

\* let's take a general example (numerical example):-

$\boxed{24}$  is a product of  $\boxed{6}$  and  $\boxed{4}$   
 $\boxed{24}$  is a product of  $\boxed{8}$  and  $\boxed{3}$   
 $\boxed{24}$  is a product of  $\boxed{1}$  and  $\boxed{24}$   
 $\boxed{24}$  is a product of  $\boxed{2}$  and  $\boxed{12}$ .

This is the process  
of "factoring"

The numbers  
in the boxes  
are called  
"factors"

therefore, factoring is the opposite  
process for multiplying.



\* Properties of Factoring :-

Given that a and b are real numbers,  
then we have the following properties:-

\*  $(a+b)^2 = a^2 + 2ab + b^2$

\*  $(a-b)^2 = a^2 - 2ab + b^2$

\*  $(a^2 - b^2) = (a-b)(a+b)$

\*  $(a^3 - b^3) = (a-b)(a^2 + ab + b^2)$

\*  $(a^3 + b^3) = (a+b)(a^2 - ab + b^2)$

Ex 1] Factor the following:

Part a:  $25x^2 - 16$

Solution:  $(25x^2 - 16) = (5x - 4)(5x + 4)$

Part b:  $24y^2 - 12$

Solution:  $(24y^2 - 12) = 2(12y^2 - 6)$   
 $= 2(\sqrt{12}y - \sqrt{6})(\sqrt{12}y + \sqrt{6})$



Part c:  $\lambda^3 - 8$

Solution:  $(\lambda^3 - 8) = (\lambda - 2)(\lambda^2 + 2\lambda + 4)$

Part d:  $16x^2 - 48xz + 36z^2 - 100$

Solution:

$$\begin{aligned}
 16x^2 - 48xz + 36z^2 - 100 &= 2(8x^2 - 24xz + 18z^2 - 50) \\
 &= 2 \cdot 2(4x^2 - 12xz + 9z^2 - 25) \\
 &= 4(4x^2 - 12xz + 9z^2 - 25) \\
 &= 4[(4x^2 - 12xz + 9z^2) - 25] \\
 &= 4[(2x - 3z)^2 - 25] \\
 &= 4[(2x - 3z + 5)(2x - 3z - 5)] \\
 &= \boxed{4(2x - 3z + 5)(2x - 3z - 5)}
 \end{aligned}$$