~~8~~ 4. $f(x) = -2x^4 + 16x^2 - 32$

$$-2x^4 + 16x^2 - 32 = 0$$

$$-2(x^4 - 8x^2 + 16) = 0$$

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

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

$$x = -2, 2$$

Rational Root Theorem:

If $f(x)$ is a polynomial function with integer coefficients, then every rational zero of f can be written as: $\dfrac{\text{factor of constant term}}{\text{factor of leading coefficient}}$

Examples

leading coef.

constant

List the possible rational zeros of each function.

(1) $f(x) = x^3 + 14x^2 + 41x - 56$ $\dfrac{\pm 1, \pm 2, \pm 4, \pm 7, \pm 8, \pm 14, \pm 28, \pm 56}{\pm 1}$

leading coef

constant term

(2) $f(x) = 5x^4 + 12x^3 - 16x^2 + 10$ $= \dfrac{\pm 1, \pm 2, \pm 5, \pm 10}{\pm 1, \pm 5}$

$\pm 1, \pm \frac{1}{5}, \pm 2, \pm \frac{2}{5}, \pm 5, \pm 10$

(3) $f(x) = x^3 + 2x^2 - 11x - 12$

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