Full paper A2

Paper 2 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 **Change** 5 days into hours.

..... hours

(1)

(Total for Question 1 is 1 mark)

---

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

.....

(1)

(Total for Question 2 is 1 mark)

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3 **Write** 0.35 as a percentage.

..... %

(1)

(Total for Question 3 is 1 mark)

---

4 Here are some temperatures in °C.

4 −2 −7 1 −5

Write the temperatures in order.
Start with the lowest temperature.

.....

(1)

(Total for Question 4 is 1 mark)

Turn over ►

5 **Write down** a sensible metric unit that could be used to measure

(a) the length of a football pitch

.....

(1)

(b) the amount of water in a teaspoon.

.....

(1)

(Total for Question 5 is 2 marks)

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6 Five numbers add up to 93
One of the numbers is 17
The other four numbers are each the same number.
Work out the value of each of the other four numbers.

> **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 6 is 3 marks)

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7 Here is a rule to work out the cost of hiring a bouncy castle.

$$\text{Cost} = £24 \times \text{number of hours}$$

Jas hires a bouncy castle.
The cost is £216
Work out the number of hours Jas hires the bouncy castle for.

.....

(2)

(Total for Question 7 is 2 marks)

---

8 Here is a list of numbers.

12 9 15 9 7 11 9 18 6 15

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

(a) **Find** the mode.

.....

(1)

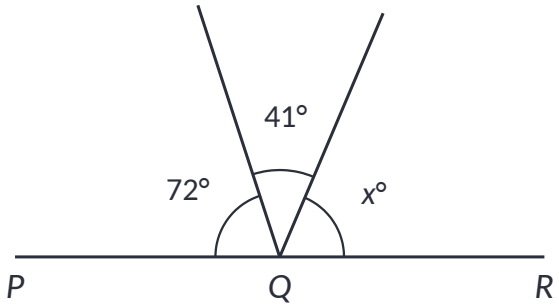
(b) **Work out** the range.

.....

(2)

(Total for Question 8 is 3 marks)

9



PQR is a straight line.

> **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 value of *x*.

x = ...

(2)

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

(1)

(Total for Question 9 is 3 marks)

10 35% of the members of a swimming club are juniors.
All the other members are adults.
Write down the ratio of

the number of juniors to the number of adults.

Give your ratio **in its simplest form**.

.....

(2)

(Total for Question 10 is 2 marks)

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11 Priya cycles for 95 minutes.
She stops for a rest.
Priya then cycles for a further 130 minutes.

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

(a) **Show that** Priya cycles for more than 3½ hours in total.

(2)

(b) A coach travels for 3 hours at a steady speed of 48 mph.
Work out the distance the coach travels.

..... miles

(2)

(Total for Question 11 is 4 marks)

---

12 180 students go on a school trip.
Each student chooses climbing or kayaking or archery.
96 of the students are in Year 9. The rest are in Year 10.
54 of the 80 students who choose climbing are in Year 9.
60 students choose kayaking.
15 of the Year 9 students choose archery.
Use this information to complete the two-way table.

	climbing	kayaking	archery	Total
Year 9				
Year 10				
Total				

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 12 is 3 marks)

13

Remember Do the same to both sides. Undo + with −, undo × with ÷. Expand brackets first.

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

.....

(1)

(b) **Solve** $4m + 7 = 35$

$m =$ .....

(2)

(Total for Question 13 is 3 marks)

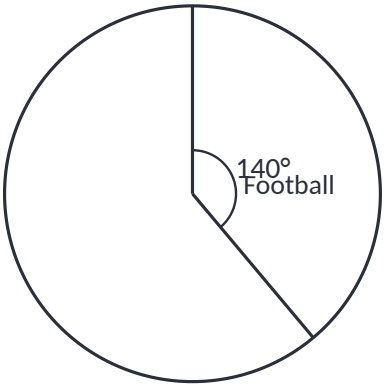
14 ✎ Complete this question on paper (printed at actual size)

90 students in Year 7 each choose one sport.
The table shows information about their choices.

Sport	Number of students
Football	35
Tennis	25
Swimming	30

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

(a) **Complete** the accurate pie chart to show this information.



(3)

(b) In another pie chart, the number of students in Year 8 choosing football is shown by an angle of 160°
Leo says,
"This means more students in Year 8 chose football than in Year 7."
Is Leo correct?
Explain why you think this.

(1)

(Total for Question 14 is 4 marks)

15 There are 24 counters in a bag.

There are

5 yellow counters

11 white counters

8 black counters

Ella puts 16 more counters in the bag.

These counters are either yellow or black.

Ella is going to take at random one counter from the bag.

The probability that this counter will be yellow is $\frac{1}{5}$

How many more black counters did Ella put in the bag?

You must show all your working.

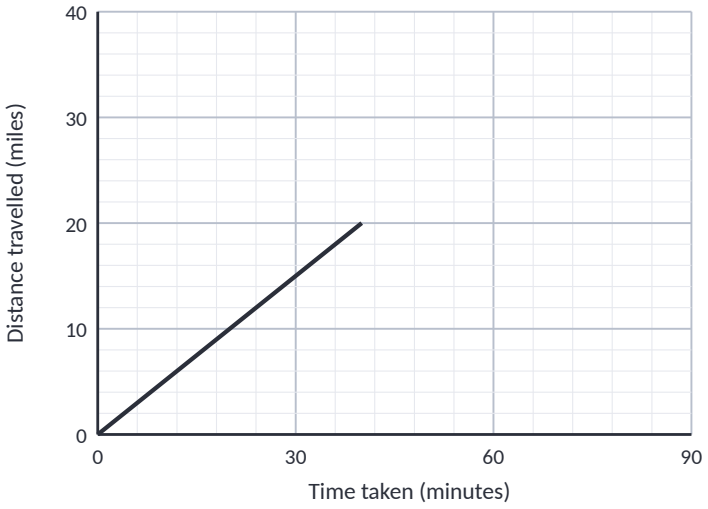
> **Remember** Probabilities add up to 1. P(event) = number of ways it can happen ÷ total number of outcomes. AND means multiply.

.....

(4)

(Total for Question 15 is 4 marks)

16 A van travels from Hull to Leeds.
The travel graph shows information about the first part of the van's journey.



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

(a) **Work out** the speed of the van.
Give your answer in miles per hour.

..... miles per hour
(2)

(b) The van then stops for 20 minutes.
Show this information on the travel graph.

(1)
(Total for Question 16 is 3 marks)

17 A school needs to repair its roof.
The cost of the repair is £12 400
A building fund will pay 65% of this cost.
The school will pay the rest of the cost.
Work out how much the school will pay.

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 17 is 3 marks)

18 A cube has a volume of 343 cm^3

Work out the surface area of the cube.

> **Remember** Find the area of every face and add them. A cuboid has 3 pairs of equal faces.

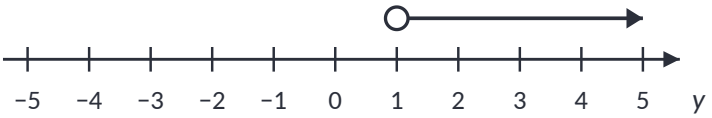
..... cm^2

(3)

(Total for Question 18 is 3 marks)

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19 Here is an inequality in y shown on a number line.



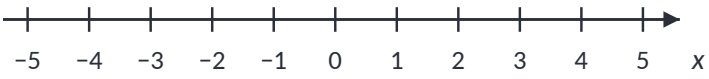
> **Remember** Solve like an equation. On a number line: ● means "included" (⩽ or ⩾), ○ means "not included" (< or >).

(a) **Write down** the smallest possible integer value for y.

.....

(1)

(b) On the number line below, show the inequality $-3 < x \leq 4$



(2)

(Total for Question 19 is 3 marks)

20

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

(a) **Express** 280 as a product of its prime factors.

.....

(2)

(b) **Find** the lowest common multiple (LCM) of 18 and 24

.....

(2)

(Total for Question 20 is 4 marks)

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21 Ava, Ben and Cal share £5600 in the ratio 3 : 4 : 7

Work out how much money each person receives.

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

Ava £ .....

Ben £ .....

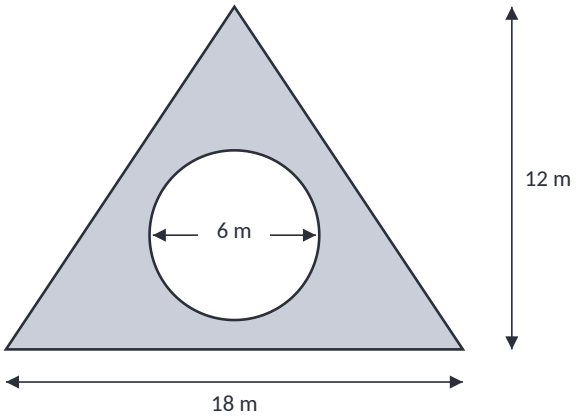
Cal £ .....

(3)

(Total for Question 21 is 3 marks)

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22 Here is a plan of a flower bed.
There is a circle inside a triangle.
The circle has a diameter of 6 m.



Lola will cover the shaded area with bark.
Bark is sold in bags.
Each bag of bark covers an area of 15 m²

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

(a) **Work out** the number of bags of bark Lola needs.

..... bags

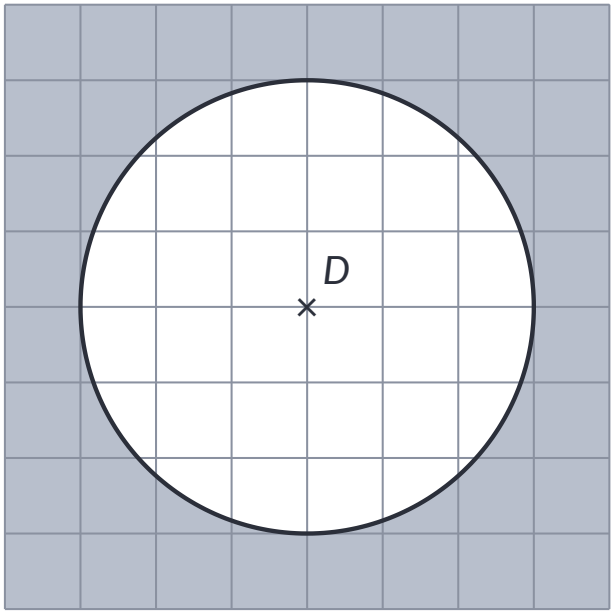
(4)

(b) Lola finds that each bag of bark only covers an area of 13 m²
How does this affect your answer to part (a)?

(1)

(Total for Question 22 is 5 marks)

23 The point D is shown on a centimetre grid.



A point T is less than 3 cm from the point D.
Omar is asked to shade the region where point T could be.
His answer is shown on the grid.
Explain the mistake Omar has made.

(1)

(Total for Question 23 is 1 mark)

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24 This year the number of visitors to a museum is $\frac{1}{4}$ less than last year.

This year the number of visitors is 4500
Work out the number of visitors last year.

> **Remember** Work out what percentage the new amount is (e.g. 80%), then ÷ by it and × 100.

.....

(3)

(Total for Question 24 is 3 marks)

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25 Here are two lists of numbers.

List A	48	63	55	74	
List B	82	x	97	104	88

mean of list **A** : mean of list **B** = 2 : 3

Work out the value of x.

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

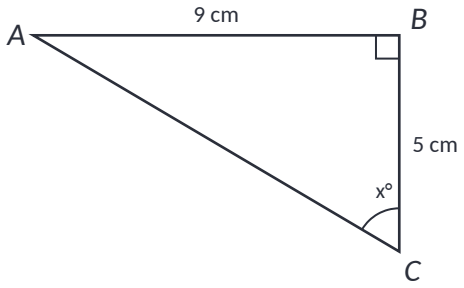
x = ...

(5)

(Total for Question 25 is 5 marks)

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26 ABC is a right-angled triangle.



Calculate the value of x.

Give your answer **correct to 1 decimal place**.

x = ...

(2)

(Total for Question 26 is 2 marks)

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27 Aluminium blocks are made from metal with density 2.7 g/cm^3
Each block has a volume of 2000 cm^3
The maximum mass of blocks that can be put in a crate is 150 kg.
Work out the greatest number of blocks that can be put in the crate.

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

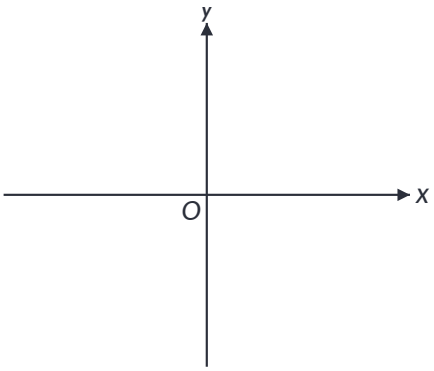
.....

(3)

(Total for Question 27 is 3 marks)

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28 Sketch the graph of $y = x^2 - 3$



(2)

(Total for Question 28 is 2 marks)

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29 The first three terms of a Fibonacci sequence are

$$2a \qquad a \qquad 3a$$

The 5th term of this sequence is 196
Work out the value of a.

> **Remember** Each term is the sum of the two terms before it.

$a =$ .....

(3)

(Total for Question 29 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

A2 mark scheme

Q		Answer	Mark	Notes
1		120	B1	
2		20*p*	B1	
3		35	B1	
4		−7, −5, −2, 1, 4	B1	
5	(a)	metres	B1	Accept m
	(b)	millilitres	B1	Accept ml
6		19	M1 M1 A1	M1 for 93 − 17 (= 76) M1 for 76 ÷ 4 A1 cao
7		9	M1 A1	M1 for 216 ÷ 24 A1 cao
8	(a)	9	B1	
	(b)	12	M1 A1	M1 for 18 − 6 A1 cao
9	(a)	67	M1 A1	M1 for 180 − 72 − 41 A1 cao
	(b)	Angles on a straight line add up to 180°	C1	C1
10		7 : 13	M1 A1	M1 for 35 : 65 A1 cao
11	(a)	225 minutes = 3 hours 45 minutes	M1 C1	M1 for 95 + 130 (= 225) C1 for 225 > 210 or 3 h 45 min > 3 h 30 min
	(b)	144	M1 A1	M1 for 3 × 48 A1 cao
12		Year 9: 54, 27, 15, 96 Year 10: 26, 33, 25, 84 Total: 80, 60, 40, 180	B3	B3 all correct (B2 for 6 correct, B1 for 4 correct)

Mark scheme continues ►

Q		Answer	Mark	Notes
13	(a)	t^4	B1	
	(b)	7	M1 A1	M1 for $4m = 28$ or $(35 - 7) \div 4$ A1 cao
14	(a)	Tennis 100°, Swimming 120°, sectors labelled	M1 A1 B1	M1 for $360 \div 90$ (= 4) or 25×4 or 30×4 A1 both angles correct (±2°) B1 sectors labelled
	(b)	No (not necessarily): we do not know how many students are in Year 8	C1	C1
15		13	M1 M1 M1 A1	M1 for $24 + 16$ (= 40) M1 for $40 \times \frac{1}{5}$ (= 8) M1 for $8 - 5$ (= 3) A1 cao
16	(a)	30	M1 A1	M1 for $20 \div 40$ or $20 \times 60 \div 40$ A1 cao
	(b)	Horizontal line from (40, 20) to (60, 20)	B1	B1
17		4340	M1 M1 A1	M1 for $100 - 65$ (= 35%) or $0.65 \times 12\,400$ (= 8060) M1 for $0.35 \times 12\,400$ or $12\,400 - 8060$ A1 cao
18		294	M1 M1 A1	M1 for $\sqrt[3]{343}$ (= 7) M1 for $6 \times 7 \times 7$ A1 cao
19	(a)	2	B1	
	(b)	Open circle at −3, filled circle at 4, joined	B2	B2 (B1 for a line from −3 to 4 with one end correct)
20	(a)	$2 \times 2 \times 2 \times 5 \times 7$	M1 A1	M1 for a factor tree or repeated division with at least 2 correct steps A1 for $2^3 \times 5 \times 7$ oe
	(b)	72	M1 A1	M1 for listing multiples of both or prime factors A1 cao
21		Ava £1200, Ben £1600, Cal £2800	M1 M1 A1	M1 for $5600 \div 14$ (= 400) M1 for 3×400 or 4×400 or 7×400 A1 cao

Mark scheme continues ►

Q		Answer	Mark	Notes
22	(a)	6	M1 M1 M1 A1	M1 for ½ × 18 × 12 (= 108) M1 for π × 3^2 (= 28.27…) M1 for (108 − 28.27…) ÷ 15 (= 5.3…) A1 cao
	(b)	She needs 7 bags (one more bag)	C1	C1 for 79.7… ÷ 13 = 6.1… so 7 bags
23		He has shaded outside the circle; he should shade inside it	C1	C1
24		6000	M1 M1 A1	M1 for $1 - \frac{1}{4} = \frac{3}{4}$ M1 for 4500 ÷ 3 × 4 A1 cao
25		79	M1 M1 M1 M1 A1	M1 for 240 ÷ 4 (= 60) M1 for 60 ÷ 2 × 3 (= 90) M1 for 90 × 5 (= 450) M1 for 450 − 371 A1 cao
26		60.9	M1 A1	M1 for $\tan x = \frac{9}{5}$ A1 for 60.9 (60.94…)
27		27	M1 M1 A1	M1 for 2.7 × 2000 (= 5400 g) M1 for 150 000 ÷ 5400 (= 27.7…) A1 cao
28		U-shaped curve with its lowest point at (0, −3)	B1 B1	B1 for a U shape with a minimum on the *y*-axis B1 for crossing the *y*-axis below *O* (at −3)
29		28	M1 M1 A1	M1 for 4th term 4*a* M1 for 5th term 7*a* = 196 A1 cao

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