RESOLUÇÃO

1.

$$\lim(u_n) = \lim\left(3 - \frac{2}{n}\right) = 3 - 0 = 3$$

$$\lim(v_n) = \lim\left(\frac{4n-1}{n+1}\right) = \lim\left(4 + \frac{3}{n-1}\right) = 4 + 0 = 4$$

2.1. $\lim(u_n) = \lim(-3n) = -\infty$

2.2. $\lim(v_n) = \lim\left(5 - \frac{1}{n}\right) = 5 + 0 = 5$

2.3. $\lim(f(u_n)) = \lim(f(-3n)) = \lim(f(-\infty)) = 2 + \frac{1}{-\infty+3} = 2 + 0 = 2$

2.4. $\lim(f(v_n)) = \lim\left(f\left(5 - \frac{1}{n}\right)\right) = \lim(f(5)) = 2 + \frac{1}{5+3} = \frac{17}{8}$

3.1. Como $(u_n) = 3 + \frac{1}{n} > 3$ então vem que

$$f(u_n) = f\left(3 + \frac{1}{n}\right) = 3 \times \left(3 + \frac{1}{n}\right) - 1 = 9 - \frac{3}{n} - 1 = 8 - \frac{3}{n}$$

3.2. Como $(v_n) = \frac{2n+1}{n} = 2 + \frac{1}{n} > 2$ então vem que

$$f(v_n) = f\left(2 + \frac{1}{n}\right) = 3 \times \left(2 + \frac{1}{n}\right) - 1 = 6 - \frac{3}{n} - 1 = 5 - \frac{3}{n}$$

3.3. $\lim(f(u_n)) = \lim\left(8 - \frac{3}{n}\right) = 8$

3.4. $\lim(f(v_n)) = \lim\left(5 - \frac{3}{n}\right) = 5$

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4. $f(x) = \frac{x}{x+3} = 1 - \frac{3}{x+3}$; $g(x) = 3x + \frac{1}{x}$

4.1. $\lim\limits_{x\to+\infty}(f(x)) = \lim\limits_{x\to+\infty}\left(1 - \frac{3}{x+3}\right) = 1 - 0 = 0$

4.2. $\lim\limits_{x\to1}(f(x)) = \lim\limits_{x\to1}\left(1 - \frac{3}{x+3}\right) = 1 - \frac{3}{1+3} = 1 - \frac{3}{4} = \frac{1}{4}$

4.3. $\lim\limits_{x\to-3^+}(f(x)) = \lim\limits_{x\to-3^+}\left(1 - \frac{3}{x+3}\right) = 1 - \frac{3}{-3^++3} = 1 - (+\infty) = -\infty$

4.4. $\lim\limits_{x\to2}(g(x)) = \lim\limits_{x\to2}\left(3x + \frac{1}{x}\right) = 3 \times 2 + \frac{1}{2} = \frac{13}{2}$

4.5. $\lim\limits_{x\to+\infty}(g(x)) = \lim\limits_{x\to+\infty}\left(3x + \frac{1}{x}\right) = 3 \times (+\infty) + 0 = +\infty$

4.6. $\lim\limits_{x\to0^+}(g(x)) = \lim\limits_{x\to0^+}\left(3x + \frac{1}{x}\right) = 3 \times 0^+ + \frac{1}{0^+} = 0 + (+\infty) = +\infty$