Full paper D2

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 down** two factors of 28

(1)

(Total for Question 1 is 1 mark)

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2 **Write** 0.7 as a fraction.

.....

(1)

(Total for Question 2 is 1 mark)

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3 **Change** 4 metres to centimetres.

..... centimetres

(1)

(Total for Question 3 is 1 mark)

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4 **Write down** a square number that is between 50 and 90

.....

(1)

(Total for Question 4 is 1 mark)

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5 **Work out** 25% of 360

.....

(1)

(Total for Question 5 is 1 mark)

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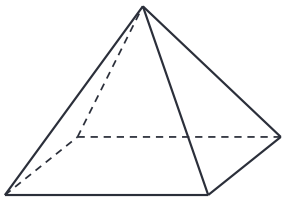
6 Josh works for 5 hours.
He is paid £62
How much is Josh paid per hour?

£ .....

(2)

(Total for Question 6 is 2 marks)

7 Here is a 3-D shape.



(a) **Write down** the name of this 3-D shape.

.....

(1)

(b) In the space below, draw a sketch of a cylinder.

(1)

(Total for Question 7 is 2 marks)

8 Maya needs to buy some items for her drama club.
Here are the prices.

Item	Price
T-shirts	£8.50 each
Costumes	£45 for 2
Lights	£18 each
Batteries	£3 for 6

Maya needs to buy

6 T-shirts
4 costumes
2 lights
12 batteries.

Maya has £200 to spend.
Show that Maya can buy all the items she needs.

> **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.

(4)

(Total for Question 8 is 4 marks)

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9 Ana is choosing a drink and a snack.
She has a choice of three drinks and three snacks.

Drink	Snack
Tea (T)	Biscuit (B)
Coffee (C)	Cake (K)
Juice (J)	Flapjack (F)

Ana is going to choose one drink and one snack.
List all the possible combinations Ana can choose.

(2)

(Total for Question 9 is 2 marks)

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10 There are 36 red counters and 60 blue counters in a bag.
Write down the ratio of the number of red counters to the number of blue counters in the bag.
Give your ratio **in its simplest form**.

.....

(2)

(Total for Question 10 is 2 marks)

---

11 Noah is going to roll a fair 6-sided dice.

(a) **Choose** the word that best describes the probability that the dice will land on the number 7

impossible	unlikely	evens	likely	certain

.....

(1)

(b) **Choose** the word that best describes the probability that the dice will land on a number less than 3

impossible	unlikely	evens	likely	certain

.....

(1)

(Total for Question 11 is 2 marks)

---

12 A coach travels at an average speed of 46 miles per hour for 4 hours.
Work out the distance that the coach travels in the 4 hours.

..... miles

(2)

(Total for Question 12 is 2 marks)

---

13 Tom is trying to find the area of this rectangle.



He writes,

"The area is 324 cm² because 6 × 3 × 6 × 3 = 324"

(a) **Explain** what is wrong with Tom's method.

(1)

(b) Zara works out the area of a shape.
Her answer is 52 cm.
Explain why her answer cannot be fully correct.

(1)

(Total for Question 13 is 2 marks)

---

14 4 kg of rice costs £5.20
3 kg of rice and 5 kg of pasta cost £11.40
Work out the cost of 2 kg of rice and 4 kg of pasta.

> **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.

£ .....

(4)

(Total for Question 14 is 4 marks)

---

15 Ana and Ben share £150
Ana gets 64% of the money.
She spends 25% of the money she gets.
How much money does Ana have left?

> **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)

---

16 180 people were asked to choose their favourite type of film.
They each chose from comedy or action or horror or drama.
95 of these people were children.
The rest were adults.
22 of the 40 people who chose comedy were children.
37 of the 80 people who chose action were adults.
9 adults chose drama.
The number of children who chose drama was the same as the number of adults who chose horror.
Work out the total number of people who chose horror.
You must show how you get your answer.

> **Remember** Rows and columns add up to the totals. Fill in the easy gaps first, then use them to find the rest.

.....

(4)

(Total for Question 16 is 4 marks)

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17 Here are the heights, in cm, of 16 plants.

23	35	41	29	38	44	27	31
36	42	25	33	47	30	38	26

Show this information in a stem and leaf diagram.



Key:

Remember Put the leaves in order and always write a key. Median = the middle value; range = biggest − smallest.

(3)

(Total for Question 17 is 3 marks)

18

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

(a) **Work out** $\frac{11.4 + 5.9}{3.2 \times 1.7}$

Give your answer as a decimal.

Write down all the figures on your calculator display.

.....

(2)

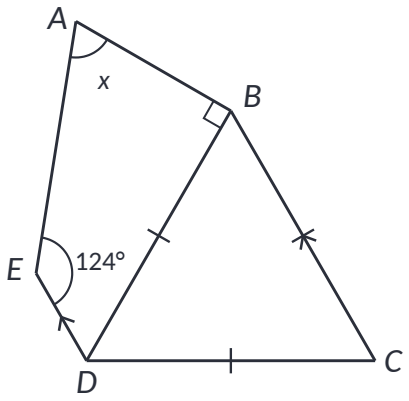
(b) **Write** your answer to part (a) **correct to 2 decimal places**.

.....

(1)

(Total for Question 18 is 3 marks)

19 The diagram shows a quadrilateral *ABDE* and an equilateral triangle *BCD*.



CB is parallel to *DE*.

Angle *AED* = 124°

Work out the size of the angle marked *x*.

You must give a reason for each stage of your working.

> **Remember** Alternate angles are equal (Z). Corresponding angles are equal (F). Co-interior angles add up to 180° (C). Name the rule you use.

.....°

(4)

(Total for Question 19 is 4 marks)

20

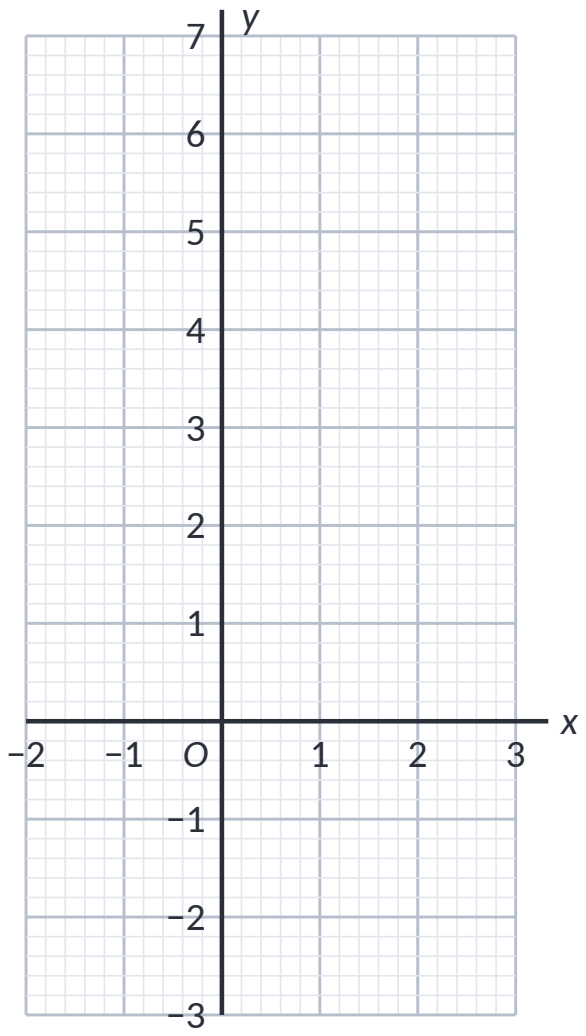
Remember Square first: $(-2)^2 = 4$. Plot each point and join with a smooth curve, not a ruler.

(a) **Complete** the table of values for $y = x^2 - 2x - 1$

x	−2	−1	0	1	2	3
y	7			−2		

(2)

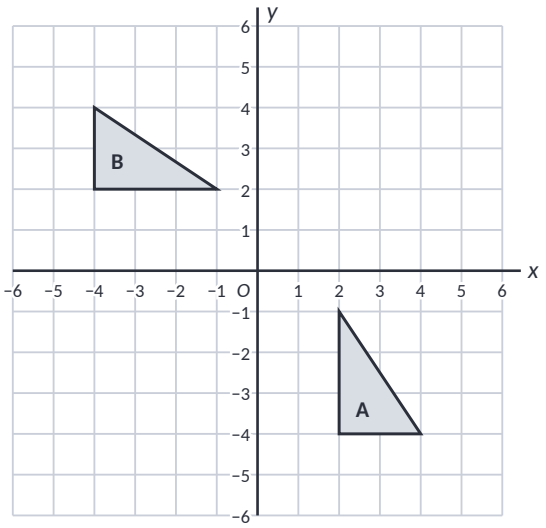
(b) On the grid, draw the graph of $y = x^2 - 2x - 1$ for values of x from −2 to 3



(2)

(Total for Question 20 is 4 marks)

21



Describe fully the single transformation that maps triangle **A** onto triangle **B**.

(2)

(Total for Question 21 is 2 marks)

22

Remember Expand: multiply every term inside the bracket. Factorise: take out the highest common factor. Quadratics: two numbers that multiply to the last term and add to the middle.

(a) **Expand and simplify** $4(3y - 2) + 5(y + 3)$

.....

(2)

(b) **Factorise fully** $8x^2 + 12x$

.....

(2)

(c) **Make *k* the subject** of the formula $h = 4k - 9$

.....

(2)

(Total for Question 22 is 6 marks)

23 Leah is organising a quiz night for a charity.

She spends

£150 on food

£90 on a hall

£60 on prizes.

Leah sells 64 tickets for the quiz night.

Each ticket costs £6.50

Work out the percentage profit Leah makes for the charity.

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

..... %

(4)

(Total for Question 23 is 4 marks)

---

24 Sara invests £5200 in a savings account for 2 years.

The account pays compound interest at a rate of 2.8% per year.

Calculate how much Sara has in this savings account at the end of the 2 years.

£ .....

(2)

(Total for Question 24 is 2 marks)

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25 **Solve** $6x - 11 = 31 - x$

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

$x =$ .....

(3)

(Total for Question 25 is 3 marks)

---

26 Fran, Gina and Hari share some money in the ratio 2 : 5 : 3
Gina gets £150
Fran then gives some of her share to Gina and some of her share to Hari.
The money that Fran, Gina and Hari each have is now in the ratio 1 : 11 : 8
How much money did Fran give to Hari?

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

£ .....

(4)

(Total for Question 26 is 4 marks)

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27 The bearing of town *Q* from town *P* is 128°
Work out the bearing of town *P* from town *Q*.

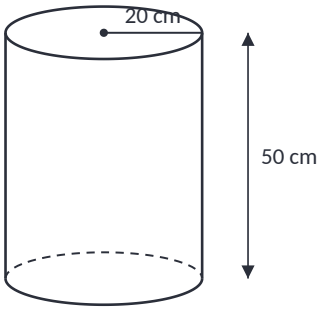
..... °

(2)

(Total for Question 27 is 2 marks)

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28 The diagram shows an empty tank in the shape of a cylinder.



The cylinder has radius 20 cm and height 50 cm.
Water flows into the tank at a rate of 0.6 litres per minute.
Calculate the number of minutes it will take to completely fill the tank.
Give your answer **correct to the nearest minute**.

> **Remember** Volume of a cylinder = π × radius² × height. Use the radius, not the diameter. 1 litre = 1000 cm³.

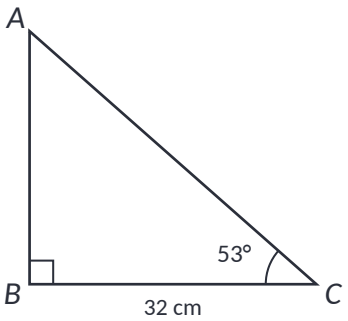
..... minutes

(4)

(Total for Question 28 is 4 marks)

---

29 *ABC* is a right-angled triangle.



Calculate the length of *AB*.
Give your answer **correct to 3 significant figures**.

..... cm

(2)

(Total for Question 29 is 2 marks)

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30 **Solve** the simultaneous equations

$$2x + y = 1.5$$

$$3x + 4y = -4$$

> **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

D2 mark scheme

Q		Answer	Mark	Notes
1		Any two of 1, 2, 4, 7, 14, 28	B1	
2		$\frac{7}{10}$	B1	
3		400	B1	
4		64 or 81	B1	
5		90	B1	
6		12.40	M1 A1	M1 for 62 ÷ 5 A1 cao
7	(a)	square-based pyramid	B1	Accept pyramid
	(b)	A sketch of a cylinder	B1	B1
8		Total cost £183, which is less than £200	M1 M1 M1 C1	M1 for 6 × 8.50 (= 51) or 2 × 18 (= 36) M1 for 2 × 45 (= 90) or 2 × 3 (= 6) M1 for adding all four costs C1 183 and a correct conclusion
9		TB, TK, TF, CB, CK, CF, JB, JK, JF	B2	B2 all 9 with no repeats (B1 for at least 5 correct)
10		3 : 5	M1 A1	M1 for 36 : 60 or a partly simplified ratio A1 cao
11	(a)	impossible	B1	
	(b)	unlikely	B1	
12		184	M1 A1	M1 for 46 × 4 A1 cao

Mark scheme continues ►

Q		Answer	Mark	Notes
13	(a)	He multiplied all four sides; the area is 6 × 3 = 18 cm²	C1	C1
	(b)	Area is measured in square units (cm²), not cm	C1	C1
14		8.60	M1 M1 M1 A1	M1 for 5.20 ÷ 4 (= 1.30) M1 for (11.40 − 3 × 1.30) ÷ 5 (= 1.50) M1 for 2 × 1.30 + 4 × 1.50 A1 cao
15		72	M1 M1 A1	M1 for 0.64 × 150 (= 96) M1 for 96 × 0.75 or 96 − 24 A1 cao
16		30	M1 M1 M1 A1	M1 for 85 adults or 18 adults chose comedy or 43 children chose action M1 for adults who chose horror = 85 − 18 − 37 − 9 (= 21) M1 for children who chose horror = 95 − 22 − 43 − 21 (= 9) A1 cao
17		2 | 3 5 6 7 9 3 | 0 1 3 5 6 8 8 4 | 1 2 4 7 Key: 2 | 3 = 23 cm	B2 B1	B2 for a correct ordered diagram (B1 for unordered or one error) B1 for a correct key
18	(a)	3.1801470588	M1 A1	M1 for 17.3 or 5.44 A1 for 3.18014...
	(b)	3.18	B1	B1 ft
19		86	B1 M1 M1 C1	B1 angle *DBC* = 60° (equilateral triangle) M1 angle *BDE* = 60° (alternate angles are equal) M1 for 360 − 124 − 60 − 90 C1 reasons including angles in a quadrilateral add up to 360°
20	(a)	2, −1, −1, 2	B2	B2 all correct (B1 for 2 or 3 correct)
	(b)	Smooth curve through all points	B2	B2 (B1 for at least 5 points plotted correctly)
21		Reflection in the line $y = x$	B1 B1	B1 reflection B1 $y = x$

Mark scheme continues ►

Q		Answer	Mark	Notes
22	(a)	$17y + 7$	M1 A1	M1 for $12y - 8$ or $5y + 15$ A1 cao
	(b)	$4x(2x + 3)$	B2	B2 (B1 for a partial factorisation)
	(c)	$k = \frac{h + 9}{4}$	M1 A1	M1 for $h + 9 = 4k$ A1 oe
23		38.7	M1 M1 M1 A1	M1 for 150 + 90 + 60 (= 300) M1 for 64 × 6.50 (= 416) M1 for (416 − 300) ÷ 300 × 100 A1 for 38.6 to 38.7
24		5495.28	M1 A1	M1 for 5200×1.028^2 A1 for 5495.27 to 5495.28
25		6	M1 M1 A1	M1 for $7x - 11 = 31$ or $6x = 42 - x$ M1 for $7x = 42$ A1 cao
26		30	M1 M1 M1 A1	M1 for 150 ÷ 5 (= 30) and total 300 M1 for Hari has 90 at first M1 for 300 ÷ 20 × 8 (= 120) A1 cao
27		308	M1 A1	M1 for 128 + 180 A1 cao
28		105	M1 M1 M1 A1	M1 for $\pi \times 20^2 \times 50$ (= 62 831.8…) M1 for ÷ 1000 (= 62.83 litres) M1 for ÷ 0.6 A1 for 105
29		42.5	M1 A1	M1 for 32 × tan 53 A1 for 42.4 to 42.5
30		$x = 2, y = -2.5$	M1 A1 A1	M1 for a correct method to eliminate one variable A1 for $x = 2$ A1 for $y = -2.5$

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

Score ____ / 80