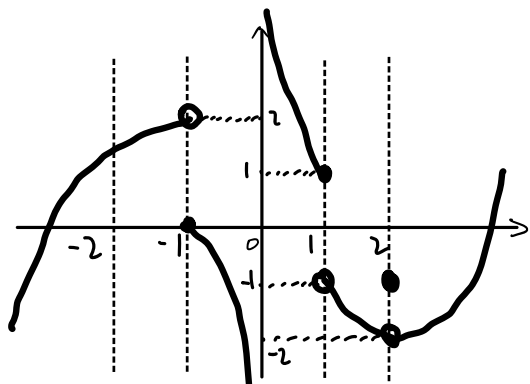


Quiz tomorrow!

Webassign access: see eLC announcement



$$\lim_{x \rightarrow -1^-} f(x) = 2 \quad \lim_{x \rightarrow -1^+} f(x) = 0$$

$$\lim_{x \rightarrow 0^-} f(x) = -\infty \quad \lim_{x \rightarrow 0^+} f(x) = +\infty$$

$$\lim_{x \rightarrow 2^-} f(x) = -2 \quad \lim_{x \rightarrow 2^+} f(x) = -2$$

$$\lim_{x \rightarrow -1} f(x) \text{ DNE}$$

$$\lim_{x \rightarrow 0} f(x) \text{ DNE}$$

$$\lim_{x \rightarrow 2} f(x) = -2$$

$$2. (1) \quad \lim_{x \rightarrow 1^+} \frac{x+2}{x+1} = \frac{3}{2}$$

$$(2) \quad \lim_{x \rightarrow 1^+} \frac{x-1}{x^2+3x-4} = \lim_{x \rightarrow 1^+} \frac{x-1}{(x+4)(x-1)}$$

$$= \lim_{x \rightarrow 1^+} \frac{1}{x+4} = \frac{1}{5}$$

$$(3) \quad \lim_{x \rightarrow 1^+} \frac{x-1}{x^2-2x+1} = \lim_{x \rightarrow 1^+} \frac{x-1}{(x-1)^2} = \lim_{x \rightarrow 1^+} \frac{1}{x-1}$$

$$= +\infty$$

$$(4) \quad \frac{2-x}{\frac{1}{x} - \frac{1}{2}} = \frac{2x(2-x)}{2x(\frac{1}{x} - \frac{1}{2})} = \frac{2x(2-x)}{2-x} = 2x$$

$$\lim_{x \rightarrow 2} \frac{2-x}{\frac{1}{x} - \frac{1}{2}} = \lim_{x \rightarrow 2} 2x = 4$$

$$(5) \quad \lim_{x \rightarrow -1} \frac{x^2+x}{1+\frac{1}{x}} = \lim_{x \rightarrow -1} \frac{x(x^2+x)}{x(1+\frac{1}{x})} = \lim_{x \rightarrow -1} \frac{x(x^2+x)}{x+1}$$

$$= \lim_{x \rightarrow -1} \frac{x^2 \cancel{(x+1)}}{\cancel{x+1}} = 1$$

$$(6) \quad \lim_{x \rightarrow 0^-} \left( \frac{1}{x} - \frac{1}{x^2+x} \right) = \lim_{x \rightarrow 0^-} \frac{x+1-1}{x(x+1)} = \lim_{x \rightarrow 0^-} \frac{1}{x+1} = 1$$

$$(7) \quad \lim_{x \rightarrow 0^-} \left( \frac{2}{x} - \frac{1}{x^2+x} \right) = \lim_{x \rightarrow 0^-} \frac{2(x+1)-1}{x(x+1)}$$

$$= \lim_{x \rightarrow 0^-} \frac{\overset{+}{2x+1}}{\underset{-}{x} \underset{+}{(x+1)}} = -\infty$$

$$(8) \quad \lim_{x \rightarrow 0^+} \frac{x^2+x}{|x^2-x|} = \lim_{x \rightarrow 0^+} \frac{x(x+1)}{\underset{+}{|x} \underset{-}{|x-1|}}$$

$$= \lim_{x \rightarrow 0^+} \frac{\cancel{x}(x+1)}{-\cancel{x}(x-1)} = \frac{1}{1} = 1$$

$$(9) \lim_{x \rightarrow 1} \frac{x(x+2) - x - 2}{(x+1)(x+2) - 6} = \lim_{x \rightarrow 1} \frac{x^2 + 2x - x - 2}{x^2 + 3x + 2 - 6}$$

$$= \lim_{x \rightarrow 1} \frac{x^2 + x - 2}{x^2 + 3x - 4} = \lim_{x \rightarrow 1} \frac{(x+2)\cancel{(x-1)}}{(x+4)\cancel{(x-1)}} = \frac{3}{5}$$

$$3. f(x) = \frac{x^3 - x^2}{x(x+1)(x^2+1)} = \frac{x^2(x-1)}{x(x+1)(x^2+1)}$$

$$\text{check: } x = 0, -1 = \frac{x(x-1)}{(x+1)(x^2+1)}$$

$$\lim_{x \rightarrow 0} f(x) = \square \quad \text{no asymp.}$$

$$\lim_{x \rightarrow -1^-} f(x) = \text{some } \infty \quad \text{asymp.}$$

$$\Rightarrow \boxed{\text{VA @ } x = -1}$$

$$g(x) = \frac{x^2(x^2-4)}{|x(x-2)|} = \frac{x^2}{|x|} \cdot \frac{x-2}{|x-2|} \cdot (x+2)$$

$$\text{check: } x = 0, 2$$

$$\lim_{x \rightarrow 0^-} \frac{x^2}{|x|} = \lim_{x \rightarrow 0^-} \frac{x^2}{-x} = 0 \Rightarrow \lim_{x \rightarrow 0^-} g(x) = 0 \Rightarrow \text{no asymp.}$$

$$\text{similarly } \lim_{x \rightarrow 0^+} g(x) = 0$$

$$\lim_{x \rightarrow 2^-} \frac{x-2}{|x-2|} = \lim_{x \rightarrow 2^-} \frac{x-2}{-(x-2)} = -1 \Rightarrow \lim_{x \rightarrow 2^-} g(x) = \text{some number}$$

$$\text{similarly } \lim_{x \rightarrow 2^+} g(x) = \text{some number} \Rightarrow \text{no asymp.}$$

$\Rightarrow$  No VA