NOTTINGHAM ACADEMY

GCSE Further Maths Summer Work

SCAN ME

Name: _____

1st Class Maths

Equation of a Circle

Revise this topic →

← Check your work

This booklet features original exam style questions designed by me. They do not feature in past papers but are good practice for your exams.

The content is designed to reflect the style of the AQA Level 2 Certificate in Further Maths.
It may not be suitable for other courses.

@1stclassmaths

Do not write outside the box

6 A circle, centre (1, 3) passes through the point P (9, 9)

Work out the equation of the circle. **[3 marks]**

Answer _____

7 AB is the diameter of a circle.
A is (-5,-1) and B is (5, 23)

Work out the equation of the circle. **[3 marks]**

Answer _____

Do not write outside the box

8 Circles C_1 and C_2 both have the same centre (1, -2)

The radius of C_1 is 10.
The difference in the areas of the two circles is 96π

Work out two possible equations for the circle C_2 **[4 marks]**

Answer _____

and

Answer _____

11

Do not write outside the box

10 The circle with equation $(x - 3)^2 + (y - 3)^2 = 68$ passes through the point P (5, -5)

Work out the equation of the tangent to the circle at the point P. **[4 marks]**

Answer _____

9

1st Class Maths

Binomial Expansion

Revise this topic →

← Check your work

This booklet features original exam style questions designed by me. They do not feature in past papers but are good practice for your exams.

The content is designed to reflect the style of the AQA Level 2 Certificate in Further Maths.
It may not be suitable for other courses.

@1stclassmaths

3 Expand and simplify fully $(1 + 2x)^5$ **[4 marks]**

Answer _____

4 Expand and simplify fully $(1 - 3x)^4$ **[4 marks]**

Answer _____

16

Do not write outside the box

8 The coefficient of x^2 in the expansion of $(1 + ax)^7$ is 189.

Work out the two possible values of a.

[3 marks]

Answer _____ and _____

9 The coefficient of x^5 in the expansion of $(b - x)^6$ is -120.

Work out the value of b.

[3 marks]

Answer _____

12

Do not write outside the box

12 In the expansion of $(a + bx)^3$

the coefficient of x is -150
the coefficient of x^2 is 60

Work out the values of a and b. **[5 marks]**

$a =$ _____ $b =$ _____

11

1st Class Maths

Differentiation (Power Rule)

Revise this topic →

← Check your work

This booklet features original exam style questions designed by me. They do not feature in past papers but are good practice for your exams.

The content is designed to reflect the style of the AQA Level 2 Certificate in Further Maths.
It may not be suitable for other courses.

@1stclassmaths

Do not write outside the box

3 $y = 20 - 4x^{-2} + \frac{x}{4}$

Work out $\frac{dy}{dx}$ **[2 marks]**

$\frac{dy}{dx} =$ _____

4 $y = \frac{2}{x^3} - \frac{3}{x}$

Work out an expression for the rate of change of y with respect to x **[3 marks]**

Answer _____

9

Do not write outside the box

7 $y = \dfrac{3x + 5x^2}{x^2}$

Work out $\dfrac{dy}{dx}$ **[3 marks]**

$\dfrac{dy}{dx} =$ _____

8 $y = \dfrac{6 + 8x^3 - x^2}{x^3}$

Work out $\dfrac{dy}{dx}$ **[4 marks]**

$\dfrac{dy}{dx} =$ _____

13

1st Class Maths

Matrix Multiplication

Revise this topic →

← Check your work

This booklet features original exam style questions designed by me. They do not feature in past papers but are good practice for your exams.

The content is designed to reflect the style of the AQA Level 2 Certificate in Further Maths.
It may not be suitable for other courses.

@1stclassmaths

Do not write outside the box

5 Work out $\begin{pmatrix} 4 & 0 \\ 2 & 1 \end{pmatrix}\begin{pmatrix} 1 \\ 5 \end{pmatrix}$ **[1 mark]**

Answer _____

6 Work out $\begin{pmatrix} -3 & 1 \\ 6 & -2 \end{pmatrix}\begin{pmatrix} 2 \\ -1 \end{pmatrix}$ **[1 mark]**

Answer _____

7 Work out $\begin{pmatrix} 2 & 3 \\ 0 & 5 \end{pmatrix}\begin{pmatrix} 1 & 0 \\ 4 & 2 \end{pmatrix}$ **[2 marks]**

Answer _____

8

Do not write outside the box

10 Work out $5\begin{pmatrix} -2 & 4 \\ -3 & 0 \end{pmatrix}\begin{pmatrix} 1 \\ 5 \end{pmatrix}$ **[2 marks]**

Answer _____

11 Work out $3\begin{pmatrix} 0 & 3 \\ -1 & 0 \end{pmatrix}\begin{pmatrix} 6 & 1 \\ -2 & -1 \end{pmatrix}$ **[3 marks]**

Answer _____

10

Do not write outside the box

12 (d) By finding **AC** and **CA,** show that matrix multiplication is not commutative.

[5 marks]

11

Turn over ►

Do not write outside the box

15 $a\begin{pmatrix} 4 & 1 \\ 0 & -2 \end{pmatrix}\begin{pmatrix} b \\ -3 \end{pmatrix} = \begin{pmatrix} -9 \\ 9 \end{pmatrix}$

Work out the values of a and b.

[5 marks]

$a =$ _____ $b =$ _____

16 $\begin{pmatrix} 0 & c \\ d & d \end{pmatrix}\begin{pmatrix} d \\ 3 \end{pmatrix} = \begin{pmatrix} -12 \\ 10 \end{pmatrix}$

Work out the values of c and d.

[4 marks]

$c =$ _____ $d =$ _____ and $d =$ _____

15

Do not write outside the box

18 $\begin{pmatrix} 2 & b \\ a & 3b \end{pmatrix}\begin{pmatrix} a \\ 1 \end{pmatrix} = \begin{pmatrix} 8 \\ 19 \end{pmatrix}$

Work out two pairs of values of a and b.

[5 marks]

$a =$ _____ $b =$ _____

$a =$ _____ $b =$ _____

10