

d) overall limit DNE so no.

4. Evaluate each of the limits below using the appropriate technique. NO CALCULATOR.

$$\text{a) } \lim_{x \rightarrow 1} \frac{x+7}{x+1} = 4$$

$$\text{b) } \lim_{x \rightarrow -3} \frac{3x+9}{x^2-9} = \lim_{x \rightarrow -3} \frac{3(x+3)}{(x+3)(x-3)} = \frac{3}{-6} = \left(-\frac{1}{2}\right)$$

$$\text{c) } \lim_{x \rightarrow 9} \frac{x-9}{\sqrt{x}-3} = \downarrow \downarrow \text{ (} x=9 \text{)}$$

$$\lim_{x \rightarrow 9} \frac{(\sqrt{x}+3)(\sqrt{x}-3)}{\sqrt{x}-3}$$

$$\sqrt{9}+3$$

$$3+3 = \boxed{6}$$

$$\text{d) } \lim_{x \rightarrow \infty} \frac{12x^3 + 10x^2 - 5x}{30x^3} = \frac{12}{30} = \left(\frac{2}{5}\right)$$