

MAY 28/09

# INTEGRAL ROOT THEOREM

$$? \sqrt{x^3 - 4x^2 + x + 6}$$

$$a = \frac{\text{FACTORS OF ENDING COEF}}{\text{FACTORS OF LEADING COEF}}$$

$$\frac{\pm 6}{\pm 1} = \frac{\pm 1 \pm 2 \pm 3 \pm 6}{\pm 1}$$

$$\times \left[ \begin{array}{r|rrrr} & 1 & -4 & 1 & 6 \\ & & 1 & -3 & -2 \\ \hline & 1 & -3 & -2 & 4 \end{array} \right]$$

$$\checkmark \left[ \begin{array}{r|rrrr} & 1 & -4 & 1 & 6 \\ & & -1 & 5 & -6 \\ \hline & 1 & -5 & 6 & 0 \end{array} \right] \checkmark$$

$$(x+1)(x^2-5x+6)$$
$$(x+1)(x-3)(x-2)$$

ROOTS -1, 3, 2

FACTOR  $2x^3 + 3x^2 - 8x + 3$

STEP 1

$$\frac{\pm 3}{\pm 2} = \frac{\pm 1 \pm 3}{\pm 1 \pm 2} = \pm 1, \pm 3, \pm \frac{1}{2}, \pm \frac{3}{2}$$

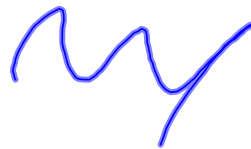
STEP 2

TRY  $(x-1) \rightarrow 1$

$$\begin{array}{r|rrrr} 1 & 2 & 3 & -8 & 3 \\ & & 2 & 5 & -3 \\ \hline & 2 & 5 & -3 & 0 \end{array}$$



$$f(1) = 2(1)^3 + 3(1)^2 - 8(1) + 3$$
$$f(1) = 0$$



STEP 3

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

STEP 4

$$(x-1)(2x-1)(x+3) \text{ ROOTS } 1, \frac{1}{2}, -3$$

FIND ALL THE FACTORS OF:

$$x^3 - 3x^2 - 4x + 12$$

$$\frac{\pm 12}{\pm 1} = \frac{\pm 1 \pm 2 \pm 3 \pm 4 \pm 6 \pm 12}{\pm 1}$$

POSSIBLE  $\pm 1 \pm 2 \pm 3 \pm 4 \pm 6 \pm 12$

$$f(1) = (1)^3 - 3(1)^2 - 4(1) + 12$$

$$f(1) = 1 - 3 - 4 + 12$$

$$f(1) = 6$$

$$f(-1) = (-1)^3 - 3(-1)^2 - 4(-1) + 12$$

$$f(-1) = -1 - 3 + 4 + 12$$

$$f(-1) = 12$$

$$f(2) = (2)^3 - 3(2)^2 - 4(2) + 12$$

$$f(2) = 8 - 12 - 8 + 12$$

$$f(2) = 0$$

$$\begin{array}{r|rrrr} 2 & 1 & -3 & -4 & 12 \\ & & 2 & -2 & -12 \\ \hline & 1 & -1 & -6 & 0 \end{array}$$

$$1 \quad -1 \quad -6 \quad 0$$

$$(x-2)(x^2 - x - 6)$$

$$(x-2)(x-3)(x+2)$$