Найти пределы:

4а) $\lim\limits_{x\to 0} \frac{3x^3-2x^2}{4x^2} = \lim\limits_{x\to 0} \frac{x^2(x-2)}{4x^2} = \lim \frac{x-2}{4} = -\frac{1}{2}$

4б) $\lim\limits_{x\to 0} \frac{\sqrt{1+x}-1}{\sqrt[3]{1+x}-1} = \lim \frac{\sqrt{1+x}-1}{\sqrt[3]{1+x}-1} \cdot \frac{\sqrt{1+x}+1}{\sqrt{1+x}+1} \cdot \frac{(\sqrt{1+x}+\sqrt[3]{1+x}+1)}{(\sqrt{1+x}+\sqrt[3]{1+x}+1)} =$

$= \lim \frac{(1+x-1)}{1+x-1} \cdot \frac{\sqrt{1+x}+\sqrt[3]{1+x}+1}{\sqrt{1+x}+1} = \frac{3}{2}$

1а) $\lim\limits_{x\to 0} \frac{\sin(2x)}{4x} = \lim \frac{\sin(2x)}{2x} \cdot \frac{1}{2} = \frac{1}{2}$

1б) $\lim\limits_{x\to 0} \frac{x}{\sin(x)} = 1$

1с) $\lim\limits_{x\to 0} \frac{x}{\arcsin(x)} = 1$

1d) $\lim\limits_{x\to 5} \left(\frac{4x+3}{4x-3}\right)^{6x} = \lim \left(\frac{4x-3}{4x-3} + \frac{6}{4x-3}\right)^{6x} = \lim \left(1+\frac{6}{4x-3}\right)^{6x}$

$= \lim \left(1+\frac{6}{4x-3}\right)^{\frac{4x-3}{6} \cdot \frac{6}{4x-3} \cdot 6x} = e^{\lim \frac{6}{4x-3} \cdot 6x} = e^{\frac{36}{4}} = e^9$

1е) $\lim\limits_{x\to 5} \frac{\sin x + \ln x}{x} = \lim \frac{\sin x}{x} + \lim \frac{\ln x}{x} =$ $\boxed{x = y+1}$

$= 1 + \lim\limits_{y\to 0} \frac{\ln(y+1)}{y+1} = 1 + \lim \frac{\ln(y+1)}{y} \cdot \frac{y}{(y+1)} = 1+1 = 2$

4с) $\lim\limits_{x\to 5} \left(\frac{x+3}{x}\right)^{4x+1} = \lim\limits_{x\to 5} \left(\frac{x+3}{x}\right) \cdot \lim\limits_{x\to 5} \left(\frac{x+3}{x}\right)^{4} = 1 \cdot \lim\limits_{x\to\infty} \left(1+\frac{3}{x}\right)^{4} =$

$= 1 \cdot e^{12} = e^{12}$