1 for both in a comparable form C1 dice with correct values
16		144	M1 M1 A1	M1 for 2 h 15 min = 2.25 h M1 for 64 × 2.25 A1 cao
17		580	M1 M1 M1 A1	M1 for 410 × 3 (= 1230) M1 for 360 + 290 (= 650) M1 for 1230 − 650 A1 cao
18	(a)	73.50	M1 M1 A1	M1 for 168 ÷ 8 (= 21) M1 for 21 × 3.50 A1 cao
	(b)	9	M1 M1 A1	M1 for 18 × 500 (= 9000) M1 for 840 ÷ 90 (= 9.33...) A1 for 9
19	(a)	phone 170: tablet 75, no tablet 95; no phone 130: tablet 45, no tablet 85	B3	B3 all correct (B2 for 4 or 5 correct, B1 for 2 or 3 correct)
	(b)	44.1	M1 A1	M1 for 75 ÷ 170 × 100 A1 for 44.1 to 44.12
20	(a)	2.7621996215	M1 A1	M1 for 22.76... or 8.24 A1 for 2.7621...
	(b)	3.125	B1	

Mark scheme continues ►

Q		Answer	Mark	Notes
21		$2 \times 3 \times 3 \times 5$	M1 A1	M1 for a factor tree or repeated division A1 for $2 \times 3^2 \times 5$ oe
22		No: there are 4 parts, so red = 60 ÷ 4 = 15	C1	C1
23	(a)	−2	B1	
	(b)	Filled circle at −5, open circle at 2, joined	B2	B2 (B1 for one end correct)
	(c)	$g < 12$	M1 M1 A1	M1 for $\frac{3}{4}g < 9$ M1 for $9 \div \frac{3}{4}$ or $9 \times 4 \div 3$ A1 cao
24		2	M1 M1 M1 A1	M1 for ½ × 8 × 5x (= 20x) M1 for 4(3x + 1) (= 12x + 4) M1 for 20x = 12x + 4 + 12 A1 cao
25		120	M1 M1 A1	M1 for 0.45 × 1200 (= 540) M1 for 540 ÷ 9 × 2 A1 cao
26		$8.35 \leqslant d < 8.45$	B2	B2 (B1 for one end correct)
27		Aisha's (£192 820.50 compared with £192 474)	M1 M1 A1 C1	M1 for 180 000 × 1.035^2 or a first year (186 300) M1 for 185 000 × 1.02^2 or a first year (188 700) A1 for 192 820.5 and 192 474 C1 Aisha with correct values
28		D, E, A, B, C (in table order)	B3	B3 all correct (B2 for 3 correct, B1 for 2 correct)

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

Score ____ / 80

Write your score on the front page