

Limits Exercise 3

$$8) \lim_{x \rightarrow \frac{1}{3}^-} \left(\frac{1}{1-3x} \right) = +\infty \quad \lim_{x \rightarrow \frac{1}{3}^+} \left(\frac{1}{1-3x} \right) = -\infty$$

$$\lim_{x \rightarrow \frac{1}{3}} \left(\frac{1}{1-3x} \right) = \text{DNE}$$

$$9) \lim_{x \rightarrow 0^-} \left| \frac{1}{x} \right| = +\infty \quad \lim_{x \rightarrow 0^+} \left| \frac{1}{x} \right| = +\infty$$

$$\lim_{x \rightarrow 0} \left| \frac{1}{x} \right| = +\infty$$

$$10) \lim_{x \rightarrow 0^-} \left(-\frac{2007}{x} \right) = +\infty \quad \lim_{x \rightarrow 0^+} \left(-\frac{2007}{x} \right) = -\infty$$

$$\lim_{x \rightarrow 0} \left(-\frac{2007}{x} \right) = \text{DNE}$$

$$23) \lim_{x \rightarrow -\infty} \left(\frac{x^4 - 3x^2 + 2}{3 - 2x^4} \right)$$

$$\lim_{x \rightarrow -\infty} \frac{x^4 \left(1 - \frac{3}{x^2} + \frac{2}{x^4} \right)}{x^4 \left(\frac{3}{x^4} - 2 \right)}$$

$$\lim_{x \rightarrow -\infty} \left(\frac{1 - \frac{3}{x^2} + \frac{2}{x^4}}{\frac{3}{x^4} - 2} \right)$$

$$= \frac{1 - 0 + 0}{0 - 2}$$

$$= -\frac{1}{2}$$

Any number divided by ∞ is zero

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$$\begin{aligned} 24) \lim_{x \rightarrow +\infty} \left(\frac{(x+1)^3 - x^3}{x^2} \right) \\ = \lim_{x \rightarrow +\infty} \left(\frac{x^3 + 3x^2 + 3x + 1 - x^3}{x^2} \right) \\ = \lim_{x \rightarrow +\infty} \left(3 + \frac{3}{x} + \frac{1}{x^2} \right) \\ = 3 + 0 + 0 \\ = 3 \end{aligned}$$