IB Pre HL
Horizontal Asymptotes

Name: Key
Period: ______

Example) Find the horizontal asymptotes by performing a long or synthetic division. Then state the end behavior of the graph as x approaches infinity.

a) $y = \dfrac{2x+1}{4x^2-4x-3} = \dfrac{(2x+1)}{(2x-3)(2x+1)} = \dfrac{1}{2x-3}$

H.A: $y = 0$

as $x \to \infty$, $y \to 0$
$x \to -\infty$, $y \to 0$

b) $y = \dfrac{x^2+3x-4}{2x^2+7x-4}$ → H.A: $y = \frac{1}{2}$

as $x \to \infty$, $y \to \frac{1}{2}$
$x \to -\infty$, $y \to \frac{1}{2}$

Practice WS

Identify every value of y for which there appears to be a horizontal asymptote. Using your graphing calculator, determine whether the graph of the function has a horizontal asymptote by selecting a window with an extremely large x value in the positive and negative direction.

1. $f(x) = \dfrac{5x^2-3x+1}{2x^2+4x-7}$
2. $f(x) = \dfrac{3x^3-x+1}{6x^3+2x^2-7}$
3. $f(x) = \dfrac{4-7x}{2+3x}$
4. $f(x) = \dfrac{(3x+4)(2x+1)}{(4x+1)(x-1)}$
5. $f(x) = \dfrac{2x^2-x+3}{x^3+1}$
6. $f(x) = \dfrac{x^2+4}{3-4x}$
7. $f(x) = \dfrac{4x}{x^2+9}$
8. $f(x) = \dfrac{1}{x^2+1}$
9. $f(x) = \dfrac{x^3}{x^2+1}$

10. Describe how you could determine horizontal asymptotes using only the algebraic representation of a function.