* Factor theorem:

* If remainder is 0.... then root is a factor.

→ It states that : If $f(x)$ is divided by $(ax-b)$, and $f(\frac{b}{a}) = 0$
Then $(ax-b)$ is a factor of $f(x)$.
∴ a factor divides perfectly into polynomial. it ALWAYS has no remainder. (or remainder = 0)

→ factor theorem can be asked in following ways:

1) Prove binomial is a factor
2) Determine if something is factor/not

{ we are going to use the factor theorem to factorise cubic expressions & solve cubic equations. }

Examples:

1) Determine if $g(x)$ is factor of $f(x)$.

a) $f(x) = 4x^3 - 3x + 1$
$g(x) = x + 1$

b) $f(x) = -x^3 + x^2 - x + 5$
$g(x) = x + 3$

2) Show that $x-2$ is a factor of $-x^3-2x^2+5x+6$

3) Prove that x^2-3x+2 is a factor of $f(x)=x^4+2x^3-7x^2-8x+12$

) Find the value of k if $2x-6$ is a factor of $2x^3-6x^2+kx+12$

5) For which values of m will $x+4$ be a factor of

$$m(x) = 2x^3 + mx^2 - 9x + 4.$$

6(a) Find the values of a and b if $x+3$ and $x-1$ are factors of $f(x) = 2x^3 + ax^2 + bx - 3$