Using a graphing calculator, approximate the zeros of \( P(x) = 21 + 10x - 3x^2 - x^3 \).

a. What is the degree of \( P \)?
b. How many possible zeros are there of \( P \)?
Let $P(x)$ be a polynomial of degree $n > 0$ with real coefficients, $a_n > 0$:

1. **Upper bound:** a number $r > 0$ is an upper bound for the real zeros of $P(x)$ if, when $P(x)$ is divided by $x - r$ by synthetic division, all numbers in the quotient row including the remainder are nonnegative.
2. **Lower bound:** a number $r < 0$ is a lower bound for the real zeros of $P(x)$ if, when $P(x)$ is divided by $x - r$ by synthetic division, all numbers in the quotient row including the remainder alternate in sign. Zero can be considered as either positive or negative in the alternating sign test.

Let $P(x) = x^4 - 5x^3 - x^2 + 40x - 70$. Find smallest positive integer and largest negative integer that are upper and lower bounds of the real zeros of $P(x)$. 
Let $P(x) = x^3 - 25x^2 + 170x - 170$.

1. Find smallest positive integer multiple of 10 and largest negative integer multiple of 10 that are upper and lower bounds of the real zeros of $P(x)$.

2. Approximate the real zeros of $P(x)$ to two decimal places.
Theorem: Suppose a function $f$ is continuous on an interval $I$ that contains the numbers $a$ and $b$. If $f(a)$ and $f(b)$ have opposite signs, then the graph of $f$ has at least one $x$ intercept between $a$ and $b$.

Corollary: A continuous function can change sign only at a zero.

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The polynomial $P(x) = x^4 - 2x^3 - 10x^2 + 40x - 90$ has a zero between $-5$ and 4. Use the bisection method to approximate it to one decimal place of accuracy.
Let \( P(x) = x^5 - x^4 + 40x - 12x - 72. \)

1. Find smallest positive integer multiple of 10 and largest negative integer multiple of 10 that are upper and lower bounds of the real zeros of \( P(x). \)

2. Approximate the real zeros of \( P(x) \) to two decimal places.

3. Identify intervals where \( P \) is positive and where it is negative.

Solve the inequality \( x^3 + x^2 - x - 1 < 0. \)

Solve the inequality \( 5x^3 - 13x < 4x^2 - 10x - 5. \)

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