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Is there a vertical asymptote or removable discontinuity at $x = -1$

$$\begin{aligned} (37) \quad f(x) &= \frac{x^2 - 6x - 7}{x + 1} \\ &= \frac{(x - 7)(x + 1)}{x + 1} \\ &= x - 7 \end{aligned}$$

Remov. Dis. hole at $x = 7$
 $\lim_{x \rightarrow -1} f(x) = -8$

$$\begin{aligned} (38) \quad f(x) &= \frac{x^2 + x - 2}{x + 1} \\ &= \frac{(x + 2)(x - 1)}{x + 1} \end{aligned}$$

Non-Remov. Disc. at $x = -1$, asymptote

$$\begin{aligned} (39) \quad \lim_{x \rightarrow 1^-} \frac{-1}{(x-1)^2} \\ &= \frac{-1}{(0.9-1)^2} \\ &= \frac{-1}{.12} = -\infty \end{aligned}$$

$$\begin{aligned} (40) \quad \lim_{x \rightarrow 1^+} \frac{2+x}{1-x} \\ &= \frac{2+1}{1-1.1} \\ &= \frac{3}{-.1} = -\infty \end{aligned}$$

$$\begin{aligned} (42) \quad \lim_{x \rightarrow 4^-} \frac{x^2}{x^2 + 16} \\ &= \frac{4^2}{4^2 + 16} \\ &= \frac{1}{2} \end{aligned}$$

$$\begin{aligned} (46) \quad \lim_{x \rightarrow 3} \frac{x-2}{x^2} \\ &= \frac{3-2}{3^2} \\ &= \frac{1}{9} \end{aligned}$$

$$\begin{aligned} (48) \quad \lim_{x \rightarrow 0^-} \left(x^2 - \frac{1}{x} \right) \\ &= (-.1)^2 - \frac{1}{-.1} \\ &= .1^2 + \infty \\ &= \infty \end{aligned}$$

$$\begin{aligned} (50) \quad \lim_{x \rightarrow \pi/2^+} \frac{-2}{\cos x} \\ &= \frac{-2}{-.1} \\ &= \infty \end{aligned}$$

$$\begin{aligned} (52) \quad \lim_{x \rightarrow 0} \frac{x+2}{\cot x} \\ (x+2) \tan x \\ (0+2) \tan 0 \\ 0 \end{aligned}$$

$$\begin{aligned} (54) \quad \lim_{x \rightarrow 1/2} \sqrt{x} \tan \pi x \\ (1/2)^2 \tan \frac{\pi}{2} \\ \uparrow \\ \text{limit DNE} \end{aligned}$$

$$\begin{aligned} (58) \quad \lim_{x \rightarrow 4^+} \sec \frac{\pi}{8} x \\ = \sec \frac{4\pi}{8} \\ = \sec \frac{\pi}{2} + \\ -\infty \end{aligned}$$

(64) If $f(x) = \frac{p(x)}{q(x)}$
must there an asymptote at $x=1$?

$$(68) \quad r = \frac{2x}{\sqrt{625-x^2}} \text{ ft/sec}$$

a) rate at $x=7$ feet

$$\begin{aligned} r &= \frac{2(7)}{\sqrt{625-7^2}} \\ &= \frac{7}{12} \text{ ft/sec} \end{aligned}$$

c) $\lim_{x \rightarrow 25^-} r$

$$\begin{aligned} r &= \frac{2(25)}{\sqrt{625-24.9^2}} \\ &= \frac{50}{\sqrt{.1^2}} = \infty \end{aligned}$$