29.04.20

№ 6.4.22

$$\lim_{x\to -\frac{1}{2}} \frac{2x^2-x-1}{-6x^2+5x+4} = \left[\frac{0}{0}\right] = \lim_{x\to -\frac{1}{2}} \frac{2(x-1)(x+\frac{1}{2})}{-6(x-4/3)(x+\frac{1}{2})} = \lim_{x\to -\frac{1}{2}} \frac{x-1}{-3(x-\frac{4}{3})} =$$

$$= \frac{-\frac{1}{2}-1}{-3\cdot(-\frac{1}{2}-\frac{4}{3})} = -\frac{3}{2} : \left(\frac{3}{2}+4\right) = -\frac{3\cdot 2}{2\cdot 11} = -\frac{3}{11}$$

№ 6.4.23

$$\lim_{x\to 1} \frac{x^3-x^2+3x-3}{2x^3-2x^2+x-1} = \left[\frac{0}{0}\right] = \lim_{x\to 1} \frac{(x-1)(x^2+3)}{(x-1)(2x^2+1)} = \lim_{x\to 1} \frac{(x^2+3)}{(2x^2+1)} = \frac{1+3}{2\cdot 1+1} = \frac{4}{3}$$

№ 6.4.24

$$\lim_{x\to -6} \frac{x^2+7x+6}{x^3+6x^2+3x+18} = \left[\frac{0}{0}\right] = \lim_{x\to -6} \frac{(x+1)(x+6)}{(x+6)(x^2+3)} = \frac{-6+1}{(-6)^2+3} = -\frac{5}{39}$$

№ 6.4.25

$$\lim_{x\to 0} \frac{\sqrt{x+25}-5}{x^2+2x} = \left[\frac{0}{0}\right] = \lim_{x\to 0} \frac{(\sqrt{x+25}-5)(\sqrt{x+25}+5)}{(x^2+2x)(\sqrt{x+25}+5)} =$$

$$= \lim_{x\to 0} \frac{(x+25)-25}{x\cdot(x+2)(\sqrt{x+25}+5)} = \lim_{x\to 0} \frac{x}{x(x+2)(\sqrt{x+25}+5)} = \lim_{x\to 0} \frac{1}{(x+2)(\sqrt{x+25}+5)} =$$

$$= \frac{1}{(0+2)(\sqrt{0+25}+5)} = \frac{1}{2\cdot 10} = \frac{1}{20} = 0{,}05$$

№ 6.4.26

$$\lim_{x\to 2} \frac{x^2-2x}{\sqrt{x^2+6x}-4} = \left[\frac{0}{0}\right] = \lim_{x\to 2} \frac{(x^2-2x)(\sqrt{x^2+6x}+4)}{(\sqrt{x^2+6x}-4)(\sqrt{x^2+6x}+4)} =$$

$$= \lim_{x\to 2} \frac{x(x-2)(\sqrt{x^2+6x}+4)}{(x^2+6x)-16} = \frac{x(x-2)(\sqrt{x^2+6x}+4)}{(x-2)(x+8)} = \lim_{x\to 2} \frac{x(\sqrt{x^2+6x}+4)}{x+8} =$$

$$= \frac{2\cdot(\sqrt{4+12}+4)}{2+8} = \frac{2\cdot 8}{10} = \frac{16}{10} = 1{,}6$$

№ 6.4.27

$$\lim_{x\to 3} \frac{\sqrt{2x+3}-3}{\sqrt{x-2}-1} = \left[\frac{0}{0}\right] = \lim_{x\to 3} \frac{(\sqrt{2x+3}-3)(\sqrt{2x+3}+3)(\sqrt{x-2}+1)}{(\sqrt{x-2}-1)(\sqrt{x-2}+1)(\sqrt{2x+3}+3)} =$$

$$= \lim_{x\to 3} \frac{((2x+3)-9)(\sqrt{x-2}+1)}{((x-2)-1)(\sqrt{2x+3}+3)} = \lim_{x\to 3} \frac{(2x-6)(\sqrt{x-2}+1)}{(x-3)(\sqrt{2x+3}+3)} =$$

$$\lim_{x\to 3} \frac{2(x-3)(\sqrt{x-2}+1)}{(x-3)(\sqrt{2x+3}+3} = \frac{2(\sqrt{3-2}+1)}{\sqrt{2\cdot 3+3}+3} = \frac{2\cdot 2}{3+3} = \frac{4}{6} = \frac{2}{3}$$

№ 6.4.28

$$\lim_{x\to 1}\frac{\sqrt{2-x}-1}{\sqrt{5-x}-2}$$

аналогично 6.4.27

№ 6.4.29

$$\lim_{x\to 0}\frac{\sqrt[3]{8-x}-2}{x}=\left[\frac{0}{0}\right]=\lim_{x\to 0}\frac{(\sqrt[3]{8-x}-2)((\sqrt[3]{8-x})^2+\sqrt[3]{8-x}\cdot 2+2^2)}{x\cdot((\sqrt[3]{8-x})^2+\sqrt[3]{8-x}\cdot 2+2^2)}=$$

$$\lim_{x\to 0}\frac{(\sqrt[3]{8-x})^x-2^3}{x\cdot((\sqrt[3]{8-x})^2+2\sqrt[3]{8-x}+4)}=\lim_{x\to 0}\frac{8-x-8}{x\cdot((\sqrt[3]{8-x})^2+2\sqrt[3]{8-x}+4)}=$$

$$=\lim_{x\to 0}\frac{-1}{\sqrt[3]{(8-x)^2}+2\sqrt[3]{8-x}+4}=\frac{-1}{\sqrt[3]{(8-0)^2}+2\sqrt[3]{8-0}+4}=\frac{-1}{\sqrt[3]{64}+2\cdot 2+4}=$$

$$=\frac{-1}{4+4+4}=-\frac{1}{12}$$

№ 6.4.30

$$\lim_{x\to 4}\frac{x^2-16}{\sqrt[3]{5-x}-\sqrt[3]{x-3}}=\left[\frac{0}{0}\right]=\lim\frac{(x^2-16)((\sqrt[3]{5-x})^2+\sqrt[3]{5-x}\cdot\sqrt[3]{x-3}+(\sqrt[3]{x-3})^2)}{(\sqrt[3]{5-x}-\sqrt[3]{x-3})((\sqrt[3]{5-x})^2+\sqrt[3]{5-x}\sqrt[3]{x-3}+(\sqrt[3]{x-3})^2)}$$

$$=\lim_{x\to 4}\frac{(x+4)(x-4)\cdot(\sqrt[3]{(5-x)^2}+\sqrt[3]{(5-x)(x-3)}+\sqrt[3]{(x-3)^2})}{(\sqrt[3]{5-x})^3-(\sqrt[3]{x-3})^3}=$$

$$=\lim_{x\to 4}\frac{(x+4)(x-4)(\sqrt[3]{(5-x)^2}+\sqrt[3]{(5-x)(x-3)}+\sqrt[3]{(x-3)^2})}{5-x-x+3}=$$

$$=\lim_{x\to 4}\frac{(x+4)(x-4)(\sqrt[3]{(5-x)^2}+\sqrt[3]{(5-x)(x-3)}+\sqrt[3]{(x-3)^2})}{8-2x}=$$

$$=\lim_{x\to 4}\frac{(x+4)(x-4)(\sqrt[3]{(5-x)^2}+\sqrt[3]{(5-x)(x-3)}+\sqrt[3]{(x-3)^2})}{-2(x-4)}=$$

$$=\lim_{x\to 4}\frac{(x+4)(\sqrt[3]{(5-x)^2}+\sqrt[3]{(5-x)(x-3)}+\sqrt[3]{(x-3)^2})}{-2}=$$

$$=\frac{(4+4)(\sqrt[3]{(5-4)^2}+\sqrt[3]{(5-4)(4-3)}+\sqrt[3]{(4-3)^2})}{-2}=\frac{8\cdot(1+1+1)}{-2}=\frac{8\cdot 3}{-2}=-12$$