

FIND THE REAL ZEROS OF POLYNOMIAL FUNCTIONS

$$f(x) = 2x^4 - x^3 - 5x^2 + 2x + 2$$

$$P = \frac{-\pm 1 \pm 2}{2} = \pm \frac{1}{2}, \pm 1, \pm 2$$

$$f(1) = 2 - 1 - 5 + 2 + 2 = 0$$

$$\begin{array}{r|rrrrr} 1 & 2 & -1 & -5 & 2 & 2 \\ & \downarrow & & & & \\ & 2 & 1 & -4 & -2 & \\ \hline & 2 & 1 & -4 & -2 & 0 \end{array}$$

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

$$\begin{array}{l} 2x^3 + x^2 - 4x - 2 \\ x^2(2x+1) - 2(2x+1) \\ (x^2-2)(2x+1) \end{array}$$

$$f(x) = (x-1)(2x-1)(x^2-2)$$

$$x^2-2=0 \quad x^2=2$$

$$x=1 \quad x=\frac{1}{2} \quad x=\sqrt{2} \quad x=-\sqrt{2}$$

SOLVE THE EQUATION

$$2x^3 - 3x^2 - 3x - 5 = 0$$

$$P = \frac{\pm 1, \pm 5}{2} = \pm 1, \pm \frac{5}{2}, \pm 5$$

$$f\left(\frac{5}{2}\right) = 2 \cdot \frac{5^3}{2^3} - 3 \cdot \frac{5^2}{2^2} - 3 \cdot \frac{5}{2} - 5 = 0$$

$$= 125 - 75 - 30 - 20 = 0$$

$$\begin{array}{r|rrrr} \frac{5}{2} & 2 & -3 & -3 & -5 \\ & \downarrow & & & \\ & 2 & 2 & 2 & 0 \end{array}$$

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

$$2x^2 + 2x + 2 = 0$$

$$x = \frac{-1 \pm \sqrt{4-16}}{2} \Rightarrow \text{no real solution}$$

$$\Rightarrow x = -\frac{5}{2} \text{ only real solution}$$