

NAME: _____ Score _____/10

1. If $\frac{p}{q}$ is a rational zero of a polynomial function with integer coefficients, then the numerator p must be a divisor of the **constant term** and the denominator q must be a divisor of the **leading coefficient**.

2. Consider the function whose rule is $f(x) = -5x^7 + 2x^5 + 13x^3 + 2x - 12$.

a. The function f is a **polynomial** function.

b. As $x \rightarrow +\infty, f(x) \rightarrow -\infty$

As $x \rightarrow -\infty, f(x) \rightarrow +\infty$

c. The graph of f tries to cross the x -axis **seven** times.

d. If $\frac{p}{q}$ is a rational zero of f , then $q \in \{ \pm 1, \pm 5 \}$

e. $f(1) = 0$, therefore **$x - 1$** is a factor of $-5x^7 + 2x^5 + 13x^3 + 2x - 12$.

f. $f(1) = 0$, therefore **$(1, 0)$** is an x -intercept of the graph of f .

3. Consider the function whose rule is $f(x) = \frac{3x-2}{2x-5}$

a. The function f is a **rational** function.

b. The zero(s) of f is/~~are~~ $\frac{2}{3}$.

c. The vertical asymptote(s) of f is/~~are~~ $x = \frac{5}{2}$. (**Asymptotes are lines not numbers**)

d. The horizontal asymptote of f is $y = \frac{3}{2}$. (**Asymptotes are lines not numbers**)

e. The x -intercept(s) of the graph of f is/~~are~~ $\left(\frac{2}{3}, 0\right)$.

f. $f(2)$ is (~~positive, zero,~~ **negative**). **Circle the correct response**

g. Give a reason why, in Part f, these are the only possibilities and exactly one of them must be correct.

The Law of Trichotomy