1.a $\lim\limits_{n\to\infty} \dfrac{1+3+\dots+(2n-1)}{3n^2} = \dfrac{\frac{1+(2n-1)}{2}\cdot \cancel{n}}{3n^{\cancel{2}}} = \dfrac{\cancel{1}+2n-\cancel{1}}{6n} =$

$= \dfrac{2n}{6n} = \dfrac{1}{3}$

1.2 $\lim\limits_{n\to\infty} \left(\sqrt{n^2+2}-n\right) = \dfrac{(\sqrt{n^2+2}-n)(\sqrt{n^2+2}+n)}{\sqrt{n^2+2}+n} = \dfrac{\cancel{n^2}+2-\cancel{n^2}}{\sqrt{n^2+2}+n} =$

$= \dfrac{2}{\sqrt{n^2+2}+n} = \dfrac{\frac{2}{n}}{\frac{\sqrt{n^2+2}+n}{n}} = \dfrac{\frac{2}{n}}{\sqrt{\frac{n^2+2}{n^2}}+1} = \dfrac{\frac{2}{n}}{\sqrt{1+\frac{2}{n^2}}+1} =$

$= \dfrac{\frac{2}{\infty}}{\sqrt{1+\frac{1}{\infty}}+1} = \dfrac{0}{1+1} = 0$

1.9 $\lim\limits_{n\to\infty} \dfrac{n^2}{1+5+\dots(4n-3)} = \dfrac{n^2}{\frac{1+(4n-3)}{2}\cdot n} =$

$= \dfrac{2n^{\cancel{2}}}{(1+(4n-3))\cancel{n}} = \dfrac{2n}{1+4n-3} = \dfrac{2n}{4n-2} = \dfrac{n}{2n-1} =$

$= \dfrac{\frac{n}{n}}{\frac{2n}{n}-\frac{1}{n}} = \dfrac{1}{2-\frac{1}{n}} = \dfrac{1}{2-\frac{1}{\infty}} = \dfrac{1}{2}$

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

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

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

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

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