Name: ___Key___

Directions: Please show all work for maximum credit. This quiz is worth 16 points. Good luck!

1. Given $f(x) = \dfrac{(x-3)}{(x+2)(x-2)}$.

(1 point) a. Find the x-intercepts of f.

$$\frac{x-3}{(x+2)(x-2)} = \frac{0}{1}$$

$$x-3 = 0$$
$$x=3 \qquad (3, 0)$$

(1 point) b. Find the y-intercept of f.

$$y = \frac{0-3}{(0+2)(0-2)} = \frac{3}{4}$$

$$\left(0, \frac{3}{4}\right)$$

(2 points) c. Determine the horizontal asymptote.

degree numerator = 1
degree denominator = 2

H.A: $y=0$

(2 points) d. Determine the vertical asymptote(s).

$$(x+2)(x-2)=0$$

V.A: $x=-2, \ x=2$

(1 point) e. Determine if the graph of the function will intersect the horizontal asymptote.
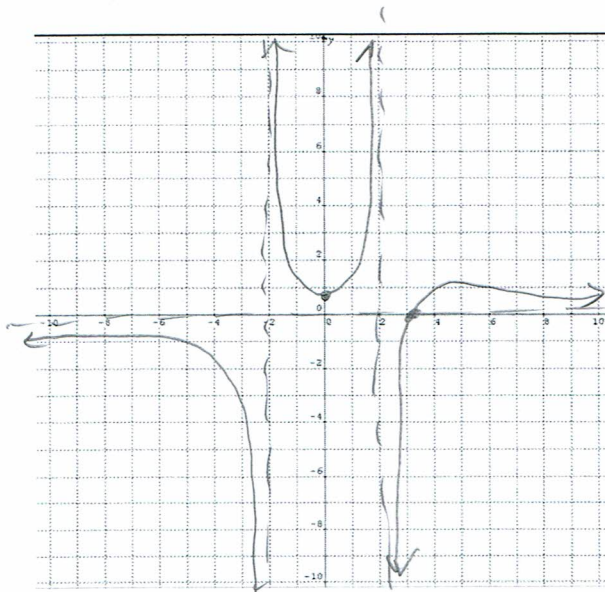
$$\frac{x-3}{(x+2)(x-2)} = 0$$

$$x-3 = 0$$
$$x=3 \qquad (3, 0)$$

(3 points) f. Use the x-intercept(s) and the vertical asymptote(s) to determine when the graph will be above the x-axis or below the x-axis.

	V.A -2	V.A 2	x-int 3	
$x-3$	$-$	$-$	$-$	$+$
$x+2$	$-$	$+$	$+$	$+$
$x-2$	$-$	$-$	$+$	$+$
	$-$	$+$	$-$	$+$
	below x-axis	above x-axis	below x-axis	above x-axis

(3 points) g. Using the information obtained from parts a-f, sketch the graph of f.

(3 points) 2. Determine the oblique asymptote of the following function.

$$f(x) = \frac{3x^2 - 4x + 8}{x + 3}$$

$$
\begin{array}{r}
3x - 13 \\
x+3 \overline{\smash{)}\ 3x^2 - 4x + 8} \\
-(3x^2 + 9x) \\
\hline
-13x + 8 \\
-(-13x - 39) \\
\hline
47
\end{array}
$$

O.A. $y = 3x - 13$