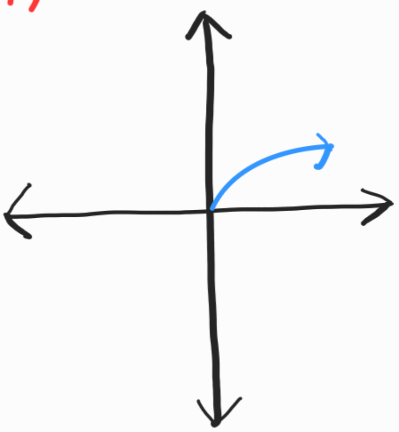
1)

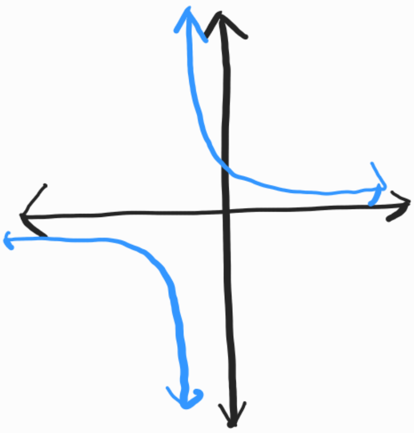


real solutions don't exist for $x < 0$

must use a 1-sided limit from the right

$$\lim_{x \to 0} \sqrt{x} = 0$$

2)

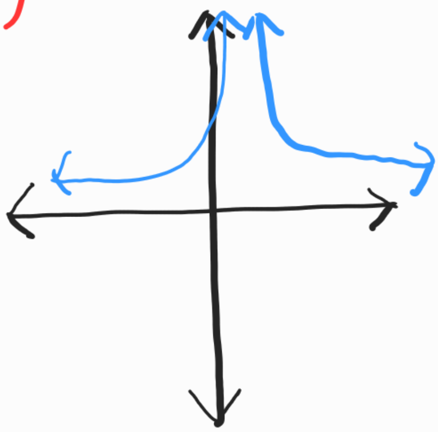


infinite discontinuity at $x = -1$ (vertical asymptote)

must use one-sided limits from both sides

$$\lim_{x \to -1^+} \frac{1}{x+1} = \text{inf} \qquad \lim_{x \to -1^-} \frac{1}{x+1} = -\text{inf}$$

3)

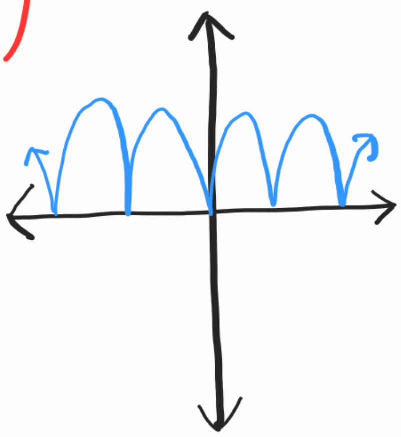


infinite discontinuity at $x=1$ (vertical asymptote)

must use one-sided limits from both sides

$$\lim_{x\to -1^+} \frac{1}{(x-1)^4} = \text{inf} \qquad \lim_{x\to -1^-} \frac{1}{(x-1)^4} = \text{inf}$$

4)

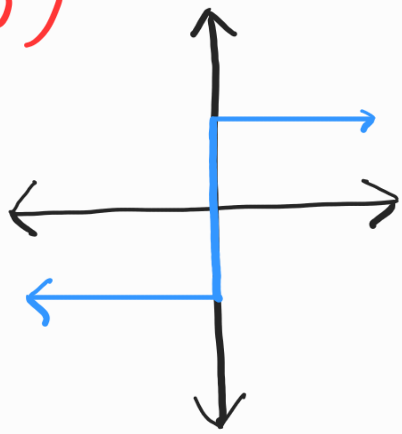


no discontinuities

can use two-sided limits

$$\lim_{x\to 0} |\sin(x)| = 0$$

5)



jump discontinuity at $x = 0$

must use one-sided limits from both sides

$$\lim_{x \to 0^+} \frac{|x|}{x} = 1 \qquad \lim_{x \to 0^-} \frac{|x|}{x} = -1$$