**MATHEMATICS – A QUICK GUIDE TO TACKLING ALGEBRA PROBLEMS**

1. **What sort of problem is it?**
   1. Adding or subtracting terms

Add 4x2 + 3xy – 9y + (7y2-5y2)) and -3x2 – 4y2 +3y – 2xy +4y

1. Simplify each expression by adding or subtracting like terms and getting rid of brackets

4x2 + 3xy – 9y + 2y2  added to -3x2 – 4y2 + y – 2xy

1. Write the expressions one below the other in the same order

4x2 + 3xy – 9y + 2y2

-3x2 -2xy + y – 4 y2

3) Now add or subtract the constant (number) parts of each term according to the signs

1. -3 = 1 So x2 + (3 - 2 = 1) xy + (-9 + 1 = -8)y + (2-4 = -2)y2
2. Write out the answer

x2 + xy -8y -2y2

* 1. Dividing or multiplying terms

-8(x2 + y)

2x(2y)

1. Simplify top and bottom by removing brackets

-8x2 -8y

4xy

1. Separate like terms with the same denominator as separate fractions

-8x2 – 8y

4xy 4xy

1. Solve the number parts first then cancel variables as far as possible in each separate term

-2x – 2

y x

* 1. Simplifying

The previous example is typical. Remember the following important principles:

BODMAS

Unlike terms cannot be added or subtracted

Distributive law when multiplying

Find common factors

* 1. Factorising

16x3– 24x + 4 x2

1. Rewrite in descending order of exponents

16x3 + 4 x2– 24x

1. Identify any common factor

4x[4x2 +x – 6]

1. Now factorise the quadratic in the brackets

4x[(2x +3)(2x – 2)] (3(-2) =6; 3-2=1)

* 1. Expanding

This is the opposite of simplifying

8x3 + 2x2 -12x

1. Solving for an unknown (equation or inequality)
   1. Linear equations

3x -18/2= -2(x -1/2)

1. Simplify

3x – 9 = -2x +1

1. Put all variables on left and all constants on right

3x + 2x = 1 +9

1. Simplify by adding and subtracting

5x = 10

1. Divide both sides by the co-efficient of the variable

x = 10/5 = 2

* 1. Exponential equations

9x = 81

1. Reduce to a common base

32x = 34

1. Remove the bases and treat it as a linear equation

2x = 4

X = 4/2 = 2

* 1. Quadratic equations
     1. Difference of squares

64x2 – 49 =0 (Both terms must be perfect squares and must be separated by a – sign)

(8x + 7)(8x -7) = 0

8x = -7 OR 8x = 7

X = -7/8 0R X =7/8

* + 1. ax2 +bx +c=0

16x2  = -4(x -3)

1. Simplify by removing brackets

16x2 = -4x +12

1. Rewrite in standard form

16x2 +4x -12 = 0

1. Factorise the quadratic

(4x +6)(4x -2) = 0

1. Apply the null factor theory

4x + 6 = 0 OR 4x -2 = 0

1. Solve for each root

4x = -6 => x= -6/4 =. x = -3/2 OR

4x = 2 => x = 2/4 => x=1/2