CHAPTER 2: QUADRATIC EXPRESSION AND EQUATION

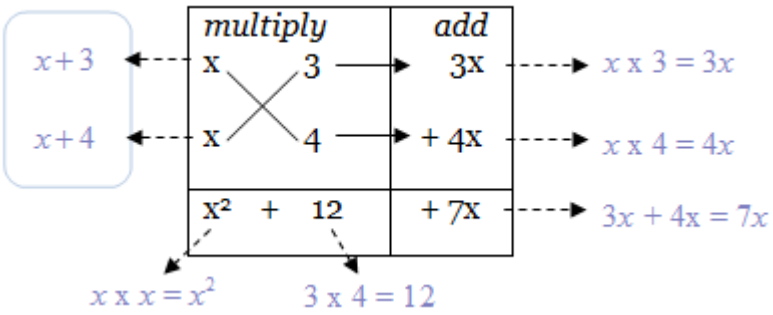
3 basic techniques in solving quadratic equation questions

1. Solve the quadratic equations
2. Form a quadratic equation
3. Determine the conditions for the type of roots

1. Solve the quadratic equations
   - Factorization

     Factorization is the decomposition of a number into the product of the other numbers, example 12 could be factored into 3x4,2x6 and 1x12.

     Example: Solve x^2 + 7x + 12



2. Form a quadratic equation

Example; 5x^2-2x-2=0

Answer:

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

$a=5, b=-2, c=-2$

Step by step:

1) Find out the SOR & POR
2) calculate NEW SOR & POR using the given roots
3) Work out the equation using $x^2-(\text{SOR})x+(\text{POR})=0$

$SOR,\ \alpha+\beta=-\frac{b}{a}=-\frac{-2}{5}=\frac{2}{5}$

$POR,\ \alpha\beta=\frac{c}{a}=-\frac{2}{5}$

Given roots are $(\alpha-5)$ and $(\beta-5)$

$$\text{New SOR}=\alpha-5+\beta-5=\alpha+\beta-10=\frac{2}{5}-10=-\frac{48}{5}$$

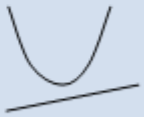
$$\text{New POR}=(\alpha-5)(\beta-5)=\alpha\beta-5\alpha-5\beta+25=\alpha\beta-5(\alpha+\beta)+25=-\frac{2}{5}-5\left(\frac{2}{5}\right)+25=\frac{113}{5}$$

$$Equation \rightarrow x^2-(\text{SOR})x+(\text{POR})=0$$

$$x^2-\left(-\frac{48}{5}\right)x+\left(\frac{113}{5}\right)=0$$

$$\underline{5x^2+48x+113=0}$$

3. Determine the conditions for the type of roots

Discriminant	Type of roots	Relation
If $b^2-4ac>0$	It has **2 different roots or 2 distinct roots**	
If $b^2-4ac=0$	It has **2 equal roots**	 tangent
If $b^2-4ac<0$	It has **no roots or no real roots.**	
If $b^2-4ac\geq 0$	It has **2 real roots**	