

Name: \_\_\_\_\_

# Maths Genie Stage 12

## Test B

### 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 David has 25 different cards.  
David is going to give one card to Dean and one card to Edwin.

How many different ways are there of doing this?

.....  
**(Total for Question 1 is 2 marks)**

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- 2 Solve  $5x^2 + x - 13 = 0$

Give your solutions correct to 3 significant figures.

.....  
**(Total for Question 2 is 3 marks)**

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- 3 The number of rabbits in a field is increasing by  $x\%$  each year.

The population is expected to double in 7 years, work out the value of  $x$ .  
Give your answer to 1 decimal place.

..... %  
**(Total for Question 3 is 3 marks)**

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4  $a$  is directly proportional to  $b$

When  $a = 9$ ,  $b = 45$

Find the value of  $b$  when  $a = 6.5$

$b = \dots\dots\dots$

**(Total for Question 4 is 3 marks)**

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5 Here are the first 5 terms of a quadratic sequence.

5                      7                      11                      17                      25

Find an expression, in terms of  $n$ , for the  $n$ th term of this sequence.

$\dots\dots\dots$   
**(Total for Question 5 is 4 marks)**

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6 Given that  $f(x) = x^2 - 5$  and  $g(x) = 2x + 3$

(a) Work out an expression for  $g^{-1}(x)$

(b) Work out an expression for  $fg(x)$   
Give your answer in its simplest form.

.....  
(2)

.....  
(2)

**(Total for Question 6 is 4 marks)**

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7 The number of people living in a town  $t$  years from now is  $P_t$  where

$$P_0 = 62000$$

$$P_{t+1} = 1.04(P_t - 1500)$$

Work out the number of people in the town 3 years from now.

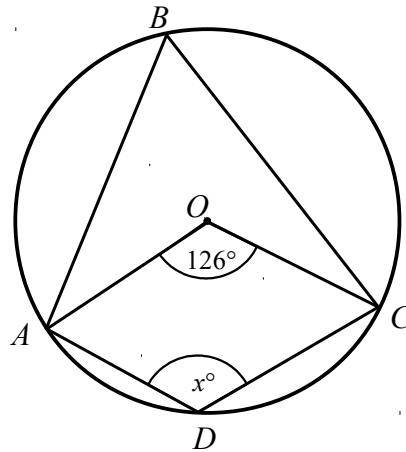
.....  
**(Total for Question 7 is 3 marks)**

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8 Factorise  $3x^2 - 2x - 8$

.....  
(Total for Question 8 is 2 marks)

9



$A$ ,  $B$ ,  $C$  and  $D$  are points on the circumference of a circle, centre  $O$ .

Angle  $AOC = 126^\circ$

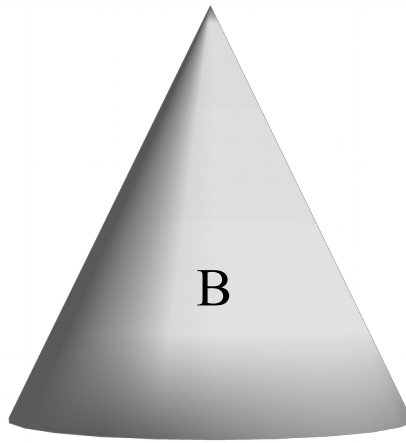
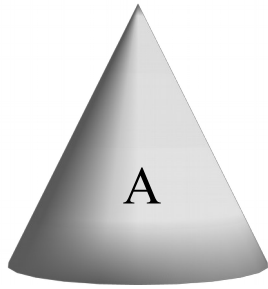
Angle  $ADC = x^\circ$

Work out the value of  $x$ .

You must show all your working.

.....  
(Total for Question 9 is 3 marks)

10



The two cones, A and B, are mathematically similar.

Cone A has a volume of  $1250\pi \text{ cm}^3$

Cone B has a volume of  $5120\pi \text{ cm}^3$

The total surface area of cone A is  $825 \text{ cm}^2$

Calculate the total surface area of cone B.

.....  $\text{cm}^2$   
**(Total for Question 10 is 3 marks)**