

Name: _____

Maths Genie Stage 12

Test A

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 Solve $3x^2 - 8x - 13 = 0$

Give your solutions correct to 3 significant figures.

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

2 Solve by factorising $5x^2 - 11x - 12 = 0$

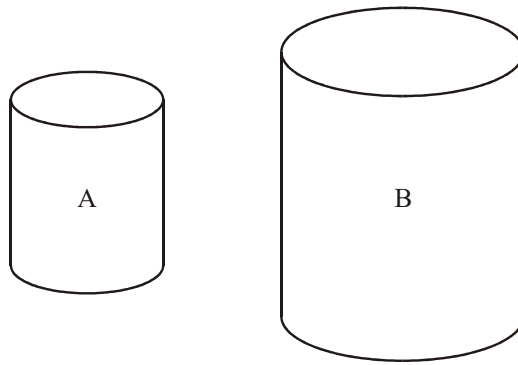
.....
(Total for Question 2 is 3 marks)

3 Charlie invests £3500 for 3 years in a savings account.
She gets 2.5% per annum compound interest in the first year, then $x\%$ for 2 years.

Charlie has £3674.12 at the end of 3 years, work out the value of x .

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

4



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

Cylinder A has a height of 4 cm.

Cylinder B has a height of 6 cm.

The volume of cylinder A is $100\pi \text{ cm}^3$

Calculate the volume of cylinder B .

Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 4 is 3 marks)

5 y is inversely proportional to the cube of x

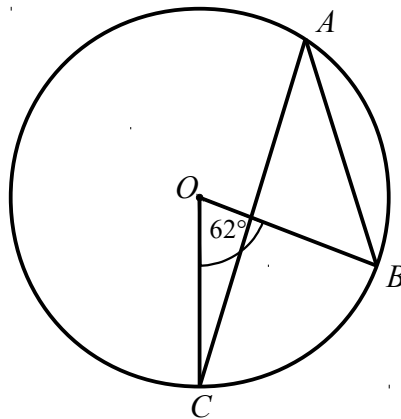
When $y = 300$, $x = 0.4$

Find the value of y when $x = 0.8$

$y = \dots\dots\dots$

(Total for Question 5 is 3 marks)

6



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

Angle $BOC = 62^\circ$

(i) Find the size of angle BAC .

(ii) Give a reason for your answer.

.....
o

.....
.....

(Total for Question 6 is 2 marks)

7 There are 5 starters, 8 main courses and 3 desserts in a restaurant.

Work out the total number of ways of choosing a starter, a main course and a dessert.

.....
(Total for Question 7 is 2 marks)

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

12 6 -4 -18 -36

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

.....
(Total for Question 8 is 4 marks)

9 Given that $f(x) = 3x - 2$ and $g(x) = 5x + 1$

(a) Find $gf(3)$

.....
(2)

(b) Work out an expression for $f^{-1}(x)$

.....
(2)

(Total for Question 9 is 4 marks)

10 Using $x_{n+1} = \frac{6}{x_n^2 + 4}$

With $x_0 = 1$

Find the values of x_1 , x_2 and x_3 .

$x_1 =$

$x_2 =$

$x_3 =$

(Total for Question 10 is 3 marks)