

Name: .....

GCSE Grade=

## Sixth Form Mathematics Induction Home Learning

This homework is to be completed without a calculator. Please show all working out and method and complete to your best ability in both quantity and quality.

### Part A: Solve by factorising

1)  $x^2 + 5x + 4 = 0$

5)  $2x^2 - 2 = 0$

2)  $x^2 - 6x - 55 = 0$

(2)

6)  $x^3 - x = 0$

(2)

3)  $x^2 - 9 = 0$

(2)

7)  $6x^2 + 11x + 3 = 0$

(2)

4)  $16x^2 - 1 = 0$

(2)

8)  $3x^2 - 10x + 8 = 0$

(3)

(2)

(3)

**Part B: Solve by completing the square**

1)  $x^2 + 4x - 3 = 0$

3)  $x^2 - 3x - 2 = 0$

2)  $x^2 - 8x - 18 = 0$

4)  $x^2 - 7x - 1 = 0$

(3 each)

**Part C: Solve (remember to rearrange first and set = 0 to solve)**

1)  $x^2 = 6 - x$

3)  $(x - 3)^2 = 10$

(3 each)

2)  $x + 5 = \frac{14}{x}$

4)  $\frac{2}{x} + \frac{2}{x+1} = 3$

(4 each)

**Part D: Simplify**

1.  $3x^2y^3 \times 4x^3y^4$

6.  $4^{-2}$

2.  $(2x^3y^2)^4$

7.  $16^{\frac{1}{2}}$

3.  $4x^5y^2 \times 8xy^{-2}$

8.  $27^{\frac{2}{3}}$

4.  $6x^2y^{-1} \div 2xy^{-2}$

9.  $1000^{-\frac{2}{3}}$

5.  $(7x^5y^3)^0$

10.  $(8y^3)^{\frac{1}{3}}$

(17)

**Part E: Solve the simultaneous equations**

1) 
$$\begin{aligned} 3x + 5y &= 31 \\ 4x - 7y &= -27 \end{aligned}$$

x =  
y =

(3)

2)  $x + y = 7$   
 $xy = 12$

$x =$   
 $y =$

(4)

**Part F:**

(a) Find the sum of the first 100 natural numbers, i.e.  $1+2+3+\dots+100$ .

(3)

(b) Find the sum of the numbers between 1 and 100 which are divisible by 3

(3)

(c) Hence or otherwise find the sum of the numbers between 1 and 100 which are not divisible by 3.

(1)

**Part G:**

(a) Find the equation of the line which passes through the coordinates A (3,5) and B (6,4)

(b) The line cuts the x-axis at C and the y-axis at D, find the coordinates of C and D (remember if a line cuts the x-axis then  $y = 0$  and if it cuts the y-axis then  $x = 0$ )

(3)

(c) Calculate the area of the triangle OCD (draw a sketch to help you)

(2)

**Part H: Write** (where a and b are integer values)

1)  $\sqrt{18} + \sqrt{50}$  in the form  $a\sqrt{2}$

(2)

2)  $\sqrt{80} - \sqrt{5}$  in the form  $b\sqrt{5}$

(2)

(2)

**Part I: Rationalise the denominator**

1)  $\frac{4}{\sqrt{8}}$

3)  $\frac{3}{\sqrt{2}+1}$

(2)

(2)

2)  $\frac{\sqrt{50}}{\sqrt{2}}$

4)  $\frac{6}{3-\sqrt{2}}$

(2)

(2)

**Part J: Simplify**

1)  $\frac{2x+4}{x^2+7x+10}$

(3)

2)  $\frac{x^2-7x+12}{x^2-16}$

(3)