Name ____________________

Date ____________ Period ______

Fundamental Theorem of Algebra

Every polynomial function of degree $n \geq 1$, has exactly n roots

Determine the number of roots the following polynomials have

$f(x) = x^3 - 4x^2 + 4x - 16$ $f(x) = 3x^5 + x^3 + 5x + 3$ $f(x) = x^2 + 4x + 2$

Given polynomial, $P(x)$, every rational root of $P(x)$ can be written as $\frac{p}{q}$, where p is a factor of the constant term and q is a factor of the leading coefficient of $P(x)$.

Leading Coefficient → 3; Constant Term → 6

$$P(x) = 3x^3 - 14x^2 + 13x + 6$$

Factors of 3, q $\frac{p}{q}$ Factors of 6, p

Find all roots of the following polynomial

$$P(x) = 3x^3 - 14x^2 + 13x + 6$$

Degree: 3 # Roots: 3

Possible Rational Roots

$\pm 1 \quad \pm 2 \quad \pm 3 \quad \pm 6 \quad \pm\frac{1}{3} \quad \pm\frac{2}{3}$

Given polynomial, $P(x)$, every rational root of $P(x)$ can be written as $\frac{p}{q}$, where p is a factor of the constant term and q is a factor of the leading coefficient of $P(x)$.

Leading Coefficient

Constant Term

$$P(x) = x^3 + x^2 - 6x + 4$$

Factors of 1, q

$\frac{p}{q}$

Factors of 4, p

Find all roots of the following polynomial

$P(x) = x^3 + x^2 - 6x + 4$

Degree: 3 # Roots: 3

Possible Rational Roots

$\pm 1 \quad \pm 2 \quad \pm 4$

Fundamental Theorem of Algebra

Every polynomial function of degree $n \geq 1$, has exactly n roots

Rational Root Theorem

Given polynomial, $P(x)$, every rational root of $P(x)$ can be written as $\frac{p}{q}$, where p is a factor of the constant term and q is a factor of the leading coefficient of $P(x)$.