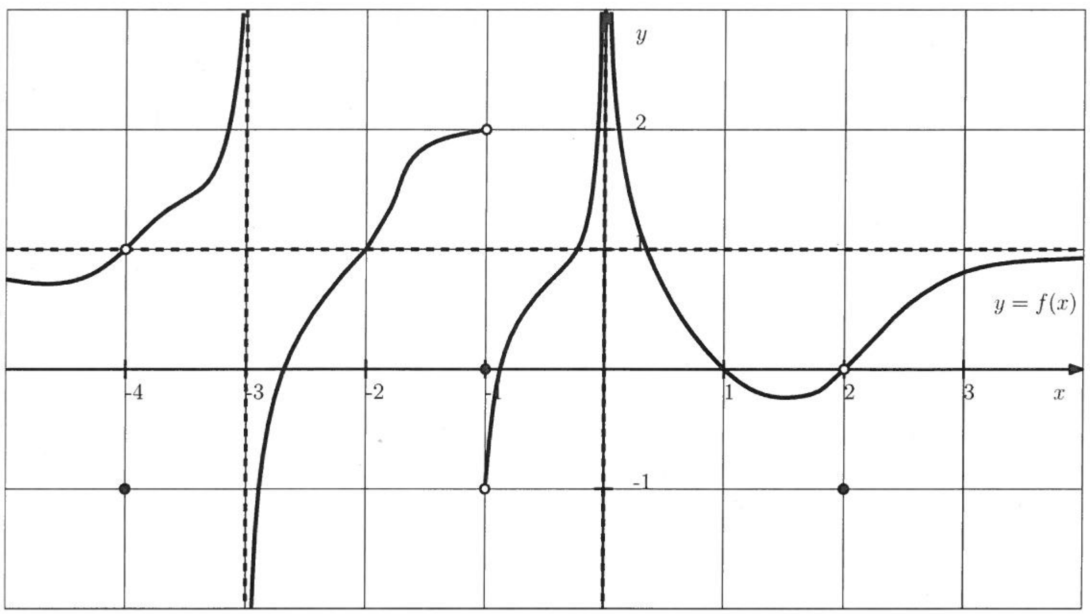
Math 1210: Quiz #3 **Fall 2017**

Name: SOLUTION	A#:	Section: A, B

[6] 1. Let f be a function whose graph of $y = f(x)$ is given below.



Then

(a) $\lim_{z \to -4^-} f(z) =$ 1

(b) $\lim_{s \to -3^+} f(s) =$ $-\infty$

(c) $\lim_{z \to -1^-} f(z) =$ 2

(d) List all numbers a for which $\lim_{s \to a} f(s)$ does not exist: $-3, -1, 0$

(e) List all horizontal asymptotes: $y = 1$

(f) List all vertical asymptotes: $x = -3,\ x = 0$

[2] 2. List all vertical asymptotes of $y = \dfrac{(x+2)^3(x-3)^2 \ln|x|}{(x+3)^2(x+2)^2(x-3)^3}$: $x = -3,\ x = 0,\ x = 3$

v3.AB

[4] 3. Find all horizontal asymptotes of $y = \dfrac{e^{2x} - 2e^{-3x}}{3e^{2x} + 5e^{-3x}}$.

$$\lim_{x\to\infty} \frac{e^{2x} - 2e^{-3x}}{3e^{2x}+5e^{-3x}} = \lim_{x\to\infty} \frac{1-2e^{-5x}}{3+5e^{-5x}} = \frac{1-0}{3+0} = \boxed{\frac{1}{3}}$$

$$\lim_{x\to-\infty} \frac{e^{2x} - 2e^{-3x}}{3e^{2x}+5e^{-3x}} = \lim_{x\to-\infty} \frac{e^{5x}-2}{3e^{5x}+5} = \frac{0-2}{0+5} = \boxed{-\frac{2}{5}}$$

Horizontal Asymptotes: $\boxed{y=\frac{1}{3}}$ and $\boxed{y=-\frac{2}{5}}$

[8] 4. Compute the limits or show that they do not exist.

(a) $\displaystyle\lim_{t\to\infty} \frac{t^2 + \sin t}{3t^2 - 2\ln(t)} = \lim_{t\to\infty} \frac{1 + \frac{\sin t}{t^2}}{3 - \frac{2\ln(t)}{t^2}} = \frac{1+0}{3-0} = \boxed{\frac{1}{3}}$

(b) $\displaystyle\lim_{x\to\infty} \left(\sqrt{x^2-2x+5} - x\right) = \lim_{x\to\infty} \frac{(\sqrt{x^2-2x+5} - x)(\sqrt{x^2-2x+5} + x)}{\sqrt{x^2-2x+5} + x}$

$$= \lim_{x\to\infty} \frac{(x^2-2x+5) - x^2}{\sqrt{x^2-2x+5} + x} = \lim_{x\to\infty} \frac{-2x+5}{\sqrt{x^2-2x+5} + x} = \lim_{x\to\infty} \frac{-2+\frac{5}{x}}{\sqrt{1-\frac{2}{x}+\frac{5}{x^2}} + 1}$$

$$= \frac{-2+0}{\sqrt{1+0+0}+1} = \boxed{-1}$$