

b. Evaluate one sided limit & find vertical asymptote, if applicable

$$\lim_{x \rightarrow -3^+} \frac{x^2 + 3x}{x^2 + 6x + 9}$$

we need to factor the fraction to avoid  $\frac{0}{0}$  indeterminate form.

$$\frac{x(x+3)}{(x+3)(x+3)} = \frac{x}{x+3} \text{ but } x \neq -3 \text{ to be defined}$$

One sided limit

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

the greatest value is  $-2.9999$

denominator will always be positive but small  $(-0.01 \dots)$

$$\frac{-}{+} = -\infty$$

vertical asymptote exist when  $\frac{x}{0}$ , therefore a vertical asymptote exists @  $x = -3$