Full paper A3

Paper 3 style · Calculator allowed · 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 down** the value of the 6 in the number 58.362

.....

(1)

(Total for Question 1 is 1 mark)

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2 **Find** $\sqrt{12.25}$

.....

(1)

(Total for Question 2 is 1 mark)

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3 **Write** 37% as a fraction.

.....

(1)

(Total for Question 3 is 1 mark)

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4 Here are some fractions.

$$\frac{2}{8} \quad \frac{5}{20} \quad \frac{3}{12} \quad \frac{4}{14} \quad \frac{6}{24}$$

Which one of these fractions is **not** equivalent to $\frac{1}{4}$?

.....

(1)

(Total for Question 4 is 1 mark)

Turn over ►

5 **Write down** two factors of 45

…… , ……

(1)

(Total for Question 5 is 1 mark)

6 Kai has some £5 notes and some £20 notes.
The notes have a total value of £235
Kai has seven £20 notes.
Work out the number of £5 notes Kai has.

> **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.

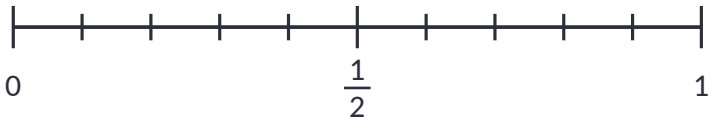
……

(3)

(Total for Question 6 is 3 marks)

7 Nadia has a fair spinner with four equal sections numbered 1, 2, 3 and 4
She spins the spinner once.

(a) On the probability scale below, mark with a cross (×) the probability that the spinner lands on 3



(1)

(b) On the probability scale below, mark with a cross (×) the probability that the spinner lands on a number greater than 1



(1)

(Total for Question 7 is 2 marks)

8 Here is a lunch menu.

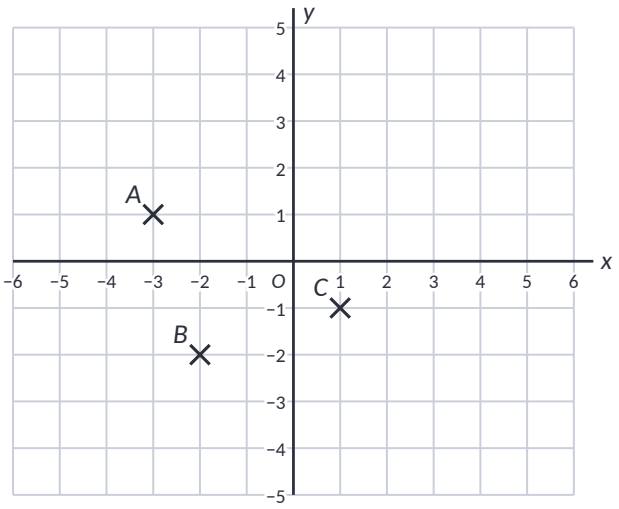
Sandwich	Fruit
Cheese (C)	Apple (A)
Ham (H)	Banana (B)
Tuna (T)	Grapes (G)

Zac can choose one sandwich and one piece of fruit.
Write down all the possible combinations Zac can choose.

(2)

(Total for Question 8 is 2 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 *D* so that *ABCD* is a square.
Label this point *D*.

(1)

(c) On the grid, mark with a cross (×) the point *E* so that *C* is the midpoint of *BE*.
Label this point *E*.

(1)

(Total for Question 9 is 3 marks)

10 Leon says,

"The square root of 64 is 32 because 64 divided by 2 is 32"

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

(1)

(Total for Question 10 is 1 mark)

---

11 Sam's height is 1.45 metres.
Kim's height is 128 centimetres.
Sam's height is greater than Kim's height.
How many centimetres greater?

..... centimetres

(2)

(Total for Question 11 is 2 marks)

---

12 The *n*th term of a sequence is $5n + 2$

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

(a) **Work out** the 3rd term of the sequence.

.....

(1)

(b) Here are the first four terms of a different sequence.

7 11 15 19

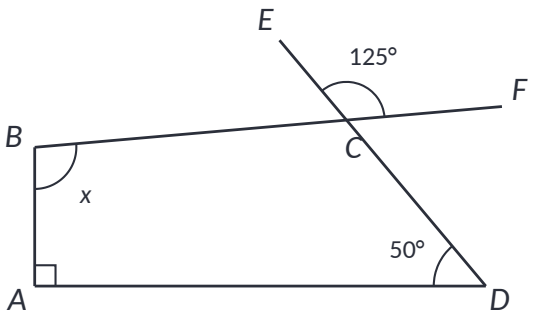
Is 54 a number in this sequence?
You must give a reason for your answer.

(2)

(Total for Question 12 is 3 marks)

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13 *ABCD* is a quadrilateral.
BCF and *DCE* are straight lines.



Work out the size of the angle marked *x*.
Give a reason for each stage of 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.

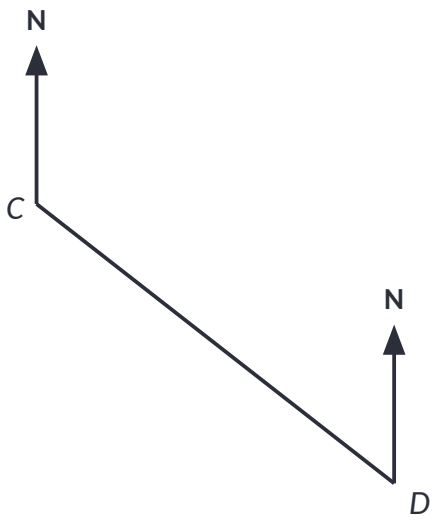
.....

(4)

(Total for Question 13 is 4 marks)

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

The accurately drawn diagram shows two points, *C* and *D*, on a map.



Remember Measure from North, clockwise, and always use 3 figures (e.g. 065°). A back bearing: add or subtract 180°.

(a) **Find** the bearing of *D* from *C*.

..... °

(1)

(b) The scale of the map is 1 cm represents 5 km.
Work out the real distance from *C* to *D*.

..... km

(2)

(Total for Question 14 is 3 marks)

15 There are 400 beads in a bag.
113 of the beads are red.
36 of the beads are blue.

(a) What fraction of the beads are red?

.....

(1)

(b) What percentage of the beads are blue?

..... %

(1)

(Total for Question 15 is 2 marks)

---

16 A team plays 60 games.
The team wins $\frac{2}{5}$ of the 60 games.
The number of games the team loses is the same as the number of games the team draws.
Work out the number of games the team loses.

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

.....

(3)

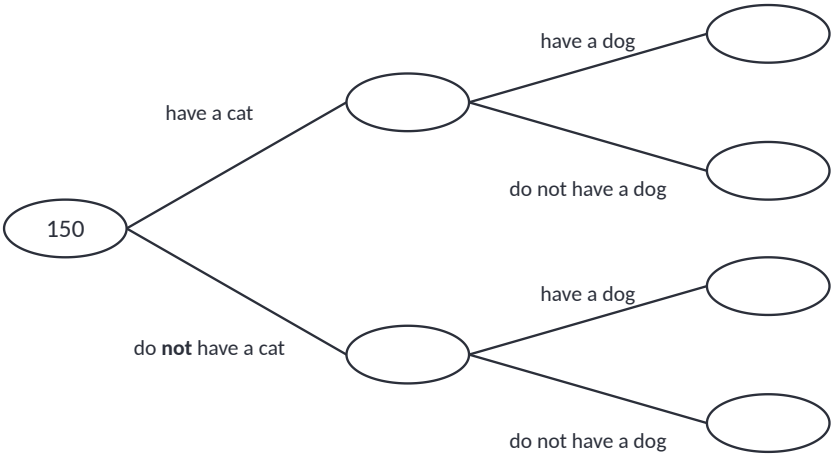
(Total for Question 16 is 3 marks)

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17 150 people are asked if they have a cat or a dog.
58 of the people have a cat.
23 of the people who have a cat also have a dog.
71 of the people have a dog.

> **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 150 people is chosen at random.
Find the probability that this person does **not** have a cat.

.....

(1)

(Total for Question 17 is 4 marks)

18 Zoe buys a sofa.
The sofa costs £3600
Zoe pays a deposit of 15% of the cost.
She pays the rest of the cost in 18 equal monthly payments.
Zoe says that each monthly payment is more than £175
Is Zoe correct?
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.

(3)

(Total for Question 18 is 3 marks)

19 Ola recorded the number of goals scored in each of 40 football matches.
The table gives information about her results.

Number of goals	Frequency
0	9
1	12
2	10
3	6
4	3

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

(a) **Find** the median number of goals.

.....

(1)

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

.....

(3)

(Total for Question 19 is 4 marks)

20

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

(a) Use your calculator to work out the value of

$$\frac{56.3 - 18.47}{7.25 + 21.9}$$

Give your answer as a decimal.
Write down all the figures on your calculator display.

.....

(2)

(b) **Write** your answer to part (a) **correct to 2 significant figures**.

.....

(1)

(Total for Question 20 is 3 marks)

21

> **Remember** Multiply: add the powers. Divide: subtract the powers. Power of a power: multiply the powers. Anything to the power 0 = 1.

(a) **Simplify** $w^{12} \div w^3$

.....

(1)

(b) **Simplify** $(k^4)^3$

.....

(1)

(c) **Expand** $y(2y^2 - 7)$

.....

(1)

(d) **Expand and simplify** $(n - 4)(n + 6)$

.....

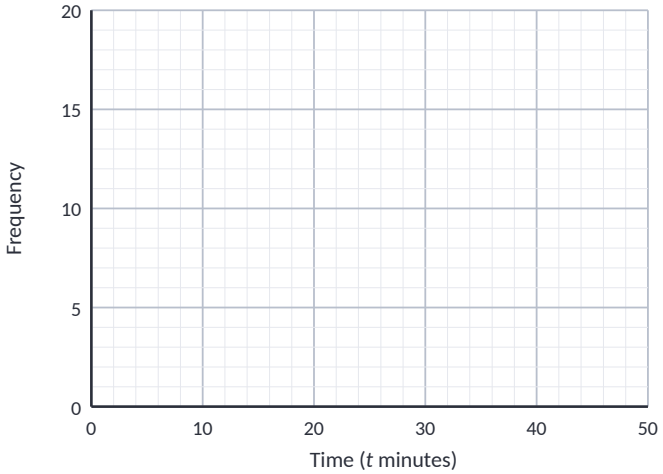
(2)

(Total for Question 21 is 5 marks)

22 The table shows information about the times that 50 runners took to finish a race.

Time (t minutes)	Frequency
$0 < t \leq 10$	6
$10 < t \leq 20$	14
$20 < t \leq 30$	18
$30 < t \leq 40$	9
$40 < t \leq 50$	3

Draw a frequency polygon for the information in the table.



(2)

(Total for Question 22 is 2 marks)

23 Ella is trying to make t the subject of $q = \frac{t}{4} - 2$

Here is her working.

$q + 2 = \frac{t}{4}$

$4 \times q + 2 = t$

$t = 4q + 2$

Ella's answer is wrong.

> **Remember** To make t the subject, undo each step in reverse order. Do the same to both sides each time.

(a) What mistake has Ella made?

(1)

(b) **Factorise fully** $6a^2b + 9ab^3$

.....

(2)

(Total for Question 23 is 3 marks)

24 Jo pays £18 for 120 apples.
Jo puts the apples into bags.
She puts 4 apples into each bag.
Jo sells all the bags of apples for 75p each.
Work out Jo's percentage profit.

> **Remember** Percentage change = change ÷ original × 100. Multipliers: increase by 5% → × 1.05, decrease by 5% → × 0.95.

..... %

(3)

(Total for Question 24 is 3 marks)

25 In Manchester, 3 kg of apples cost £4.20
In Boston, 4 lbs of apples cost 3.60 US dollars.

£1 = 1.25 US dollars
1 kg = 2.2 lbs

In which city are apples better value for money, Manchester or Boston?
You must show how you get your answer.

> **Remember** Find the cost of the same amount for each one (e.g. per 100 g or per item), then compare. Write a conclusion.

(4)

(Total for Question 25 is 4 marks)

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26 Ravi rounds a number, n, **to 1 decimal place**.
The result is 16.2
Complete the error interval for n.

..... ≤ n < .....

(2)

(Total for Question 26 is 2 marks)

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27 A plane takes 3 hours 45 minutes to fly from Leeds to Tenerife.
The plane flies a distance of 2700 kilometres.
Work out the average speed of the plane.
Give your answer in kilometres per hour.

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

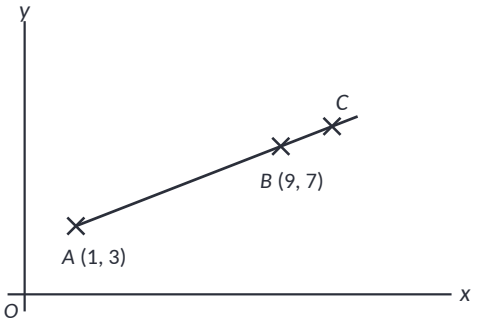
..... kilometres per hour

(3)

(Total for Question 27 is 3 marks)

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28 *ABC* is a straight line.



Point *A* has coordinates (1, 3)

Point *B* has coordinates (9, 7)

$BC = \frac{1}{4}AB$

Find the coordinates of point *C*.

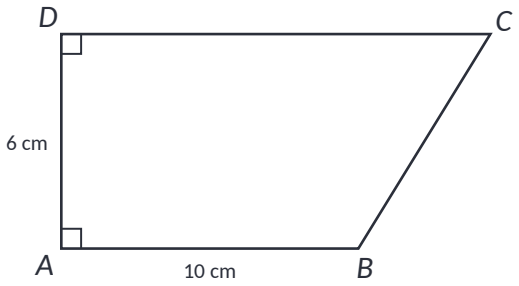
> **Remember** (x, y): go along first, then up. Midpoint: add the x values and halve, add the y values and halve.

(..... , ...)

(3)

(Total for Question 28 is 3 marks)

29 The diagram shows trapezium *ABCD*.



AB = 10 cm

AD = 6 cm

The trapezium has an area of 81 cm²

Work out the perimeter of the trapezium.

Give your answer **correct to 3 significant figures**.

> **Remember** Longest side² = one side² + other side². Shorter side: subtract instead of add.

..... cm

(5)

(Total for Question 29 is 5 marks)

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30 **Solve** algebraically the simultaneous equations

$$x + 4y = 13$$

$$5x - 2y = 10$$

> **Remember** Make one letter have the same number in both equations, then add or subtract to remove it. Substitute back to find the other.

x = ...

y = ...

(3)

(Total for Question 30 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

A3 mark scheme

Q		Answer	Mark	Notes
1		$\frac{6}{100}$ (0.06)	B1	Accept 6 hundredths
2		3.5	B1	
3		$\frac{37}{100}$	B1	
4		$\frac{4}{14}$	B1	
5		Any two of 1, 3, 5, 9, 15, 45	B1	
6		19	M1 M1 A1	M1 for 7 × 20 (= 140) M1 for (235 − 140) ÷ 5 A1 cao
7	(a)	Cross at $\frac{1}{4}$	B1	
	(b)	Cross at $\frac{3}{4}$	B1	
8		CA, CB, CG, HA, HB, HG, TA, TB, TG	B2	B2 all 9 and no extras (B1 for at least 5 correct)
9	(a)	(−3, 1)	B1	
	(b)	(0, 2)	B1	
	(c)	(4, 0)	B1	
10		No, √64 = 8 because 8 × 8 = 64	C1	C1
11		17	M1 A1	M1 for 1.45 m = 145 cm (or 128 cm = 1.28 m) A1 cao
12	(a)	17	B1	
	(b)	No, e.g. all the terms are odd (or $4n + 3 = 54$ gives $n = 12.75$)	M1 C1	M1 for $4n + 3$ or continuing the sequence to 51, 55 C1 No with a correct reason

Mark scheme continues ►

Q		Answer	Mark	Notes
13		95	M1 M1 A1 C1	M1 for angle *BCD* = 125° M1 for 360 − 90 − 50 − 125 A1 cao C1 vertically opposite angles are equal and angles in a quadrilateral add up to 360°
14	(a)	128	B1	Accept 126 to 130
	(b)	30	M1 A1	M1 for measuring 6 cm (±0.2) A1 for 29 to 31
15	(a)	$\frac{113}{400}$	B1	
	(b)	9	B1	
16		18	M1 M1 A1	M1 for $\frac{2}{5} \times 60$ (= 24) M1 for (60 − 24) ÷ 2 A1 cao
17	(a)	cat 58: dog 23, no dog 35; no cat 92: dog 48, no dog 44	B3	B3 all correct (B2 for 4 or 5 correct, B1 for 2 or 3 correct)
	(b)	$\frac{92}{150}$	B1	oe
18		No, each payment is £170	M1 M1 C1	M1 for 0.15 × 3600 (= 540) or 0.85 × 3600 (= 3060) M1 for 3060 ÷ 18 C1 No with £170
19	(a)	1	B1	
	(b)	1.55	M1 M1 A1	M1 for finding goals × frequency (0, 12, 20, 18, 12) M1 for 62 ÷ 40 A1 cao
20	(a)	1.297770154...	M1 A1	M1 for 37.83 or 29.15 A1 for 1.2977...
	(b)	1.3	B1	ft from (a)
21	(a)	w^9	B1	
	(b)	k^{12}	B1	
	(c)	$2y^3 - 7y$	B1	
	(d)	$n^2 + 2n - 24$	M1 A1	M1 for 3 of 4 terms correct A1 cao

Mark scheme continues ►

Q		Answer	Mark	Notes
22		Points at (5, 6), (15, 14), (25, 18), (35, 9), (45, 3) joined with straight lines	B2	B2 (B1 for 4 or 5 points correctly plotted at the midpoints, or all plotted at the right height but not the midpoints)
23	(a)	She only multiplied q by 4; she should multiply all of $q + 2$ by 4 ($t = 4(q + 2)$)	C1	C1
	(b)	$3ab(2a + 3b^2)$	B1 B1	B1 for a partial factorisation, e.g. $3a(2ab + 3b^3)$ B1 fully correct
24		25	M1 M1 A1	M1 for 120 ÷ 4 (= 30) and 30 × 0.75 (= £22.50) M1 for (22.50 − 18) ÷ 18 × 100 A1 cao
25		Manchester (£1.40 per kg compared with about £1.58 per kg)	M1 M1 M1 C1	M1 for 3.60 ÷ 1.25 (= £2.88) M1 for 4 ÷ 2.2 (= 1.81… kg) or 3 × 2.2 (= 6.6 lbs) M1 for comparable values, e.g. £1.40 and £1.58 per kg C1 Manchester with correct figures
26		$16.15 \leq n < 16.25$	B1 B1	B1 for 16.15, B1 for 16.25
27		720	M1 M1 A1	M1 for 3 h 45 min = 3.75 h M1 for 2700 ÷ 3.75 A1 cao
28		(11, 8)	M1 M1 A1	M1 for the change from A to B: 8 across, 4 up M1 for $\frac{1}{4}$ of this: 2 across, 1 up A1 cao
29		42.2	M1 A1 M1 M1 A1	M1 for (10 + DC) ÷ 2 × 6 = 81 A1 for DC = 17 M1 for 17 − 10 (= 7) M1 for $\sqrt{(7^2 + 6^2)}$ (= 9.21…) A1 for 42.2
30		$x = 3$, $y = 2.5$	M1 A1 A1	M1 for a correct method to eliminate one variable A1 for one correct value A1 for the other

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