

Finding Zeros of Polynomial Functions - Notes

Find all zeros of the function. One zero has been given to you.

$$1) f(x) = 6x^4 - x^3 - 47x^2 + 30x; \frac{2}{3}$$

$$= x(6x^3 - x^2 - 47x + 30)$$

$$\begin{array}{r|rrrr} \frac{2}{3} & 6 & -1 & -47 & 30 \\ & & 4 & 2 & -30 \\ \hline & 6 & 3 & -45 & 0 \\ \div 3 & 2 & 1 & -15 & \end{array}$$

$$2x^2 + 1x - 15 = 0$$

$$(2x - 5)(x + 3) = 0$$

$$\begin{array}{l} 2x - 5 = 0 \\ 2x = 5 \\ x = \frac{5}{2} \end{array} \qquad \begin{array}{l} x + 3 = 0 \\ x = -3 \end{array}$$

Zeros: $-3, 0, \frac{2}{3}, \frac{5}{2}$

$$2) f(x) = 4x^4 - 4x^3 - 33x^2 + 45x; \frac{3}{2}$$

$$= x(4x^3 - 4x^2 - 33x + 45)$$

$$\begin{array}{r|rrrr} \frac{3}{2} & 4 & -4 & -33 & 45 \\ & & 6 & 3 & -45 \\ \hline & 4 & 2 & -30 & 0 \\ \div 2 & 2 & 1 & -15 & \end{array}$$

$$2x^2 + 1x - 15 = 0$$

$$(2x - 5)(x + 3) = 0$$

$$\begin{array}{l} 2x - 5 = 0 \\ 2x = 5 \\ x = \frac{5}{2} \end{array} \qquad \begin{array}{l} x + 3 = 0 \\ x = -3 \end{array}$$

Zeros: $-3, 0, \frac{3}{2}, \frac{5}{2}$

$$3) f(x) = 2x^4 - 15x^3 + 34x^2 - 24x; 2$$

$$= x(2x^3 - 15x^2 + 34x - 24)$$

$$\begin{array}{r|rrrr} 2 & 2 & -15 & 34 & -24 \\ & & 4 & -22 & 24 \\ \hline & 2 & -11 & 12 & 0 \end{array}$$

$$2x^2 - 11x + 12 = 0$$

$$(2x - 3)(x - 4) = 0$$

$$\begin{array}{l} 2x - 3 = 0 \\ 2x = 3 \\ x = \frac{3}{2} \end{array} \qquad \begin{array}{l} x - 4 = 0 \\ x = 4 \end{array}$$

Zeros: $0, \frac{3}{2}, 2, 4$