

$$\sqrt{x^2} = |x| \quad (\sqrt{x})^2 = x$$

$$x=2 \rightarrow \sqrt{2^2} = \sqrt{4} = 2$$

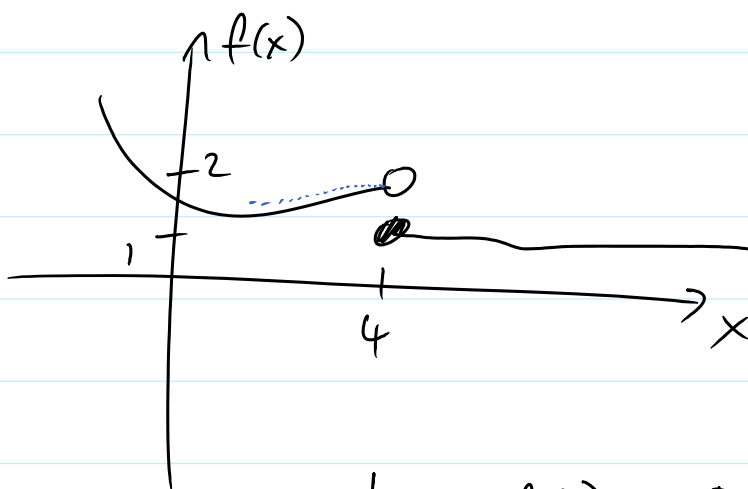
$$x=-2 \rightarrow \sqrt{(-2)^2} = \sqrt{4} = 2$$

$$\frac{a+b}{1} = \frac{a}{1} + \frac{b}{1}$$

$$(2+x)^2 \neq 2^2 + x^2$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

Section 1.5 - Limits

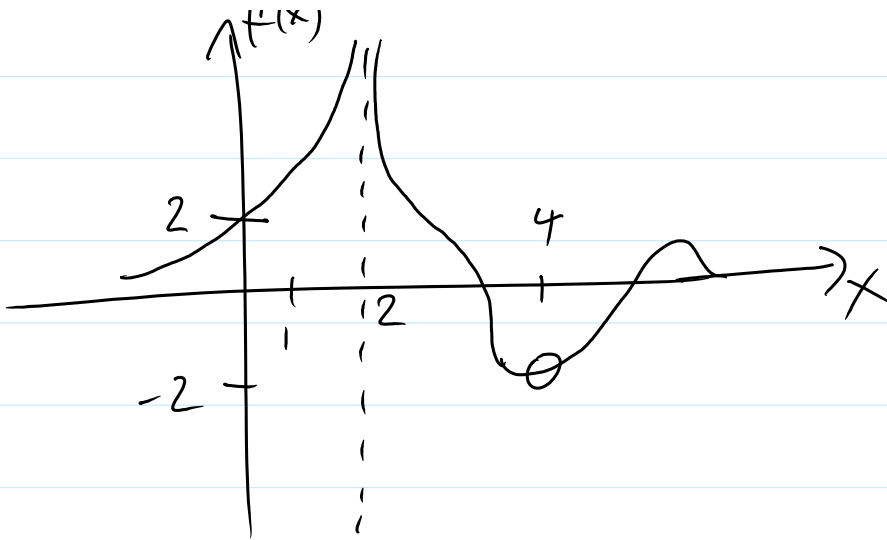


$$f(4) = 1$$

$$\lim_{x \rightarrow 4} f(x) \quad \text{DNE}$$

$$\uparrow f(x) \quad //$$

$$f(4) \text{ DNE}$$



$$f'(4) \text{ DNE}$$

$$\lim_{x \rightarrow 4} f(x) = -2$$

$$\lim_{x \rightarrow 0} f(x) = 2 = f(0)$$

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

$$f(2) \text{ DNE}$$

$x=2$ is an asymptote
 Domain is $(-\infty, 2) \cup (2, 4) \cup (4, \infty)$

Estimating a limit

$$\lim_{x \rightarrow 1} \frac{\sqrt{x}-1}{x-1} = 0.5$$

x	0.9	0.95	0.99	1	1.01	1.05	1.1
$f(x)$	0.513	0.506	0.501	X	0.498	0.493	0.488

$\rightarrow 0.5 \leftarrow$

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

$$g(x) = x - 1$$

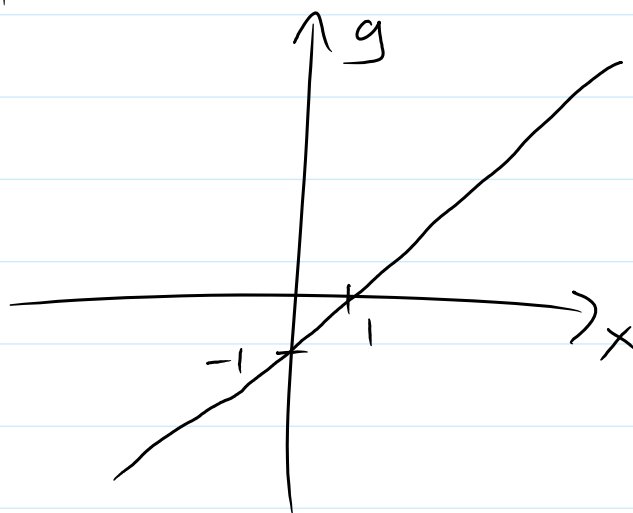
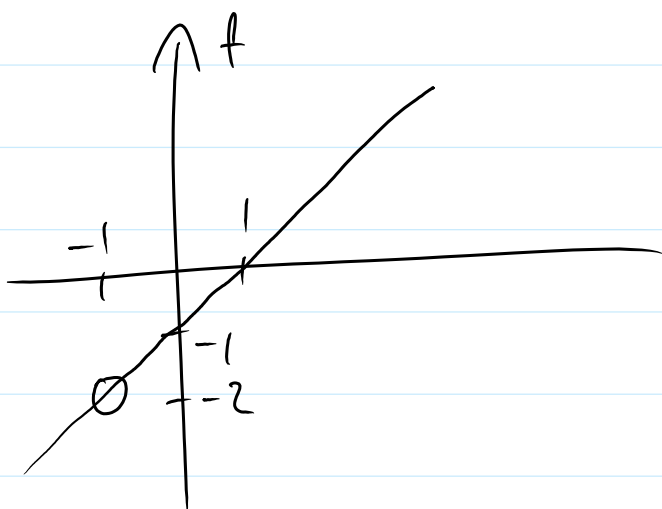
$$\frac{x^2-1}{x+1} = \frac{(x-1)\cancel{(x+1)}}{\cancel{x+1}} = x-1$$

$$f(-1) = \frac{(-1)^2-1}{-1+1} = \frac{1-1}{0} \text{ DNE}$$

Domain: $(-\infty, -1) \cup (-1, \infty)$

$$g(-1) = -1-1 = -2$$

Domain: $(-\infty, \infty)$



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

$$= \lim_{x \rightarrow 1} \frac{1}{\sqrt{x}+1} = \frac{1}{\sqrt{1}+1} = \boxed{\frac{1}{2}}$$