Математический анализ (29.04.20)

№6.4.22

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

$$= \frac{-\frac{3}{2}}{\frac{11}{2}} = \frac{(-3)\cdot 6}{2\cdot(-3)\cdot(-11)} = -\frac{3}{11}$$

№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.

$$\lim_{x\to -6} \frac{x^2+7x+6}{x^3+6x^2+3x+18} = \left[\frac{0}{0}\right] = \lim_{x\to -6} \frac{(x+1)(x+6)}{(x+6)(x^2+3)} = \lim_{x\to -6} \frac{x+1}{x^2+3} = \frac{-6+1}{36+3} = -\frac{5}{39}$$

№6.4.25

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

$$= \lim_{x\to 0} \frac{1}{(x+2)(\sqrt{x+25}+5)} = \frac{1}{(0+2)(\sqrt{0+25}+5)} = \frac{1}{20}$$

№6.4.26.

$$\lim_{x\to 2} \frac{x^2-2x}{\sqrt{x^2+6x}-4} = \left[\frac{0}{0}\right] = \lim_{x\to 2} \frac{(x^2-2x)(\sqrt{x^2+6x}+4)}{x^2+6x-16} = \lim_{x\to 2} \frac{(x^2-2x)(\sqrt{x^2+6x}+4)}{(x-2)(x+8)}$$

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

$$= \frac{16}{10} = \frac{8}{5}$$

№ 6.4.27

$$\lim_{x\to 3}\frac{\sqrt{2x+3}-3}{\sqrt{x-2}-1}=\left[\frac{0}{0}\right]=\lim_{x\to 3}\frac{((2x+3)-9)(\sqrt{x-2}+1)}{((x-2)-1)(\sqrt{2x+3}+3)}=\lim_{x\to 3}\frac{(2x-6)(\sqrt{x-2}+1)}{(x-3)(\sqrt{2x+3}+3)}=$$

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

№ 6.4.28

$$\lim_{x\to 1}\frac{\sqrt{2-x}-1}{\sqrt{5-x}-2}=\left[\frac{0}{0}\right]=\lim_{x\to 1}\frac{(1-x)(\sqrt{5-x}+2)}{(1-x)(\sqrt{2-x}+1)}=\lim_{x\to 1}\frac{\sqrt{5-x}+2}{\sqrt{2-x}+1}=$$

$$=\frac{\sqrt{5-1}+2}{\sqrt{2-1}+1}=\frac{2+2}{1+1}=\frac{4}{2}=2$$

№ 6.4.29

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

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

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

№ 6.4.30

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

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

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