

1)

$$a) = \lim_{x \rightarrow 6} \frac{(x-6)(x+6)}{(x-6)(x+5)} = \lim_{x \rightarrow 6} \frac{x+6}{x+5} = \frac{12}{11}$$

$$b) = \lim_{x \rightarrow 7} \frac{(x-7)(x+7)}{(x-7)(x-6)} = \lim_{x \rightarrow 7} \frac{x+7}{x-6} = 14$$

$$2) = \lim_{x \rightarrow 0} \frac{3x \cdot 4x}{1 - \cos 4x} \cdot \underbrace{\lim_{x \rightarrow 0} \frac{\sin 4x}{4x}}_{=1} = \lim_{x \rightarrow 0} \frac{12}{16} \cdot \left(\frac{1}{\frac{1 - \cos 4x}{4x}} \right) =$$

$$= \frac{12}{16} \cdot 2 = \frac{3}{2}$$

$$g) = \lim_{x \rightarrow 0} \frac{\sqrt{2} x^2 \cdot 4x}{(1 - \cos 2x)^{3/2}} \cdot \underbrace{\lim_{x \rightarrow 0} \frac{\sin 4x}{4x}}_{=1} = \lim_{x \rightarrow 0} \frac{4\sqrt{2} \cdot x^{3/2} \cdot x^{3/2}}{(1 - \cos(2x))^{3/2}} =$$

$$= \lim_{x \rightarrow 0} 2 \cdot x^{3/2} \cdot \underbrace{\lim_{x \rightarrow 0} \left(\frac{2x}{1 - \cos(2x)} \right)^{3/2}}_{=1/(1/2)^{3/2}} = \emptyset$$

$$e) = \lim_{x \rightarrow \infty} e^{\left(\frac{4x}{4x+3} - 1 \right) \frac{5x^2}{7x-1}} = \lim_{x \rightarrow \infty} e^{\frac{-3}{4x+3} \cdot \frac{5x^2}{7x-1}} = e^{-\frac{3}{4} \cdot \frac{5}{7}} = e^{-\frac{15}{28}}$$

$$n) = \ln 5$$

$$3) = \lim_{x \rightarrow \infty} \frac{x^{10} + x + 1}{x^2 - x + 1} = \lim_{x \rightarrow \infty} \frac{10x + 1}{2x - 1} = +\infty$$