

$$c) \lim_{\theta \rightarrow 0} \frac{\cos 4\theta \cdot \tan 3\theta}{5\theta}$$

$$= \lim_{\theta \rightarrow 0} \cos 4\theta \cdot \lim_{\theta \rightarrow 0} \frac{\sin 3\theta}{\cos 3\theta} \cdot \lim_{\theta \rightarrow 0} \frac{1}{5\theta}$$

$$= 1 \cdot \frac{1}{5} \lim_{\theta \rightarrow 0} \frac{\sin 3\theta}{\theta} \cdot \lim_{\theta \rightarrow 0} \frac{1}{\cos 3\theta}$$

$$= 1 \cdot \frac{3}{5} \cdot 1$$

$$= \frac{3}{5}$$

$$d) \lim_{x \rightarrow -1} \frac{3x^2 + 7x + 4}{x^2 - 1}$$

$$= \lim_{x \rightarrow -1} \frac{(3x+4)(x+1)}{(x-1)(x+1)}$$

$$= \frac{-3+4}{-1-1} = -\frac{1}{2}$$

$$f) \lim_{x \rightarrow \infty} \frac{-3x^7 - 2x + 12}{-5x^3 + 4x^2 - x - 2} = \infty$$

$$g) \lim_{x \rightarrow 0} \frac{\tan x}{\sin x - 1} = \frac{0}{0-1} = 0$$

$$h) \lim_{x \rightarrow 1} \frac{x-1}{\frac{4}{4+x} - \frac{4}{5}}$$

$$= \lim_{x \rightarrow 1} \frac{x-1}{\frac{20-16-4x}{5(4+x)}}$$

$$= \lim_{x \rightarrow 1} \frac{x-1}{1} \cdot \frac{5(4+x)}{4-4x}$$

$$= \lim_{x \rightarrow 1} \frac{x-1}{1} \cdot \frac{5(4+x)}{-4(x-1)}$$

$$= -\frac{25}{4}$$

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



$$e) \lim_{x \rightarrow \infty} \frac{-6x^2 + x - 2x^3}{4x^2 - 5x + 5x^3 + 12} = \frac{1}{5}$$

$$b) \lim_{x \rightarrow 0} \frac{x^2 \cdot \cos 2x}{\cos 2x - 1}$$

$$\cos 2x = 1 - 2 \sin^2 x$$

$$= \lim_{x \rightarrow 0} \frac{x^2 \cdot (1 - 2 \sin^2 x)}{1 - 2 \sin^2 x - 1}$$

$$\lim_{x \rightarrow 0} \frac{x}{\sin x} = 1 \quad \text{since}$$

$$= \lim_{x \rightarrow 0} \frac{x^2 - x^2 \cdot 2 \sin^2 x}{-2 \sin^2 x}$$

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

$$= \lim_{x \rightarrow 0} \left[\frac{-x^2}{2 \sin^2 x} + x^2 \right]$$

$$= \lim_{x \rightarrow 0} \frac{-x \cdot x}{2 \cdot \sin x \cdot \sin x} + \lim_{x \rightarrow 0} x^2$$

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