

$$1.1 \quad \lim_{n \rightarrow \infty} \frac{1+3+\dots+(2n-1)}{3n^2} = \frac{\frac{1+(2n-1)}{2} \cdot n}{3n^2} = \frac{n+2n-1}{6n} = \frac{3n-1}{6n} = \frac{2n}{6n} = \frac{1}{3}$$

$$1.2 \quad \lim_{n \rightarrow \infty} (\sqrt{n^2+2}-n) = \frac{(\sqrt{n^2+2}-n)(\sqrt{n^2+2}+n)}{\sqrt{n^2+2}+n} = \frac{n^2+2-n^2}{\sqrt{n^2+2}+n} = \frac{2}{\sqrt{n^2+2}+n} = \frac{\frac{2}{n}}{\frac{\sqrt{n^2+2}}{n}+1} = \frac{\frac{2}{n}}{\sqrt{1+\frac{2}{n^2}}+1} = \frac{\frac{2}{\infty}}{\sqrt{1+\frac{1}{\infty}}+1} = \frac{0}{1+1} = 0$$

$$1.9 \quad \lim_{n \rightarrow \infty} \frac{n^2}{1+5+\dots+(4n-3)} = \frac{n^2}{\frac{1+(4n-3)}{2} \cdot n} = \frac{2n^2}{(1+(4n-3))n} = \frac{2n}{1+4n-3} = \frac{2n}{4n-2} = \frac{n}{2n-1} = \frac{\frac{n}{n}}{\frac{2n}{n}-\frac{1}{n}} = \frac{1}{2-\frac{1}{n}} = \frac{1}{2-\frac{1}{\infty}} = \frac{1}{2}$$

$$2.a \quad \lim_{x \rightarrow \infty} \frac{x^{100} - 2x + 1}{x^{50} - 2x + 1} = \frac{1 - \frac{2}{x^{99}} + \frac{1}{x^{100}}}{\frac{1}{x^{50}} - \frac{2}{x^{99}} + \frac{1}{x^{100}}} = \frac{1 - \frac{2}{\infty} + \frac{1}{\infty}}{\frac{1}{\infty} - \frac{2}{\infty} + \frac{1}{\infty}} = \frac{1}{0} = \infty$$

$$3.a \quad f(x) = \frac{2x^3 - 6x^2}{x - 3}$$

$$\lim_{x \rightarrow 3-0} \frac{2x^3 - 6x^2}{x - 3} = \frac{2x^2(x - 3)}{x - 3} = 2x^2 = 2 \cdot 3^2 = 18$$

$$\lim_{x \rightarrow 3+0} \frac{2x^3 - 6x^2}{x - 3} = 2x^2 = 2 \cdot 3^2 = 18$$

3.б По поводу точки  $x = -2$  я не писал в решении, что оба предела равны 0, что это точка устранимого разрыва.