

Example 3

Factorise $f(x) = 2x^3 + x^2 - 13x + 6$. and Solve.

① guess to find solution and related factor.

$$f(1) = 2(1)^3 + (1)^2 - 13(1) + 6 = 2 + 1 - 13 + 6 = -4 \neq 0$$

$$f(2) = 2(2)^3 + (2)^2 - 13(2) + 6 = 16 + 4 - 26 + 6 = 0 \checkmark$$

$\Rightarrow x=2$ is a soln
 $\Rightarrow (x-2)$ is a factor

② Divide

$$\begin{array}{r} 2x^2 + 5x - 3 \\ x-2 \overline{) 2x^3 + x^2 - 13x + 6} \\ \underline{+ 2x^3 + 4x^2} \\ 5x^2 - 13x \\ \underline{+ 5x^2 + 10x} \\ -3x + 6 \\ \underline{+ 3x + 6} \\ 0 \end{array}$$

③ factorise quadratic

$$2x^2 + 5x - 3 = (2x - 1)(x + 3)$$

④ Solns?

3 FACTORS are: $(x-2)(2x-1)(x+3)$
 3 Solns are: $x=2$, $x=\frac{1}{2}$, $x=-3$

Example 3

Factorise $f(x) = 2x^3 + x^2 - 13x + 6$.

By calculator

	Solutions	factors
$f(2) = 0$	$x=2$	$x-2$
$f(-3) = 0$	$x=-3$	$x+3$
$f(\frac{1}{2}) = 0$	$x = \frac{1}{2}$	$2x-1$