

NAME: _____ Score _____/10

Please **print** your name1. What are the possible rational zeros of the polynomial function whose rule is $f(x) = 4x^5 + 8x^3 + 4x + 3$. $p \in \{\pm 1, \pm 3\}$ **p must be a divisor of the constant term.** $q \in \{\pm 1, \pm 2, \pm 4\}$ **q must be a divisor of the leading coefficient.** $\frac{p}{q} \in \left\{ \pm 1, \pm \frac{1}{2}, \pm \frac{1}{4}, \pm 3, \pm \frac{3}{2}, \pm \frac{3}{4} \right\}$ 2. What is the horizontal asymptote for the rational function whose rule is $f(x) = \frac{2x^3 - 4x + 2}{7x^4 + 9}$.**The horizontal asymptote is the line whose equation is $y = 0$.****You should be aware that an asymptote (vertical or horizontal) is a line, not a number nor a point.****If the degree of the denominator is greater the degree of the numerator, the horizontal asymptote is the line whose equation is $y = 0$** 3. What are the vertical asymptotes of the rational function whose rule is $f(x) = \frac{x^4 + 2}{(x + 2)(x + 3)}$.**The vertical asymptotes are the vertical lines whose equations are $x = -2$ and $x = -3$.****Vertical asymptotes are the vertical lines through real zeros of the denominator which are not zeros of the numerator. In this case, the numerator has no real zeros and both zeros of the denominator are real, so the vertical asymptotes are at the zeros of the denominator.**4. What are the zeros of the rational function whose rule is $f(x) = \frac{x^2 - 1}{x^2 + 5x + 6} = \frac{(x - 1)(x + 1)}{(x + 2)(x + 3)}$ **The zeros of the rational function f are 1 and -1.****The zeros of a rational function are the zeros of the numerator which are not zeros of the denominator.****Clearly the zeros of the numerator are 1 and -1 whereas the zeros of the denominator are -2 and -3.**5. Consider the function whose rule is $f(x) = (x - 4)^5(x + 3)^2$. What are the zeros and what are their multiplicities.**4 is a zero whose multiplicity is 5.****-3 is a zero whose multiplicity is 2****It seems as if no-one studied the multiple page handout, or the textbook, or the Chapter summary, or lecture notes that dealt with polynomial and rational functions.**