1)

$$\lim_{n\to\infty} \frac{n\sqrt[3]{7n} - \sqrt[4]{81n^8-1}}{(n+4\sqrt{n})(\sqrt{n^2-5})} =$$ ~~разделим всё на~~ $\cancel{n^2}$

$$= \lim_{n\to\infty} \frac{\sqrt[3]{7n^4} - \sqrt[4]{81n^8-1}}{(n+4\sqrt{n})(\sqrt{n^2-6})}$$ разделим всё на n^2 $\Rightarrow$

$$\Rightarrow \lim_{n\to\infty} \frac{\dfrac{\sqrt{7}\,n^{\frac{4}{3}}}{n^2} - \dfrac{\sqrt[4]{81n^8-1}}{n^2}}{\dfrac{n+4\sqrt{n}}{n^2} \cdot \dfrac{\sqrt{n^2-5}}{n^2}} =$$

$$= \lim_{n\to\infty} \frac{\cancel{\dfrac{\sqrt[3]{7}}{n^{\frac{2}{3}}}}^{\to 0} - \sqrt[4]{81 - \cancel{\dfrac{1}{n^8}}^{\to 0}}}{\left(1+\cancel{\dfrac{4}{\sqrt{n}}}^{0}\right)\left(1-\cancel{\dfrac{5}{n^2}}^{0}\right)} =$$

$$= -3$$

2) $\lim\limits_{n\to\infty} \dfrac{3^n-2^n}{3^{n-1}+2^n}$ разделим всё на 3^{n-1}

$$\lim_{n\to\infty} \frac{\frac{3^n}{3^{n-1}} - \frac{2^n}{3^{n-1}}}{\frac{3^{n-1}}{3^{n-1}} + \frac{2^n}{3^{n-1}}} = \lim_{n\to\infty} \frac{3 - \frac{2^n}{3^{n-1}}\to 0}{1 + \cancel{\frac{2^n}{3^{n-1}}}\to 0} =$$

$$= 3$$

3) $$\lim_{x\to\frac{5}{2}} \frac{2x^2-9x+10}{2x-5} = \lim_{x\to\frac{5}{2}} \frac{2\left(x-\frac{5}{2}\right)(x-2)}{(2x-5)} =$$

$2x^2-9x+10=0$

$D = 81-80=1$

$\sqrt{D}=1$

$x_1 = \frac{9+1}{4} = \frac{10}{4} = \frac{5}{2}$

$x_2 = 2$

$$= \lim_{x\to\frac{5}{2}} x-2 =$$

$$= \frac{5}{2} - 2 = 2{,}5 - 2 = 0{,}5$$

4) $\lim\limits_{x\to -2} \dfrac{\sqrt[3]{x-6}+2}{x+2} = \lim\limits_{x\to -2} \dfrac{(x-6)^{\frac{1}{3}}+2}{x+2} =$

$= \lim\limits_{x\to -2} \dfrac{\frac{1}{3}(x-6)^{-\frac{2}{3}}}{1} = \lim\limits_{x\to -2} \dfrac{1}{3} \cdot \dfrac{1}{\sqrt[3]{(x-6)^2}} =$

$= \dfrac{1}{3} \cdot \dfrac{1}{\sqrt[3]{64}} = \dfrac{1}{12}$