

Name: _____

Maths Genie Stage 7

Test D

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**
- **Calculators may be used.**

Information

- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

- 1 n is an integer such that $-5 < 2n < 4$
Write down all the possible values of n .

$$-2.5 < n < 2$$

1 for just one error

.....
-2, -1, 0, 1

(Total for Question 1 is 2 marks)

- 2 The probability that a sunflower seed will germinate is 0.84
Alan is going to plant 50 sunflower seeds.

Work out an estimate for the number of seeds that will germinate.

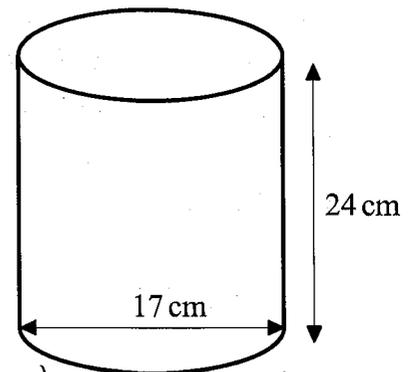
$$0.84 \times 50$$

1 for 0.84×50

.....
42

(Total for Question 2 is 2 marks)

- 3 A solid cylinder has a diameter of 17 cm and a height of 24 cm.
Work out the total surface area of the cylinder.
Give your answer correct to 3 significant figures.



$$\begin{aligned} \text{Total surface area} &= 2\pi r^2 + 2\pi r h \\ &= 2\pi(8.5)^2 + 2\pi(8.5)(24) \\ &= 1740 \text{ cm}^2 \end{aligned}$$

$$r = 8.5 \text{ cm}$$

1 for correct area of circle = 226.98 or $\pi(8.5)^2$

1 for correct area of rectangle = 1281.77 or $2\pi(8.5)(24)$

.....
1740 cm²

(Total for Question 3 is 3 marks)

- 4 Perrie invests £9200 for 3 years in a savings account.
She gets 2.4% per annum compound interest.

Calculate the total amount of interest Perrie will get after 3 years.

1 for 2.4% of 9200 or 9200×1.024^3

$$9200 \times 1.024^3 = 9878.42$$

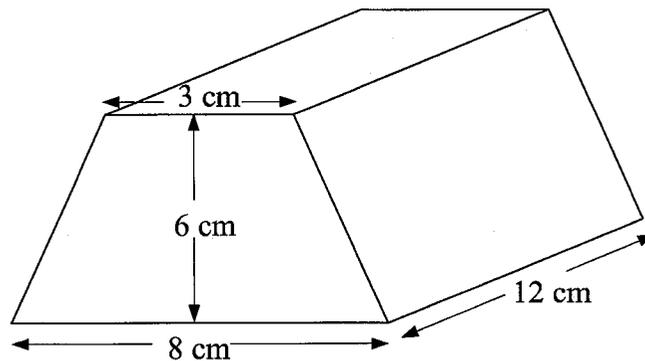
$$9878.42 - 9200 = £678.42$$

1 for ANS - 9200

£..... 678.42

(Total for Question 4 is 3 marks)

5



The diagram shows a prism.
The cross-section of the prism is a trapezium.

Work out the volume of the prism. 1 for correct area of trapezium: $0.5(3+8) \times 6$ or 33

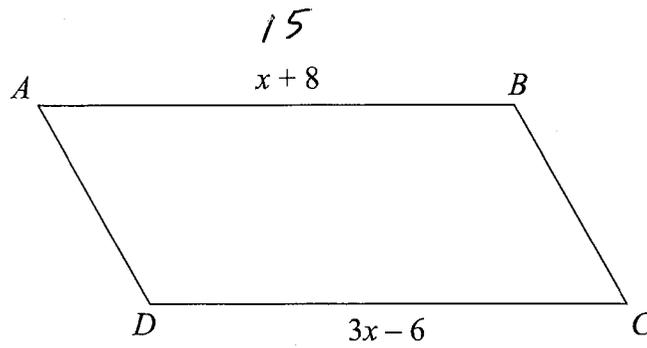
$$\begin{aligned} \text{volume} &= \frac{1}{2}(3+8) \times 6 \times 12 \\ &= 396 \text{ cm}^3 \end{aligned}$$

1 for Area of Trapezium $\times 12$

..... 396 cm^3

(Total for Question 5 is 3 marks)

6



$ABCD$ is a parallelogram

All measurements are in centimetres.

The perpendicular height of the parallelogram is 5 cm.

Find the area of $ABCD$

$$x + 8 = 3x - 6$$

$$8 = 2x - 6$$

$$14 = 2x$$

$$\underline{x = 7}$$

1 for 7

$$7 + 8 = \underline{15}$$

1 for 15

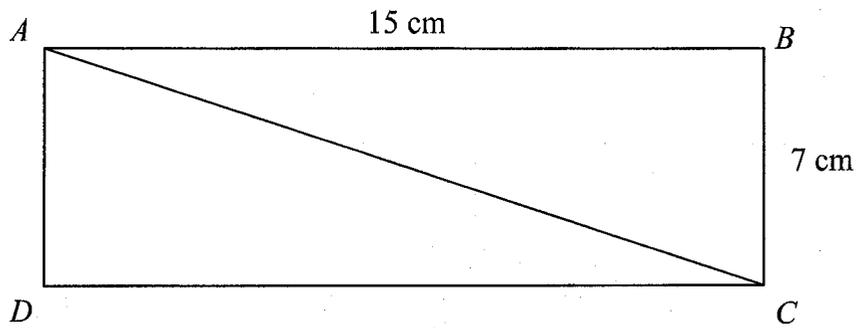
$$\text{Area} = 15 \times 5 = 75 \text{ cm}^2$$

1 for 15×5

$$\underline{75 \text{ cm}^2}$$

(Total for Question 6 is 4 marks)

7



$ABCD$ is a rectangle.

Calculate the length of the diagonal AC .

Give your answer correct to 1 decimal place.

$$AC^2 = 15^2 + 7^2 \quad \begin{array}{l} \text{1 for correct substitution into} \\ \text{formula} \end{array}$$

$$AC^2 = 274$$

1 for 274

$$AC = \sqrt{274}$$

$$= 16.6$$

.....16.6.....cm

(Total for Question 7 is 3 marks)

8

Here are the first four terms of an arithmetic sequence.

33

29

25

21

Write down an expression, in terms of n , for the n th term of the sequence.

$$-4n \quad -4 \quad -8 \quad -12 \quad -16$$

$$-4n + 37$$

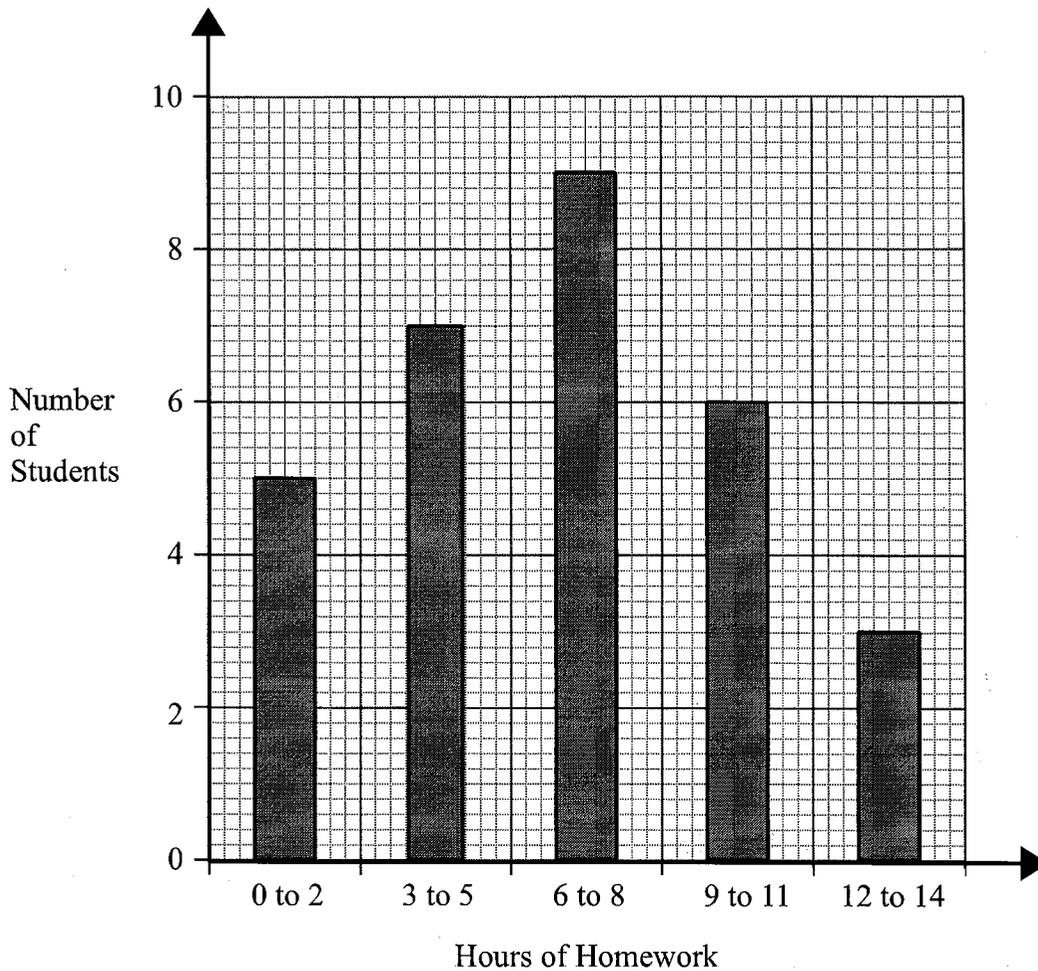
1 for $-4n$

.....37-4n.....

(Total for Question 8 is 2 marks)

9

The bar chart shows how many hours of homework 30 students did last week.



Calculate an estimate for the mean number of hours of homework.

$$\begin{array}{r}
 1 \times 5 = 5 \\
 4 \times 7 = 28 \\
 7 \times 9 = 63 \\
 10 \times 6 = 60 \\
 13 \times 3 = 39 \\
 \hline
 195
 \end{array}$$

1 for midpoint x frequency

$$\frac{195}{30} = 6.5$$

1 for "195"/30

..... 6.5 hours

(Total for Question 9 is 3 marks)