Практика

15.04.20

№ 6.4.14

1) $$\lim_{x\to -1} \frac{3x^2-1}{4x^2+5x+2} = \frac{\lim(3x^2-1)}{\lim(4x^2+5x+2)} =$$

$$= \frac{\lim\limits_{x\to -1}(3x^2) - \lim\limits_{x\to -1} 1}{\lim\limits_{x\to -1}(4x^2) + \lim\limits_{x\to -1}(5x) + \lim\limits_{x\to -1}(2)} =$$

$$= \frac{\lim\limits_{x\to -1}(3x^2) - 1}{4\lim\limits_{x\to -1}(x^2) + 5\lim\limits_{x\to -1}(x) + 2} = \frac{3\cdot 1 - 1}{4\cdot 1 + 5\cdot(-1) + 2} =$$

$= 2$

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

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

к нулю стремится

3) $\lim_{x\to 1} \frac{\sqrt{x+8}-3}{x-1} = \left[\frac{0}{0}\right] / \cdot \sqrt{x+8}+3$

$\lim_{x\to 1} \left(\frac{(\sqrt{x+8}-3)\cdot(\sqrt{x+8}+3)}{(x-1)(\sqrt{x+8}+3)}\right) =$

$= \lim_{x\to 1} \frac{(\sqrt{x+8}^2-3^2)}{(x-1)(\sqrt{x+8}+3)} = \lim_{x\to 1} \frac{(x+8)-9}{(x-1)(\sqrt{x+8}+3)} =$

$\lim_{x\to 1} \frac{x-1}{(x-1)(\sqrt{x+8}+3)} = \lim_{x\to 1} \frac{1}{\sqrt{x+8}+3} = \frac{1}{\sqrt{1+8}+3} =$

$= \frac{1}{6}$

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

$= \lim_{x\to\infty} \frac{x^2(1/x^2+1/x-1)}{x^2(2+3/x)} =$

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

№ 6 4 15

$\lim_{x\to -2} (5x^2+2x-1) = \lim_{x\to -2} (5x^2) + \lim_{x\to -2} (2x) - 1 =$

$= 5\cdot(-2)^2 + 2\cdot(-2) - 1 = 20 - 4 - 1 =$

$= 15$

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$\lim_{x\to 1} \frac{5x+1}{x^3-2x+3} = \frac{\lim_{x\to 1} 5x + 1}{\lim_{x\to 1} x^3 - \lim_{x\to 1} 2x + 3} =$

$= \frac{5\cdot\lim_{x\to 1} x + 1}{\lim_{x\to 1} x^3 - 2\lim_{x\to 1} x + 3} = \frac{5\cdot 1+1}{1-2+1+3} = \frac{6}{2} = 3$

№ 6.4.17

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

№ 6.4.18

$\lim_{x\to 3} \frac{2^x-8}{2^x+8} = \lim_{x\to 3} (2^x-8) / \lim_{x\to 3} (2^x+8) = \frac{\lim_{x\to 3} 2^x - 8}{\lim_{x\to 3} 2^x + 8} = \frac{8-8}{8+8}$

$= \frac{0}{16} = 0$

№ 6.4.19

$$\lim_{x\to 5} \frac{x^2-6x+5}{x^2-25} = \left[\frac{0}{0}\right] = \lim_{x\to 5} \frac{(x-5)(x-1)}{(x-5)(x+5)} =$$

$$= \lim_{x\to 5} \frac{x-1}{x+5} = \frac{\lim_{x\to 5}(x) - 1}{\lim_{x\to 5} x + 5} = \frac{5-1}{5+5} = \frac{4}{10} =$$

$$= \frac{2}{5}\ (0{,}4)$$

№ 6.4.20

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

$$\lim_{x\to 0} \frac{x(4x^2-3x+1)}{2x} = \frac{4\lim_{x\to 0} x^2 - 3\lim_{x\to 0} x + 1}{2} =$$

$$= \frac{1}{2}$$

№ 6.4.21

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

$$= \begin{array}{r|l} x^3+0\cdot x^2+x+2 & x+1 \\ \hline -\ x^3+x^2 & x^2-x+2 \\ -x^2+x & \\ -\ -x^2-x & \\ 2x+2 & \\ -\ 2x+2 & \\ 0 & \end{array}$$

$$x^3+x+2 = (x+1)(x^2-x+2)$$

$$\lim_{x\to -1} \frac{x^2-x+2}{x^2-x+1} = \frac{1+1+2}{1+1+1} = \frac{4}{3}$$