

29) ~~sin~~ πx .

$\frac{\pi}{2}, \frac{3\pi}{2}$

$$x = \frac{1}{2}, \frac{3}{2}$$

31) $S(t) = \frac{t}{\sin t}$.

$t = \pi$

$$27) f(x) = x^2 - 2x - 15$$

~~$$(x^3 - 5x^2) \div (x - 5)$$~~

~~$$x^2(x-5) + 1(x-5)$$~~

$$(x^2 + 1)(x - 5)$$

$x = 5$ Remainder

$$13) f(x) = 5x^3 - 3$$

$$a) \lim_{x \rightarrow \infty} \left(h(x) = \frac{f(x)}{x^2} = \frac{5x^3 - 3}{x^2} \right) = \text{DNE}$$

$$b) \lim_{x \rightarrow \infty} \left(h(x) = \frac{f(x)}{x^3} = \frac{5x^3 - 3}{x^3} \right) = \boxed{5}$$

$$c) \dots \dots \dots \frac{5x^3 - 3}{x^4} = 0$$

$$4a) \lim_{x \rightarrow \infty} x \sin \frac{1}{x} \quad (\text{hint: let } x = 1/t, \text{ and } \lim_{t \rightarrow 0^+})$$

$$= \lim_{t \rightarrow 0^+} \left(\frac{1}{t} \sin t = \frac{\sin t}{t} \right) = 1$$

$$37) \lim_{x \rightarrow \infty} (2 - 5e^{-x})$$

$$= \lim_{x \rightarrow \infty} 2 - \lim_{x \rightarrow \infty} (5e^{-x} = \frac{5}{e^x})$$

$$2 - 0 = 2$$

$$\begin{aligned}
 33) \lim_{x \rightarrow \infty} \frac{1}{2x + \sin x} &= \frac{\lim_{x \rightarrow \infty} 1}{\lim_{x \rightarrow \infty} (2x + \sin x)} \\
 &= \frac{\lim_{x \rightarrow \infty} 1}{\lim_{x \rightarrow \infty} 2x + \lim_{x \rightarrow \infty} \sin x} = \frac{1}{\infty + \text{DNE}} = \text{DNE}.
 \end{aligned}$$

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

$$HA = 2$$

y-int

$$f(x) = \frac{x}{x^2+2} = 0$$

$$HA = 0$$

$$x=0 \text{ x-int.}$$

$$4) f(x) = 2 + \frac{x^2}{x^2+1} = 0$$

$$\begin{aligned}
 z7) \quad f(x) &= \frac{x^2 - 2x - 15}{(x^3 - 5x^2 + 1)(x-5)} \\
 &= \frac{x^2 - 2x - 15}{x^2(x-5)(x^2+1)(x-5)} \\
 &= \frac{x^2 - 2x - 15}{(x^2+1)(x-5)^2}
 \end{aligned}$$

$$25 - 10 - 15 = 0$$

$$VA = \emptyset.$$

$$36) f(x) = \frac{\sin(x+1)}{x+1} \quad \sin(0) = 0$$

$$4) f(x) = \frac{-1}{(x-4)^2} \quad \text{Not a VA.}$$

$$\lim_{x \rightarrow 4^-} -\infty$$

$$\lim_{x \rightarrow 4^+} -\infty$$

$$35) \lim_{x \rightarrow \infty} \left(\frac{\sin 2x \cdot 2}{x \cdot 2} = \frac{2 \sin 2x}{2x} = 2 \left(\frac{\sin 2x}{2x} \right) \right)$$

$$\Rightarrow 2 \lim_{x \rightarrow \infty} \left(\frac{\sin 2x}{2x} \right) \Rightarrow 2 \lim_{y \rightarrow \infty} \left(\frac{\sin y}{y} \right) = 2(0) = \boxed{0}$$

$$\text{let } y = 2x$$

$$\therefore x \rightarrow \infty \cdot 2$$

$$2x \rightarrow \infty$$

$$y \rightarrow \infty$$

$$27) \lim_{x \rightarrow \infty} \frac{2(x+1)}{\sqrt{x^2 - x}} \quad \frac{\infty}{\infty}$$

$$\boxed{-2}$$

$$29) \lim_{x \rightarrow \infty} \frac{\sqrt{x^2 - 1}}{2x - 1} \text{ les } 1$$

$$\frac{1}{2}$$

$$49) \lim_{x \rightarrow \infty} x \sin \frac{1}{x} \quad (\text{hint: let } x = \frac{1}{t}, \text{ and let } t \rightarrow 0^+)$$

$$\Rightarrow \lim_{t \rightarrow 0^+} \left(\frac{1}{t} \sin t = \frac{\sin t}{t} \right) = 1$$