GR 11 EQUATIONS

Remember you can always check your answer by subbing it into the LHS and RHS.

If they are the same, you have won the game!

LINEAR EQUATIONS

1 Normal

*Variables to left

*Numbers to right

*Divide both sides by co-efficient

2 With brackets

*Distribute out brackets

*Solve like normal

3 With fractions

*Multiply both sides by LCD

*You may need to factorise denominator first!

*Solve like normal

*Use brackets if there is more than 1 term in numerator or denominator.

*Remember your restriction (den $\neq 0$)

Solve for x: $\frac{8x+1}{x} - \frac{6+x}{2x} = \frac{2}{4x}$

QUADRATIC EQUATIONS

*Make it = 0

*Factorise LHS using tools learnt in gr9

*Make each bracket = 0 & solve linear equation.

OR

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

1 Normal:

$x^2 - 5x - 14 = 0$

2 With fraction

$$\frac{2x+4}{x+1}-\frac{6}{x-2}=\frac{2}{x+1}$$

3 With root

*Isolate root

*Square both sides

*Check answer!

$$\sqrt{x+5}-x=-1$$

4 "k" method

*Make part of the equation = k to simplify.

$$x^2 - 2x + 3 + \frac{2}{x^2 - 2x} = 0$$

5 Completing the square

*Move the constant to RHS.

*Make the co-efficient on $x^2 = 1$

*Square half the co-efficient on x and add it to both sides

$$-2x^2 + 12x - 11 = 0$$

LINEAR INEQUALITIES

*Sign changes when we move a term across the sign.

*Sign changes direction when we multiply/divide by a negative number.

* An open dot or round bracket means the number is excluded.

*A closed dot or square bracket means the number is included.

1. $2x + 8 < 0$

2. $-5 < 1 - 2x \leq 3$

QUADRATIC INEQUALITIES

*Find critical values

*Test numbers on either side to see where it meets the condition.

$$x^2 - x - 6 \geq 0$$

SIMULTANEOUS EQUATIONS

Substitution

*Get 1 variable in terms of the other.

*Sub it into the OTHER equation.

$x + 2y = 5$

$2y^2 - xy - 4x^2 = 8$

Elimination (only for linear)

*Multiply/divide 1 equation by a factor.

* Add/subtract the equations to eliminate 1 variable.

$y - 3x = -4$

$2y = -2x + 8$

NATURE OF ROOTS

*A root is where the quadratic graph would cut the x-axis.

Discriminant (Δ) = $b^2 - 4ac$

If Δ is:	Roots are:
A perfect square	Rational
0	Equal
Greater than 0	Unequal
Non-perfect square	Irrational
Negative	Non-real