Quiz12, MAT 1375 Professor Chiu

ID:_____ Name:_____

- This quiz consists of 2 sets of questions for a total of 10 points.
- You have 15 minutes to complete the quiz.
- Scientific calculators are allowed.
- Wishing you success.

True or False questions:

1. T Let $f(x)=\frac{x-2}{x-3}$. Then $x=3$ is a vertical asymptote of $f(x)$.
2. T Let $f(x)=\frac{x-2}{x-3}$. Then $y=1$ is a horizontal asymptote of $f(x)$.
3. F Let $f(x)=\frac{(x-2)(x-3)}{x-3}$. Then $x=3$ is a vertical asymptote of $f(x)$. $x=3$ is a removable singularity.
4. T Let $f(x)=\frac{x^2-1}{x-3}$. Then there is no horizontal asymptote of $f(x)$.
5. F A ~~vertical~~ Horizontal asymptote of a function f occurs when $x\to\pm\infty$.

Show all your work and justify your answer:

6. Work out the following problems for rational function

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

Let $p(x)=2x+4$, $q(x)=x^2-x-2=(x+1)(x-2)$. $f(x)=\frac{p(x)}{q(x)}$

Domain: $(-\infty,-1)\cup(-1,2)\cup(2,\infty)$, (exclude the zeros of $q(x)$)

Vertical asymptotes: $x=-1$, $x=2$ (the vertical lines pass the zeros of q)

Horizontal asymptote: $y=0$ ($\deg(p)=1<\deg(q)=2$)

x-intercept: $(-2,0)$ (let $f(x)=\frac{2x+4}{x^2-x-2}=0\Rightarrow 2x+4=0\Rightarrow x=-2$)

y-intercept: $(0,-2)$ (find $f(0)=\frac{2\cdot 0+4}{0^2-0-2}=\frac{4}{-2}=-2$)