

Try:

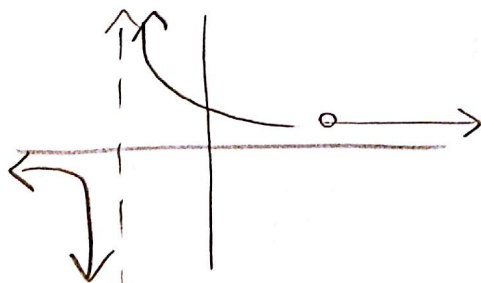
$$3(x-5)$$

13) Given  $f(x) = \frac{3x-15}{x^2-25}$ , find the vertical asymptote(s) and justify using limits.

$$(x+5)(x-5) \quad x = -5$$

$$\lim_{x \rightarrow -5^+} \frac{3}{x+5} = \infty$$

$$\lim_{x \rightarrow -5^-} \frac{3}{x+5} = -\infty$$



14) Given  $f(x) = \frac{3x-2}{\sqrt{2x^2+1}}$ , find the horizontal asymptote(s) and justify using limits.

$$\frac{3x-2}{\sqrt{2x^2+1}} \quad y = \pm \frac{3}{\sqrt{2}} = \pm \frac{3\sqrt{2}}{2} \text{ graph}$$

$$\lim_{x \rightarrow \infty} f(x) = \frac{3x}{\sqrt{2} \cdot x} = \frac{3}{\sqrt{2}} = \frac{3\sqrt{2}}{2}$$

$$\lim_{x \rightarrow -\infty} f(x) = \frac{3(-\infty)}{\sqrt{2(-\infty)^2}} = \frac{-3}{\sqrt{2}} = -\frac{3\sqrt{2}}{2}$$

Evaluate Other Limits Involving Infinity (no calculator!):

15)  $\lim_{x \rightarrow 1^-} \frac{2+x}{1-x} = \infty$   
small

16)  $\lim_{x \rightarrow 0^+} x^2 - \frac{1}{x} =$   
 $\lim_{x \rightarrow 0^+} x^2 = 0$  (small)  $- \lim_{x \rightarrow 0^+} \frac{1}{x} = \infty$  (big)  
 $0 - \infty = -\infty$

17)  $\lim_{x \rightarrow 1^+} \frac{x^2+1}{x-1} =$   
\frac{x^2+1}{x-1} big

18)  $\lim_{x \rightarrow 2^+} \frac{3}{x-2} = \infty$   
\frac{3}{x-2} big

$$\frac{\lim_{x \rightarrow 1^+} (x^2+1) \text{ small } \frac{2}{\infty}}{\lim_{x \rightarrow 1^+} \frac{1}{x-1} \text{ big } 0} = 0$$