Finding Rational Zeros

Rational Zero Theorem: Given a polynomial function defined by

$$P(x) = a_n x^n + a_{n-1} x^{n-1} + \ldots + a_1 x + a_0$$

with integer coefficients and where n is a non-negative integer, the possible rational zeros of $P(x)$ are of the form $\frac{p}{q}$, where p is a factor of a_0 and q is a factor of a_n.

Practice Exercises

A. Find all rational zeros of each function.

1. $P(x) = 3x^3 + 8x^2 - 15x + 4$
2. $P(x) = 15x^4 - x^3 - 17x^2 + x + 2$
3. $P(x) = 2x^4 + 3x^3 - 12x^2 - 7x + 6$
4. $P(x) = 2x^3 + 7x^2 - 5x - 4$
5. $P(x) = 3x^3 + 4x^2 - 28x + 16$

B. Find a polynomial function with the following sets of zeros.

1. $\left\{-4, 2, \frac{2}{3}\right\}$
2. $\left\{1, -1, -\frac{2}{5}, \frac{1}{3}\right\}$
3. $\{4, 2+i, 2-i\}$
4. $\{7, 3+i, 3-i\}$

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