when to use factorising

$x^2 - 9x + 18 = 0$

$(x-3)(x-6) = 0$

$x = 3 \quad x = 6$

$\dfrac{-3}{\quad} x \dfrac{-6}{\quad} = 18 \left\langle \begin{array}{c} 2 \\ 9 \end{array} \right.$

$\dfrac{-3}{\quad} + \dfrac{-6}{\quad} = -9$

$x^2 - 2x - 1 = 0$

Don't do factorisation

$-x- = -1$

$-+- = -2$

$x^2 - 2x = 1$

$x^2 - 2x + 1^2 = 1 + 1^2$

$(x-1)^2 = 2$

$x - 1 = \pm\sqrt{2}$

$x = 1 \pm \sqrt{2}$

when to use Square root method

$3x^2 - 27 = 0$

$3x^2 = 27$

$x^2 = 9$

$x = \pm 3$

If the middle term is absent, Square root method

$$-x-=-3$$
$$-+-=5 \quad X$$

$$3x^2+5x-1=0 \div 3$$

$$2x^2-5x+3=0$$

$\hookrightarrow$ Quadratic formula

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

$$x=\frac{-5\pm\sqrt{5^2-4\times3\times-1}}{2\times3}=\frac{-5\pm\sqrt{37}}{6}$$

$$x=\frac{-5+\sqrt{37}}{6}$$

$$x=\frac{-5-\sqrt{37}}{6}$$

$2x^2 - 5x + 3 = 0$

x^2

$2x^2 - 4x - 8 = 0 \div 2$

$x^2 - 2x - 4 = 0$

$x^2 - 2x = 4$

$x^2 - 2x + 1^2 = 4 + 1^2$

$(x-1)^2 = 5$

For completing Square

$$ax^2 + bx + c = 0$$

You should divide the equation by a and make it in the form $x^2 + \frac{b}{a}x + \frac{c}{a} = 0$

$$2x^2 - 5x + 3 = 0 \div 2$$

Go for quadratic formula

Step 1

Equation A

$x^2 - 9x + 21 = 0$

$b^2 - 4ac = (-9)^2 - 4 \times 1 \times 21$

$= 81 - 84$

$= -3$

$b^2 - 4ac < 0$

Two Imaginary roots

Equation B

$-2x^2 + 144 = 0$

$a = -2 \quad b = 0 \quad C = 144$

$b^2 - 4ac = 0^2 - 4 \times -2 \times 144$

$= 1152 > 0$

Two real irrational roots

Equation C

$3x^2 - 22x + 7$

$b^2 - 4ac = (-22)^2 - 4 \times 3 \times 7$

$= 400$

Two real rational roots

Equation 1)

$b^2 - 4ac = 6^2 - 4 \times 1 \times -15$

$\qquad = 96$

Two irrational roots

$x^2 - 9x + 21 = 0$

$-2x^2 + 144 = 0$

$3x^2 - 22x + 7 = 0$

$x^2 + 6x - 15 = 0$

$-2x^2 = -144$

$x^2 = 72$

$x = \pm\sqrt{72}$

$x = \pm\sqrt{36 \times 2}$

$x = \pm 6\sqrt{2}$

$$3x^2 - 22x + 7 = 0$$

$$3x^2 - 21x - 1x + 7 = 0$$

$$3x(x-7) - 1(x-7) = 0$$

$$(x-7)(3x-1) = 0$$

$$x = 7 \qquad x = \frac{1}{3}$$

$$x = \frac{9 \pm 8i}{2}$$

$$x = \frac{9}{2} \pm \frac{3i}{2}$$

farralatheefv@gmail.com

$$\boxed{x^2 - 9x + 21 = 0}$$

$$-2x^2 + 144 = 0$$

$$3x^2 - 22x + 7 = 0$$

$$\boxed{x^2 + 6x - 15 = 0}$$

$$x = \pm\sqrt{24} - 3$$

$$x = \pm\sqrt{4 \times 6} - 3$$

$$x = \pm 2\sqrt{6} - 3$$

$$\sqrt{-324} = \sqrt{4 \times 81} \; i$$
$$= 2 \times 9 \; i$$
$$= \underline{18i}$$

$$2\sqrt{-147} = \underline{2\sqrt{147} \; i}$$

$$(a-b)^2 \cancel{= a^2 - b^2}$$

$$(7-i)^2 = (7-i)(7-i) = 49 - 7i - 7i + i^2$$
$$= \underline{48 - 14i}$$

$$\frac{8 \times 1}{-12i} = \frac{-2}{3} \times -i = \frac{2i}{3}$$

$$\frac{8}{-12i} = \frac{8 \times \boxed{1}}{-12 \times i} = \frac{-2}{3} \times -i = \frac{2i}{3}$$

$$\boxed{\frac{1}{i} = -i}$$

$$\frac{1}{i} = \frac{1 \times i}{i \times i}$$

$$= \frac{i}{-1}$$

$$= -i$$

$$\frac{3-6i}{4-3i} = \frac{(3-6i)(4+3i)}{(4-3i)(4+3i)} = \frac{12+9i-24i-18i^2}{4^2+3^2}$$

$$= \frac{30-15i}{25} = \frac{30}{25} - \frac{15i}{25}$$

$$= \frac{6}{5} - \frac{3}{5}i$$

$$x\bar{x} = a^2 + b^2$$