Домашнее задание к уроку 3.

(1) а) $\lim\limits_{n\to\infty} \dfrac{10n}{n^2+1} = \left[\dfrac{\infty}{\infty}\right]$ делим на n^2

$\lim\limits_{n\to\infty} \dfrac{\dfrac{10}{n}\nearrow^0}{1+\dfrac{1}{n^2}\searrow_0} = 0$

б) $\lim\limits_{n\to\infty} \dfrac{n^2-n}{n-\sqrt{n}} = \left[\dfrac{\infty}{\infty}\right]$ делим на $n^2 = \lim\limits_{n\to\infty} \dfrac{1-\dfrac{1}{n}\nearrow^0}{\dfrac{1}{n}\searrow_0 - \dfrac{1}{\sqrt{n^3}}\searrow_0} = \dfrac{1}{0} = \infty$

в) $\lim\limits_{n\to\infty} \dfrac{5\cdot 3^n}{3^n-2} = \left[\dfrac{\infty}{\infty}\right]$ делим на 3^n

$\lim\limits_{n\to\infty} \dfrac{5}{1-\dfrac{2}{3^n}\searrow_0} = 5$

(2) $\lim\limits_{n\to\infty} \left(\sqrt{n^2+n}-n\right) = [\infty-\infty]$ домножим на $\left(\sqrt{n^2+n}+n\right)$

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

$\lim\limits_{n\to\infty} \dfrac{1}{\dfrac{\sqrt{n^2+n}}{n}+1} = \dfrac{1}{\sqrt{\dfrac{n^2+n}{n^2}}+1} = \dfrac{1}{\sqrt{1+\dfrac{1}{n}\searrow_0}+1} = \dfrac{1}{2}$

(3) $\lim\limits_{n\to\infty} \dfrac{\sqrt{n}\cdot\cos n}{n+1} = \left[\dfrac{\infty}{\infty}\right]$ делим на n

$\lim\limits_{n\to\infty} \dfrac{\dfrac{1}{\sqrt{n}}\cdot\cos n}{1+\dfrac{1}{n}} = \dfrac{\dfrac{\cos n}{\sqrt{n}}\nearrow^0}{1+\dfrac{1}{n}} = 0$