

Name: _____

Maths Genie Stage 8

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 (a) Write 3.4×10^6 as an ordinary number.

3 400 000

(1)

(b) Write 0.007 in standard form.

7×10^{-3}

(1)

(Total for Question 1 is 2 marks)

2 A car travels a distance of 235 miles in 4 hours and 20 minutes.
Work out the average speed of the car, in miles per hour.
Give your answer to 1 decimal place.

$4\frac{1}{3}$ hours

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{235}{4\frac{1}{3}}$$

54.2

..... miles/hour

(Total for Question 2 is 2 marks)

3 The value of a litre of petrol increased by 4%.
A litre of petrol then cost £1.30

Work out the price of a litre of petrol before the increase.

$$x \times 1.04 = 1.30$$

$$x = \frac{1.30}{1.04}$$

$$= 1.25$$

£ 1.25

(Total for Question 3 is 2 marks)

4 A block exerts a force of 126 Newtons on the ground.
The block has an area of 3 m^2 .

Work out the pressure on the ground.

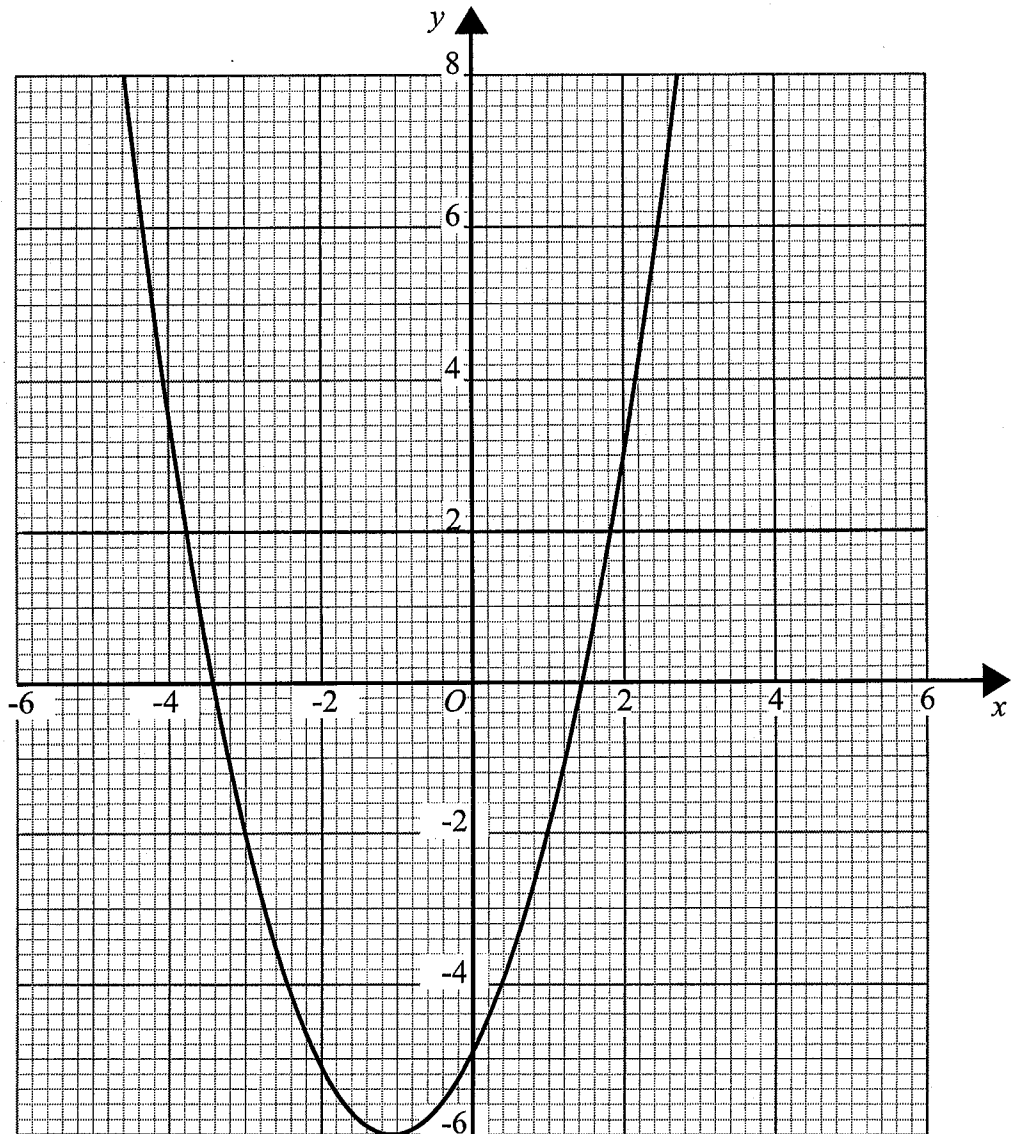
$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

$$\frac{126}{3} = 42$$

..... 42 N/m^2

(Total for Question 4 is 1 mark)

5 Here is the graph of $y = x^2 + 2x - 5$



(a) Write down the turning point of the graph $y = x^2 + 2x - 5$

(-1, -6)
(1)

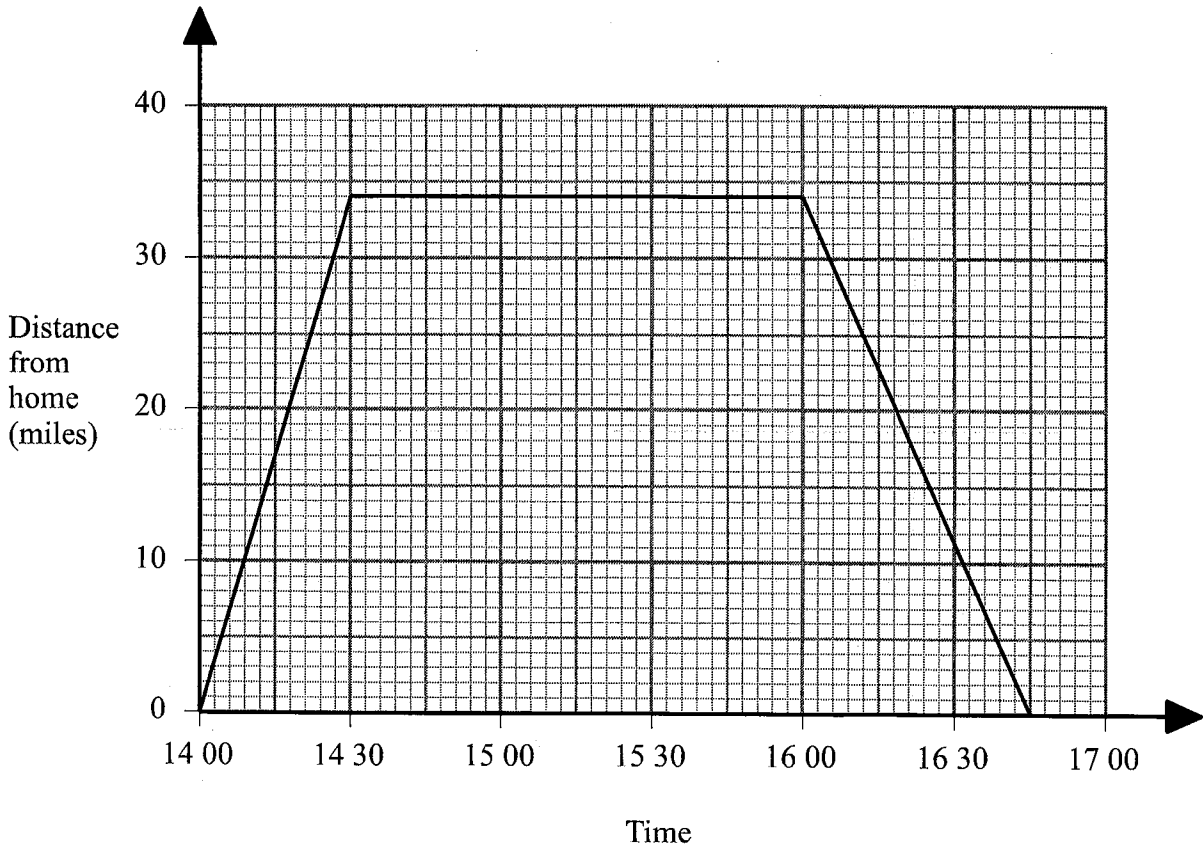
(b) Use the graph to find the roots of the equation $x^2 + 2x - 5 = 2$

-3.8 and 1.8
(2)

(Total for Question 5 is 3 marks)

6 Emily drove to the beach. She stayed at the beach and then she drove back home.

Here is Emily's travel graph.



(a) For how many minutes did Emily stay at the beach?

14 30 to 16 00

.....90.....minutes
(1)

(b) What was Emily's average speed on her journey on the way back from the beach?

34 miles in 45 mins

$$\frac{34}{0.75} = 45.\dot{3}$$

.....45. $\dot{3}$miles/hour
(2)

(Total for Question 6 is 3 marks)

7 Solve $x^2 - x - 42 = 0$

$$(x - 7)(x + 6) = 0$$

$$x = 7 \quad x = -6$$

$x = 7$ or $x = -6$
(Total for Question 7 is 3 marks)

8 A large rock has a weight of 1.42×10^4 grams.

Find, in standard form, the weight of 18 of these large rocks.

$$1.42 \times 10^4 \times 18 = 255600$$

2.556×10^5 grams
(Total for Question 8 is 2 marks)

9 (a) Expand and simplify $(a - 5)(a - 5)$

$$a^2 - 5a - 5a + 25$$

$a^2 - 10a + 25$
(2)

(b) Factorise $b^2 - 121$

$(b + 11)(b - 11)$
(1)

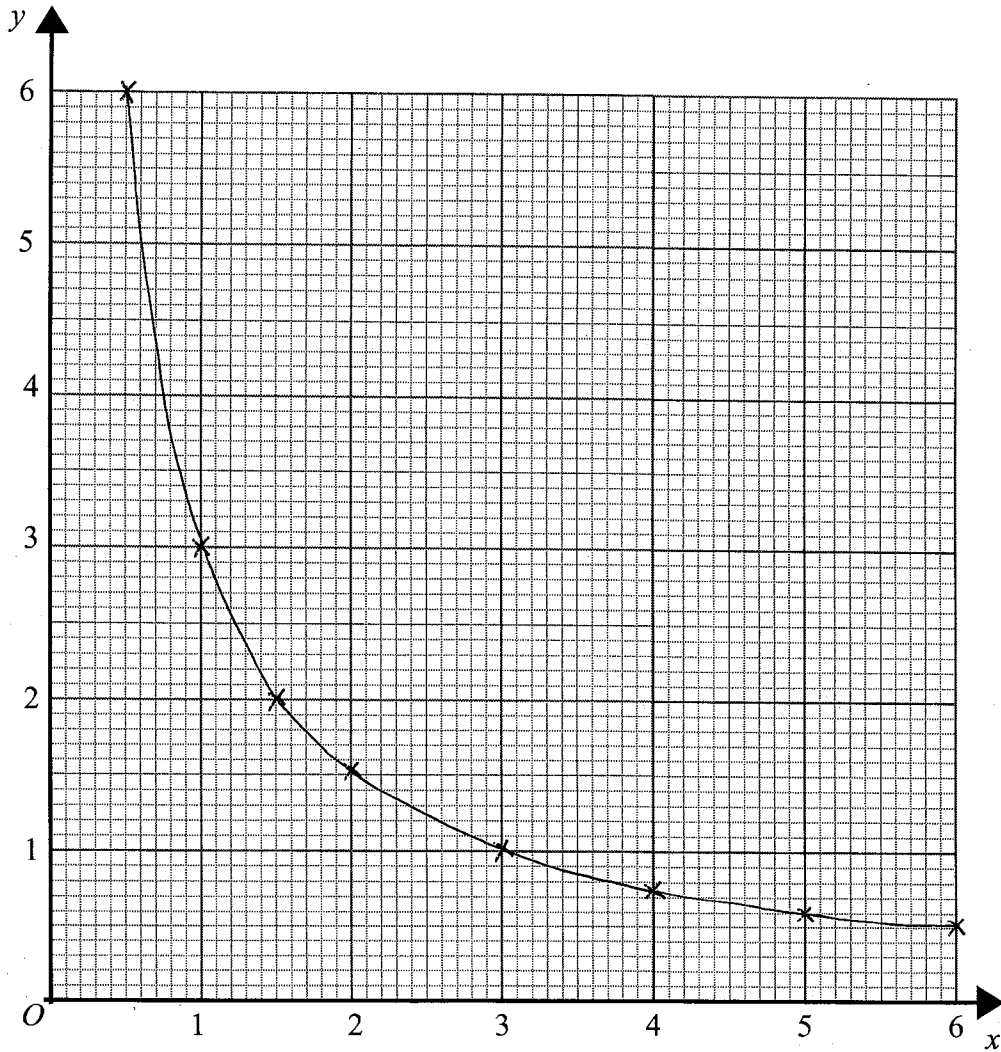
(Total for Question 9 is 3 marks)

10 (a) Complete the table of values for $y = \frac{3}{x}$

x	0.5	1	1.5	2	3	4	5	6
y	6	3	2	1.5	1	0.75	0.6	0.5

(2)

(b) On the grid, draw the graph of $y = \frac{3}{x}$



(2)

(Total for Question 10 is 4 marks)