Meramec College Algebra Quiz 3 Solution Fall 2007

Name _____ Score_____/10

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1. Consider the rational function whose rule is $f(x) = \frac{2x-5}{3x+4}$.

What are the zeros of f ? **The zeros of a function f are found by solving the equation resulting from f(x) = 0. In this case we solve the equation $\frac{2x-5}{3x+4} = 0$ to obtain $\frac{5}{2}$ as the zero of f.**

What are the vertical asymptotes for the graph of f ? **Vertical asymptotes occur at zeros of the denominator which are not zeros of the numerator. Therefore $x = -\frac{4}{3}$ is a vertical asymptote for f.**

What are the horizontal asymptotes for the graph of f ? **Because the numerator and denominator have the same degree, the quotient of the leading coefficients yields a horizontal asymptote. In this case $y = \frac{2}{3}$ is the horizontal asymptote.**

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

What are the zeros of f and what are their multiplicities ?

3 is a zero with multiplicity 2
-5 is a zero with multiplicity 1
-2 is a zero with multiplicity 3.

Where does the graph cross the x-axis ?

The graph crosses the x-axis at (-5, 0) and (-2, 0).

Where does the graph intersect but not cross the x-axis?

(3, 0) is an x-intercept but the graph does not cross the x-axis at (3, 0).

3. Suppose f is a polynomial function with the following properties.

a) The real zeros of f are:
-2 with multiplicity 1
2 with multiplicity 3
3 with multiplicity 2

b) As $x \to \infty$, $f(x) \to \infty$
As $x \to -\infty$, $f(x) \to \infty$

Sketch the graph of f .

Observe the behavior at x = 2.