

WORKSHEET

LESSON 3-8: RATIONAL ZERO THEOREM

Key Concept Rational Zero Theorem	
Words	If $P(x)$ is a polynomial function with integral coefficients, then every rational zero of $P(x) = 0$ is of the form $\frac{p}{q}$, a rational number in simplest form, where p is a factor of the constant term and q is a factor of the leading coefficient.
Example	Let $f(x) = 6x^4 + 22x^3 + 11x^2 - 80x - 40$. If $\frac{4}{3}$ is a zero of $f(x)$, then 4 is a factor of -40 , and 3 is a factor of 6.
Corollary to the Rational Zero Theorem	
If $P(x)$ is a polynomial function with integral coefficients, a leading coefficient of 1, and a nonzero constant term, then any rational zeros of $P(x)$ must be factors of the constant term.	

$$\text{Possible Rational Roots} = \frac{\text{factors of the constant}}{\text{factors of the lead coefficient}} \quad \frac{p}{q}$$

1) List all of the possible rational zeros of $g(x) = 3x^3 - 4x + 10$

p = factors/divisors of

$$= \pm 1, \pm 2, \pm 5, \pm 10$$

q = factors/divisors of

$$= \pm 1, \pm 3$$

$$\text{Possible rational roots/zeros} = \frac{p}{q}$$

$$= \pm 1, \pm \frac{1}{3}, \pm 2, \pm \frac{2}{3}, \pm 5, \pm \frac{5}{3}, \pm 10, \pm \frac{10}{3}$$

1) List all of the possible rational zeros of $g(x) = x^3 - 4x^2 + x + 6$

p = factors/divisors of

$$= \pm 1, \pm 2, \pm 3, \pm 6$$

q = factors/divisors of

$$= \pm 1$$

$$\text{Possible rational roots/zeros} = \frac{p}{q}$$

$$= \pm 1, \pm 2, \pm 3, \pm 6$$