

Контрольная по теме Введение в анализ

Вариант 1

$$1. \lim_{x \rightarrow 2} \frac{7x^2 - 6x - 16}{x - 2} =$$

$$2. \lim_{x \rightarrow \infty} \frac{7x^2 - 6x - 16}{x - 2} =$$

$$3. \lim_{n \rightarrow \infty} \frac{n! + (n+1)!}{n! - (n+1)!} =$$

$$4. \lim_{x \rightarrow 0 \pm 0} \frac{3^{1/x}}{4^{1/x} + 1} =$$

$$5. \lim_{x \rightarrow 2} \frac{\sqrt{x+7} - 3}{x - 2} =$$

$$6. \lim_{x \rightarrow -5} \left(\frac{1}{x+5} - \frac{4}{x^2 - 25} \right) =$$

$$7. \lim_{x \rightarrow 1} \frac{x^{10} - 1}{x^2 - 1} =$$

$$8. \lim_{x \rightarrow 0} \frac{1 - \cos 6x^2}{\sin^4 x} =$$

$$9. \lim_{x \rightarrow 0} (1 + \sin 2x)^{1/x^2} =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{3x-1}{4x+5} \right)^{2x} =$$

$$11. f(x) = 49^{\frac{1}{2-x}}$$

$$12. f(x) = \begin{cases} -x, & x \leq 0 \\ \sin x, & 0 < x \leq \pi \\ x-2, & x > \pi \end{cases}$$

Вариант 2

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

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

$$3. \lim_{n \rightarrow \infty} \frac{(n+1)! - 2}{n! + 2} =$$

$$4. \lim_{x \rightarrow 1} \left(\frac{1}{x-1} - \frac{2}{x^2 - 3x + 2} \right) =$$

$$5. \lim_{x \rightarrow 0 \pm 0} \frac{5^{1/x} + 2}{3^{1/x} - 1} =$$

$$6. \lim_{x \rightarrow 0} \frac{\sqrt{3x^2 + 1} - 1}{x^2 + x} =$$

$$7. \lim_{x \rightarrow \infty} \frac{(x-1)^5}{(x^2+1)(2x+1)^3} =$$

$$8. \lim_{x \rightarrow \infty} (3x^4 + 1) \operatorname{tg} \frac{3}{x^4 + 1} =$$

$$9. \lim_{x \rightarrow \infty} \left(1 - \frac{5}{2x+3} \right)^x =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{3x-1}{2x+3} \right)^{2x} =$$

$$11. f(x) = 4^{\frac{1}{x}}$$

$$12. f(x) = \begin{cases} -(x+1), & x \leq -1 \\ -(x+1)^2, & -1 < x \leq 0 \\ -x, & x > 0 \end{cases}$$

Вариант 3

$$1. \lim_{x \rightarrow 3} \frac{2x^2 - 5x - 3}{x - 3} =$$

$$2. \lim_{x \rightarrow \infty} \frac{2x^2 - 5x - 3}{x - 3} =$$

$$3. \lim_{n \rightarrow \infty} \frac{5^n + 7^n}{5^n - 2 \cdot 8^n} =$$

$$4. \lim_{x \rightarrow 0} \frac{x}{\sqrt{1+3x} - 1} =$$

$$5. \lim_{x \rightarrow -\infty} \frac{5^x + 4}{3^x + 2} =$$

$$6. \lim_{x \rightarrow -5} \left(\frac{x - \sqrt{x^2 + 3}}{x + 2} \right) =$$

$$7. \lim_{x \rightarrow -2} \frac{x^7 + 128}{x + 2} =$$

$$8. \lim_{x \rightarrow 2} \frac{\arcsin(x-2)}{\sin(x-2)} =$$

$$9. \lim_{x \rightarrow \infty} \left(\frac{2x+1}{2x+4} \right)^{2x} =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{2x+1}{4x-3} \right)^{2x+3} =$$

$$11. f(x) = \frac{x}{x^2 - 9}$$

$$12. f(x) = \begin{cases} -2x, & x \leq 0 \\ x^2 + 1, & 0 < x \leq 1 \\ 2, & x > 1 \end{cases}$$

Вариант 4

$$1. \lim_{x \rightarrow -1/6} \frac{6x^2 - 5x - 1}{6x + 1} =$$

$$2. \lim_{x \rightarrow 1} \frac{6x^2 - 5x - 1}{6x + 1} =$$

$$3. \lim_{n \rightarrow \infty} \frac{n^2 - \sqrt{4n^6 + 1}}{n^3 + \sqrt{n^6 - 2}} =$$

$$4. \lim_{x \rightarrow 0} \frac{1 - \sqrt{x+1}}{x} =$$

$$5. \lim_{x \rightarrow -\infty} \frac{4^x}{5^x + 1} =$$

$$6. \lim_{x \rightarrow \infty} (x-1) \cos 2x =$$

$$7. \lim_{x \rightarrow 2} \frac{x^5 - 32}{x - 2} =$$

$$8. \lim_{x \rightarrow \infty} (3x+1) \sin \frac{2}{x} =$$

$$9. \lim_{x \rightarrow 0} (1 + 5 \sin x)^{1/x^4} =$$

$$10. \lim_{x \rightarrow 1} \left(\frac{2x+1}{4x-1} \right)^{\frac{3}{x-1}} =$$

$$11. f(x) = 8^{\frac{1}{4-x}}$$

$$12. f(x) = \begin{cases} x+1, & x \leq 1 \\ 2x^2, & 1 < x \leq 2 \\ -3x, & x > 2 \end{cases}$$

Вариант 5

$$1. \lim_{x \rightarrow -1} \frac{2x^2 - 3x - 2}{x - 2} =$$

$$2. \lim_{x \rightarrow 2} \frac{2x^2 - 3x - 2}{x - 2} =$$

$$3. \lim_{x \rightarrow 5} \frac{3 - \sqrt{x+4}}{x - 5} =$$

$$4. \lim_{n \rightarrow \infty} \frac{n! + 1}{(n+1)! - n!} =$$

$$5. \lim_{x \rightarrow -\infty} \frac{3^x + 4}{4^x + 2} =$$

$$6. \lim_{x \rightarrow \infty} \frac{(2x-1)^6}{(x^3-1)(2x+1)(x^2+2x)} =$$

$$7. \lim_{x \rightarrow 2} \frac{x^6 - 64}{x - 2} =$$

$$8. \lim_{x \rightarrow 1} \frac{\sin(x^2 - 1)}{2x^2 - x - 1} =$$

$$9. \lim_{x \rightarrow \infty} \left(1 - \frac{3}{1+3x} \right)^x =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{2x^2 + x + 1}{x^2 + 1} \right)^{3x-1} =$$

$$11. f(x) = 15^{\frac{x}{x+2}}$$

$$12. f(x) = \begin{cases} x-1, & x \leq 0 \\ x^2, & 0 < x \leq 2 \\ 2x, & x > 2 \end{cases}$$

Вариант 6

$$1. \lim_{x \rightarrow 3} \frac{2x^2 - x - 15}{x - 3} =$$

$$2. \lim_{x \rightarrow \infty} \frac{2x^2 - x - 15}{x - 3} =$$

$$3. \lim_{x \rightarrow 0} \frac{x}{\sqrt{x+9} - 3} =$$

$$4. \lim_{x \rightarrow 0 \pm 0} \frac{3^{1/x}}{6^{1/x} + 1} =$$

$$5. \lim_{x \rightarrow 2} \left(\frac{1}{x-2} - \frac{1}{x^2-4} \right) =$$

$$6. \lim_{x \rightarrow -2} \frac{x^5 + 32}{x + 2} =$$

$$7. \lim_{x \rightarrow 3} \frac{\sin(x^2 - 9)}{\sqrt{(x-3)^2}} =$$

$$8. \lim_{x \rightarrow \infty} (2x-4) \sin(2x-4) =$$

$$9. \lim_{x \rightarrow \infty} \left(\frac{x+3}{x-7} \right)^{2x-3} =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{2x+3}{x-7} \right)^{2x-3} =$$

$$11. f(x) = 0.5^{\frac{1}{x-2}}$$

$$12. f(x) = \frac{3x}{x^2 - 36}$$

Вариант 7

$$1. \lim_{x \rightarrow 1} \frac{5x^2 - x - 4}{x - 1} =$$

$$2. \lim_{x \rightarrow 1} \frac{5x^2 - x - 4}{(x - 1)^2} =$$

$$3. \lim_{n \rightarrow \infty} \frac{\sqrt{n^4 + n} - n}{2n^2 + \sqrt{n + 1}} =$$

$$4. \lim_{x \rightarrow 1} \frac{\sqrt{5 - x} - 2}{x - 1} =$$

$$5. \lim_{x \rightarrow 0} \frac{3^{1/x}}{5^{1/x} + 1} =$$

$$6. \lim_{x \rightarrow 0} \frac{(x^2 + 1)(3 - x^2)(2x + 3)}{(2x - 1)^5} =$$

$$7. \lim_{x \rightarrow \infty} \frac{\sqrt{x^2 + 1} - x}{\sqrt{9x^2 + 1}} =$$

$$8. \lim_{x \rightarrow 1} \frac{\sin(3x - 3)}{x - 1} =$$

$$9. \lim_{x \rightarrow \infty} \left(1 + \frac{2}{5x - 4}\right)^x =$$

$$10. \lim_{x \rightarrow 1} \left(\frac{x^2 - 3x + 5}{4 - x}\right)^{\frac{1}{x-1}} =$$

$$11. f(x) = 4^{\frac{1}{x+2}}$$

$$12. f(x) = \begin{cases} -2x, & x \leq 0 \\ x^2 + 1, & 0 < x \leq 1 \\ 2, & x > 1 \end{cases}$$

Вариант 8

$$1. \lim_{x \rightarrow -2} \frac{2x^2 + 5x + 2}{x + 2} =$$

$$2. \lim_{x \rightarrow 2} \frac{2x^2 + 5x + 2}{x^3 + 2x^2 + 1} =$$

$$3. \lim_{x \rightarrow 0} \frac{\sqrt{x+1} - 1}{x^2} =$$

$$4. \lim_{x \rightarrow \infty} \frac{5^x + 6}{3^x + 2} =$$

$$5. \lim_{x \rightarrow \infty} x^2 \sin 2x =$$

$$6. \lim_{x \rightarrow -1} \frac{x^5 + 1}{x + 1} =$$

$$7. \lim_{x \rightarrow 0} \frac{4(x-1)(1+2x^2)(1-3x)}{(2x-1)^4} =$$

$$8. \lim_{x \rightarrow 2} \frac{x^2 + 4x - 12}{\sin(x^2 - 4)} =$$

$$9. \lim_{x \rightarrow \infty} \left(\frac{2x+1}{2x-5}\right)^{3x} =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{2x+1}{3x-5}\right)^{2x} =$$

$$11. f(x) = 16^{\frac{1}{x+4}}$$

$$12. f(x) = \begin{cases} 2x - 3, & x < 2 \\ x^2 - 3, & 2 \leq x \leq 4 \\ 2x, & x > 4 \end{cases}$$

Вариант 9

$$1. \lim_{x \rightarrow 1} \frac{-2x^2 + 3x - 1}{x - 1} =$$

$$2. \lim_{x \rightarrow \infty} \frac{-2x^2 + 3x - 1}{x - 1} =$$

$$3. \lim_{x \rightarrow 0} \frac{x}{\sqrt{x+16} - 4} =$$

$$4. \lim_{x \rightarrow +\infty} \frac{6^x + 4}{5^x - 1} =$$

$$5. \lim_{x \rightarrow \infty} (2x + 1) \sin(2x + 1) =$$

$$6. \lim_{x \rightarrow 1} \frac{x^9 - 1}{x - 1} =$$

$$7. \lim_{x \rightarrow 2} \left(\frac{1}{x^2 - 2x} - \frac{1}{x^2 - 3x + 2}\right) =$$

$$8. \lim_{x \rightarrow \pi} \frac{\operatorname{arctg}(\pi - x)}{\pi - x} =$$

$$9. \lim_{x \rightarrow \infty} \left(\frac{2x-1}{2x+1}\right)^{2x+1} =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{x-2}{2x+1}\right)^{2/(x-4)} =$$

$$11. f(x) = 25^{\frac{1}{x-2}}$$

$$12. f(x) = \begin{cases} x, & x \leq 0 \\ \operatorname{tg} x, & 0 < x \leq \frac{\pi}{4} \\ 2, & x > \frac{\pi}{4} \end{cases}$$

Вариант 10

$$1. \lim_{x \rightarrow 1} \frac{2x^2 - 3x + 1}{x^2 - 1} =$$

$$2. \lim_{x \rightarrow \infty} \frac{2x^2 - 3x + 1}{x^2 + 2} =$$

$$3. \lim_{x \rightarrow 2} \frac{\sqrt{2x+5} - \sqrt{x+7}}{x-2} =$$

$$4. \lim_{x \rightarrow 0 \pm 0} \frac{2^{1/x} + 1}{3^{1/x} + 1} =$$

$$5. \lim_{x \rightarrow \infty} \sqrt{9 + \sin x} =$$

$$6. \lim_{x \rightarrow 1} \frac{x^5 - 1}{x^2 - 1} =$$

$$7. \lim_{x \rightarrow 0} \frac{1 - \cos 4x^2}{x^4} =$$

$$8. \lim_{x \rightarrow 0} (x - \sqrt{x^2 - 2x}) =$$

$$9. \lim_{x \rightarrow \infty} \left(\frac{x+1}{x-3} \right)^{2x} =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{2x-1}{3x+1} \right)^x =$$

$$11. f(x) = 16^{\frac{1}{4-x}}$$

$$12. f(x) = \begin{cases} x+2, & x \leq -1 \\ x^2+1, & -1 < x \leq 1 \\ |x+1|, & x > 1 \end{cases}$$

Вариант 11

$$1. \lim_{x \rightarrow 2} \frac{2x^2 - x - 6}{x^2 - 4} =$$

$$2. \lim_{x \rightarrow \infty} \frac{2x^2 - x - 6}{x^2 - 4} =$$

$$3. \lim_{n \rightarrow \infty} \frac{n! + (n+3)!}{(n+4)! - (n+2)!} =$$

$$4. \lim_{x \rightarrow 0 \pm 0} \frac{3^{1/x}}{4^{1/x} - 2} =$$

$$5. \lim_{x \rightarrow 0} \frac{\sqrt{x+9} - 3}{x} =$$

$$6. \lim_{x \rightarrow \infty} (2x - \sin x) =$$

$$7. \lim_{x \rightarrow 1} \frac{x^{2/5} - \sqrt{x}}{x^2 - 1} =$$

$$8. \lim_{x \rightarrow 3} \frac{\arcsin(x-3)}{x^2 - 5x + 6} =$$

$$9. \lim_{x \rightarrow \infty} \left(\frac{x+3}{x-4} \right)^{2x} =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{2x^2 + 3x - 1}{x^2 + 1} \right)^x =$$

$$11. f(x) = 4^{\frac{1}{2-x}}$$

$$12. f(x) = \begin{cases} x+4, & x \leq -1 \\ x^2+2, & -1 < x \leq 1 \\ 2x, & x > 1 \end{cases}$$

Вариант 12

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

$$2. \lim_{x \rightarrow \infty} \frac{3x^2 - 5x + 2}{x^2 - 1} =$$

$$3. \lim_{n \rightarrow \infty} \frac{n!}{n! - (n+1)!} =$$

$$4. \lim_{x \rightarrow 1 \pm 0} \frac{\frac{1}{4^{x-1}}}{\frac{1}{6^{x-1}} + 1} =$$

$$5. \lim_{x \rightarrow 1} \frac{\sqrt{x+3} - 2}{x-1} =$$

$$6. \lim_{x \rightarrow \infty} (\sqrt[3]{9 + \cos x}) =$$

$$7. \lim_{x \rightarrow 1} \frac{x^5 - 1}{x-1} =$$

$$8. \lim_{x \rightarrow 0} \frac{\sin 4x}{\sqrt{1+x} - 1} =$$

$$9. \lim_{x \rightarrow \infty} \left(\frac{x+5}{x+7} \right)^{x+1} =$$

$$10. \lim_{x \rightarrow 1} \left(\frac{x^2 + 1}{3x^2 + 1} \right)^{\frac{1}{x-1}} =$$

$$11. f(x) = 9^{\frac{1}{x-2}}$$

$$12. f(x) = \begin{cases} x+2, & x \leq -1 \\ x^2+1, & -1 < x \leq 1 \\ -x+3, & x > 1 \end{cases}$$

Вариант 13

$$1. \lim_{x \rightarrow -3} \frac{5x^2 + 13x - 6}{x + 3} =$$

$$2. \lim_{x \rightarrow \infty} \frac{5x^2 + 13x - 6}{x + 3} =$$

$$3. \lim_{n \rightarrow \infty} \frac{n! + n}{(n+1)!} =$$

$$4. \lim_{x \rightarrow 2} \left(\frac{1}{x-2} - \frac{1}{x^2-4} \right) =$$

$$5. \lim_{x \rightarrow 0 \pm 0} \frac{5^{1/x} + 3}{3^{1/x} + 7} =$$

$$6. \lim_{x \rightarrow 1} \left(\frac{1 - \sqrt[3]{x}}{1 - \sqrt{x}} \right) =$$

$$7. \lim_{x \rightarrow \infty} \frac{(x-1)^2 (3x+1)^3}{(x^2+1)(2x+1)^3} =$$

$$8. \lim_{x \rightarrow 2} \frac{\operatorname{tg}(x^2 - 4)}{x - 2} =$$

$$9. \lim_{x \rightarrow \infty} \left(1 + \frac{2}{x+1} \right)^x =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{5x+3}{3x+2} \right)^x =$$

$$11. f(x) = 25^{\frac{1}{x+2}}$$

$$12. f(x) = \begin{cases} -x, & x \leq 0 \\ -(x-1)^2, & 0 < x \leq 2 \\ x-3, & x > 2 \end{cases}$$

Вариант 16

$$1. \lim_{x \rightarrow 2} \frac{5x^2 - 3x - 2}{x - 2} =$$

$$2. \lim_{x \rightarrow \infty} \frac{5x^2 - 3x - 2}{x^2 - 2x - 3} =$$

$$3. \lim_{n \rightarrow \infty} \frac{2^n + 7^{n-1}}{2^n - 7^n} =$$

$$4. \lim_{x \rightarrow 0} \frac{1 - \sqrt{1+4x}}{x} =$$

$$5. \lim_{x \rightarrow 1} \frac{x^8 - 1}{x - 1} =$$

$$6. \lim_{x \rightarrow \infty} \frac{(x^2+1)(2x^2+5)}{(x+1)^4} =$$

$$7. \lim_{x \rightarrow -1} \frac{1 + \sqrt[9]{x}}{1 + \sqrt[3]{x}} =$$

$$8. \lim_{x \rightarrow 0} \frac{x \cdot \operatorname{tg} 3x}{1 - \cos 2x} =$$

$$9. \lim_{x \rightarrow 0} (1 + 5x)^{\frac{1}{\sin 2x}} =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{2x+1}{3x-1} \right)^{2x} =$$

$$11. f(x) = \frac{x}{x^2 - 16}$$

$$12. f(x) = \begin{cases} -x, & x \leq 0 \\ x^2, & 0 < x \leq 2 \\ x+1, & x > 2 \end{cases}$$

Вариант 17

$$1. \lim_{x \rightarrow 3} \frac{2x^2 - 5x - 3}{x - 3} =$$

$$2. \lim_{x \rightarrow \infty} \frac{2x^2 - 5x - 3}{x - 3} =$$

$$3. \lim_{n \rightarrow \infty} \frac{5^n + 7^n}{5^n - 2 \cdot 8^n} =$$

$$4. \lim_{x \rightarrow 0} \frac{x}{\sqrt{1+3x} - 1} =$$

$$5. \lim_{x \rightarrow -\infty} \frac{5^x + 4}{3^x + 2} =$$

$$6. \lim_{x \rightarrow -5} \left(\frac{x - \sqrt{x^2 + 3}}{x + 2} \right) =$$

$$7. \lim_{x \rightarrow -2} \frac{x^7 + 128}{x + 2} =$$

$$8. \lim_{x \rightarrow 2} \frac{\arcsin(x-2)}{\sin(x-2)} =$$

$$9. \lim_{x \rightarrow \infty} \left(\frac{2x+1}{2x+4} \right)^{2x} =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{2x+1}{4x-3} \right)^{2x+3} =$$

$$11. f(x) = \frac{x}{x^2 - 9}$$

$$12. f(x) = \begin{cases} -2x, & x \leq 0 \\ x^2 + 1, & 0 < x \leq 1 \\ 2, & x > 1 \end{cases}$$

Вариант 18

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

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

$$3. \lim_{n \rightarrow \infty} \frac{(n+1)! - 2}{n! + 2} =$$

$$4. \lim_{x \rightarrow 1} \left(\frac{1}{x-1} - \frac{2}{x^2 - 3x + 2} \right) =$$

$$5. \lim_{x \rightarrow 0 \pm 0} \frac{5^{1/x} + 2}{3^{1/x} - 1} =$$

$$6. \lim_{x \rightarrow 0} \frac{\sqrt{3x^2 + 1} - 1}{x^2 + x} =$$

$$7. \lim_{x \rightarrow \infty} \frac{(x-1)^5}{(x^2 + 1)(2x + 1)^3} =$$

$$8. \lim_{x \rightarrow \infty} (3x^4 + 1) \operatorname{tg} \frac{3}{x^4 + 1} =$$

$$9. \lim_{x \rightarrow \infty} \left(1 - \frac{5}{2x + 3} \right)^x =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{3x - 1}{2x + 3} \right)^{2x} =$$

$$11. f(x) = 4^{\frac{1}{x}}$$

$$12. f(x) = \begin{cases} -(x+1), & x \leq -1 \\ -(x+1)^2, & -1 < x \leq 0 \\ -x, & x > 0 \end{cases}$$

Вариант 14

$$1. \lim_{x \rightarrow 3} \frac{2x^2 - 3x - 9}{x^2 - 4x + 3} =$$

$$2. \lim_{x \rightarrow \infty} \frac{2x^2 - 3x - 9}{x^3 - 4x + 3} =$$

$$3. \lim_{n \rightarrow \infty} \frac{n! + (n+1)!}{3n!} =$$

$$4. \lim_{x \rightarrow 0 \pm 0} \frac{3^{1/x} + 4}{5^{1/x} + 3} =$$

$$5. \lim_{x \rightarrow 0} \frac{3 - \sqrt{x+9}}{x} =$$

$$6. \lim_{x \rightarrow \infty} x^2 \sin 3x =$$

$$7. \lim_{x \rightarrow \infty} (\sqrt[3]{x+1} - \sqrt[3]{2x-3}) =$$

$$8. \lim_{x \rightarrow 0} \frac{\cos x - \cos 7x}{x \cdot \operatorname{tg} 6x} =$$

$$9. \lim_{x \rightarrow \infty} \left(1 + \frac{2}{x+1} \right)^x =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{2x+1}{x+2} \right)^x =$$

$$11. f(x) = 36^{\frac{1}{x-2}}$$

$$12. f(x) = \begin{cases} \cos x, & x \leq 0 \\ x^2 + 1, & 0 < x \leq 1 \\ x, & x > 1 \end{cases}$$

Вариант 15

$$1. \lim_{x \rightarrow 2} \frac{7x^2 - 6x - 16}{x - 2} =$$

$$2. \lim_{x \rightarrow \infty} \frac{7x^2 - 6x - 16}{x - 2} =$$

$$3. \lim_{n \rightarrow \infty} \frac{n! + (n+1)!}{n! - (n+1)!} =$$

$$4. \lim_{x \rightarrow 0 \pm 0} \frac{3^{1/x}}{4^{1/x} + 1} =$$

$$5. \lim_{x \rightarrow 2} \frac{\sqrt{x+7} - 3}{x - 2} =$$

$$6. \lim_{x \rightarrow -5} \left(\frac{1}{x+5} - \frac{4}{x^2 - 25} \right) =$$

$$7. \lim_{x \rightarrow 1} \frac{x^{10} - 1}{x^2 - 1} =$$

$$8. \lim_{x \rightarrow 0} \frac{1 - \cos 6x^2}{\sin^4 x} =$$

$$9. \lim_{x \rightarrow 0} (1 + \sin 2x)^{1/x^2} =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{3x-1}{4x+5} \right)^{2x} =$$

$$11. f(x) = 49^{\frac{1}{2-x}}$$

$$12. f(x) = \begin{cases} -x, & x \leq 0 \\ \sin x, & 0 < x \leq \pi \\ x - 2, & x > \pi \end{cases}$$

Вариант 19

$$1. \lim_{x \rightarrow -1/6} \frac{6x^2 - 5x - 1}{6x + 1} =$$

$$2. \lim_{x \rightarrow 1} \frac{6x^2 - 5x - 1}{6x + 1} =$$

$$3. \lim_{n \rightarrow \infty} \frac{n^2 - \sqrt{4n^6 + 1}}{n^3 + \sqrt{n^6 - 2}} =$$

$$4. \lim_{x \rightarrow 0} \frac{x}{2 - \sqrt{x + 4}} =$$

$$5. \lim_{x \rightarrow -\infty} \frac{4^x}{5^x + 1} =$$

$$6. \lim_{x \rightarrow \infty} (x - 1) \cos 2x =$$

$$7. \lim_{x \rightarrow 2} \frac{x^5 - 32}{x - 2} =$$

$$8. \lim_{x \rightarrow \infty} (3x + 1) \sin \frac{2}{x} =$$

$$9. \lim_{x \rightarrow 0} (1 + 5 \sin x)^{1/x^4} =$$

$$10. \lim_{x \rightarrow 1} \left(\frac{2x + 1}{4x - 1} \right)^{\frac{3}{x-1}} =$$

$$11. f(x) = 8^{\frac{1}{4-x}}$$

$$12. f(x) = \begin{cases} x + 1, & x \leq 1 \\ 2x^2, & 1 < x \leq 2 \\ -3x, & x > 2 \end{cases}$$

Вариант 20

$$1. \lim_{x \rightarrow -1} \frac{2x^2 - 3x - 2}{x - 2} =$$

$$2. \lim_{x \rightarrow 2} \frac{2x^2 - 3x - 2}{x - 2} =$$

$$3. \lim_{x \rightarrow 5} \frac{3 - \sqrt{x + 4}}{x - 5} =$$

$$4. \lim_{n \rightarrow \infty} \frac{n! + 1}{(n + 1)! - n!} =$$

$$5. \lim_{x \rightarrow -\infty} \frac{3^x + 4}{4^x + 2} =$$

$$6. \lim_{x \rightarrow \infty} \frac{(2x - 1)^6}{(x^3 - 1)(2x + 1)(x^2 + 2x)} =$$

$$7. \lim_{x \rightarrow 2} \frac{x^6 - 64}{x - 2} =$$

$$8. \lim_{x \rightarrow 1} \frac{\sin(x^2 - 1)}{2x^2 - x - 1} =$$

$$9. \lim_{x \rightarrow \infty} \left(1 - \frac{3}{1 + 3x} \right)^x =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{2x^2 + x + 1}{x^2 + 1} \right)^{3x-1} =$$

$$11. f(x) = 15^{\frac{x}{x+2}}$$

$$12. f(x) = \begin{cases} x - 1, & x \leq 0 \\ x^2, & 0 < x \leq 2 \\ 2x, & x > 2 \end{cases}$$

Вариант 21

$$1. \lim_{x \rightarrow 3} \frac{2x^2 - x - 15}{x - 3} =$$

$$2. \lim_{x \rightarrow \infty} \frac{2x^2 - x - 15}{x - 3} =$$

$$3. \lim_{x \rightarrow 0} \frac{\sqrt{2x + 9} - 3}{x} =$$

$$4. \lim_{x \rightarrow 0 \pm 0} \frac{3^{1/x}}{6^{1/x} + 1} =$$

$$5. \lim_{x \rightarrow 2} \left(\frac{1}{x - 2} - \frac{1}{x^2 - 4} \right) =$$

$$6. \lim_{x \rightarrow -2} \frac{x^5 + 32}{x + 2} =$$

$$7. \lim_{x \rightarrow 3} \frac{\sin(x^2 - 9)}{\sqrt{(x - 3)^2}} =$$

$$8. \lim_{x \rightarrow \infty} (2x - 4) \sin(2x - 4) =$$

$$9. \lim_{x \rightarrow \infty} \left(\frac{x + 3}{x - 7} \right)^{2x-3} =$$

$$10. \lim_{x \rightarrow \infty} \left(\frac{2x + 3}{x - 7} \right)^{2x-3} =$$

$$11. f(x) = 0.5^{\frac{1}{x-2}}$$

$$12. f(x) = \frac{3x}{x^2 - 36}$$