

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

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

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

(3 each)

(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 $x = 0$)

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

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

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

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

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)