Контрольная работа №4 «Производная»

Найти производные

Вариант 1.

1. $y = \frac{1}{x} + \frac{1}{\sqrt{x^7}} - \frac{3}{\sqrt[3]{x^2}}$.
2. $y = \sqrt{\frac{\sin 2x}{1+\cos 2x}}$.
3. $y = \sin 3x \cdot \arccos x - \pi x^2$.
4. $y = 3^x \arcsin(e^x + 3^x)$.
5. $y = \left(\frac{x}{2} - e^{x^2}\right)e^{-\frac{x}{2}}$.

Вариант 2.

1. $y = x^3 \cdot \sqrt{1+x^2}$.
2. $y = \left(\frac{\sin 3x}{1+tg3x}\right)^3$.
3. $y = \left(ax^2 - \arccos 3x\right) \cdot \frac{\cos 3x}{x^2}$.
4. $y = 0{,}5(tg2x + \ln\cos^2 2x)$.
5. $y = \frac{7^{2x}+1}{x^2 arcctgx}$.

Вариант 3.

1. $y = \frac{(1-x)^2}{(1+x)^3}$.
2. $y = x^2 \sin 2x \cdot tgx$.
3. $y = \frac{1+\arcsin x}{x^3} + \sqrt{x} \cdot arctgx$.
4. $y = \ln\frac{1-\sqrt[3]{x}}{\sqrt{1+\sqrt[3]{x}}}$.
5. $y = e^{2x}\cos^3 2x$.

Вариант 4.

1. $y = \sqrt{2+x^2} \cdot \sqrt[3]{3+x^3}$.
2. $y = (3x^3+1)\sqrt{\cos 3x}$.
3. $y = \frac{\arcsin\left(x-\sqrt{x}\right)}{4-x^2}$.
4. $y = x^2 \log_3 x + 5^{-\sin 2x}$.
5. $y = \frac{1}{\sqrt{x}} arctg\frac{2}{\sqrt{x}}$.

Вариант 5.

1. $y = \left(1+\sqrt{x}\right)\left(1-2\sqrt{x}\right)$.
2. $y = \frac{\cos x}{x^2} + \frac{x^2}{\sin x}$.
3. $y = \arccos 2x - x^2 \arcsin 2x$.
4. $y = \frac{xe^x}{arctgx}$.
5. $y = \frac{\sqrt{3}}{6} arctg\frac{4x-1}{\sqrt{3}}$.

Вариант 6.

1. $y = (x^2-4)\left(\sqrt{x}+3\right)$.
2. $y = \frac{2\cos x}{3x+\sin x}$.
3. $y = \frac{arctg2x}{x^3+\arcsin 2x}$.
4. $y = \sin 8x \cdot e^{\frac{1}{\cos 8x}}$.
5. $y = \ln\sin arctg\sqrt{1+x^2}$.

Вариант 7.

1. $y = \left(\sqrt[3]{x} + 2x\right)\left(1 + \sqrt[3]{x} + 3x\right)$.

2. $y = \dfrac{\arccos 2x}{x^3 + 2x}$.

3. $y = (tgx + ctgx)\sin\dfrac{1}{x}$.

4. $y = 2^{2x}\log_5 x$.

5. $y = \arcsin(\sin^2 x - \cos 2x)$.

Вариант 8.

1. $y = 4x\sqrt[3]{x} + \dfrac{\sqrt[3]{x^2}}{3x}$.

2. $y = \dfrac{\sin x + \cos x}{tgx}$.

3. $y = -8\sqrt[4]{x}\cdot arctg(ctgx)$.

4. $y = \arcsin\sin^2\dfrac{1}{x}$.

5. $y = 2^{1-\sqrt{\cos x}} + e^{1-\cos x}$.

Вариант 9.

1. $y = \left(\sqrt{x} + 2\right)\left(\dfrac{1}{\sqrt{x}} - x\right)$.

2. $y = \dfrac{\sin x}{\cos x + x\sin x}$.

3. $y = \dfrac{3}{arctg2x + arcctg2x}$.

4. $y = \arccos\left(-\dfrac{1}{x}\right) + \log_2(x^2 - 2x)$.

5. $y = \ln(e^x\cos x - e^{-x}\sin x)$.

Вариант 10.

1. $y = \dfrac{2x^4}{4 - x^2}$.

2. $y = (2 - x^2)\cos 3x + 2x\sin x$.

3. $y = \dfrac{\cos(tgx)}{x^2 ctgx}$.

4. $y = 6^x arctgx + \log_6 x$.

5. $y = \sqrt[3]{e^x - e^{-x}}$.

Вариант 11.

1. $y = \dfrac{1}{x^3 - 3x + 6}$.

2. $y = \dfrac{\sin x}{x^2} + x^{2/3}\cos x$.

3. $y = \dfrac{2arcctgx - x}{3arctgx}$.

4. $y = x^2\arcsin(3\ln^2 x)$.

5. $y = 2arctg\sqrt{\dfrac{1-x}{1+x}}$.

Вариант 12.

1. $y = \dfrac{1 - x^3}{2\sqrt[3]{x}}$.

2. $y = x^2 ctgx - \dfrac{tgx}{x^2}$.

3. $y = (5x^2 - 3x)^3 - \sqrt[4]{e^{4x-5} + 4}$.

4. $y = xe^x(\cos x - \sin x)$.

5. $y = \dfrac{\arccos x}{x - \arcsin x}$.

Вариант 13.

1. $y = \dfrac{\sqrt[4]{x^3} - 2x}{x^2 + \sqrt{x} + 1}$.

2. $y = \dfrac{ctg3x}{2\sqrt{x} - 1}$.

3. $y = \dfrac{\arccos x + x}{\arcsin x - x}$.

4. $y = 3ctgx \cdot (e^{2x} - 2)$.

5. $y = 2arcctg^3 \dfrac{x^2 - 2}{\sqrt{6}}$.

Вариант 14.

1. $y = \dfrac{x^2 + 1}{3(x^2 - 1)} + \sqrt[3]{x^2}$.

2. $y = \dfrac{\sqrt[3]{x^4}}{ctg^2 x - 2}$.

3. $y = (tgx - 1)\arcsin x^2$.

4. $y = \dfrac{\sqrt[3]{x+1}}{\log_2 x + e^x}$.

5. $y = \cos tg2^{\sin(1/x)}$.

Вариант 15.

1. $y = \dfrac{1 - x^3}{1 + x^3} + \dfrac{2}{\sqrt{x}}$.

2. $y = \dfrac{4\cos^2 4x}{tgx - 2x}$.

3. $y = (x - arctgx)\arcsin(1/x)$.

4. $y = \dfrac{\sin^2 x}{1 + ctgx} + \dfrac{\cos^2 x}{1 + tgx}$.

5. $y = \dfrac{1 - \ln 2x}{1 + \ln 2x}$.

Вариант 16.

1. $y = \dfrac{3}{1 - 2x^3} - \sqrt[3]{3x}$.

2. $y = \sqrt{tgx} \cdot \sin x^2 + \ln 2$.

3. $y = \sqrt[5]{(x^3 - 1)arcctg2x}$.

4. $y = \dfrac{x^3 + 2^{x - x^2}}{e^{\sqrt{x}}}$.

5. $y = \log_3 \sqrt[6]{\cos 2x + \sin 2x}$.

Вариант 17.

1. $y = \dfrac{x^2 + x - 1}{x^3 + 1} - \sqrt[3]{7x}$.

2. $y = (3x^2 - 2)tg3x$.

3. $y = \dfrac{\arccos^2 2x}{1 - x^2}$.

4. $y = \sqrt{\dfrac{1 + 2e^x}{1 - 2e^{-x}}}$.

5. $y = \ln\sqrt{1 + x^2} + arctg3x + \dfrac{2x^2}{2x^3 - 1}$.

Вариант 18.

1. $y = \left(\sqrt[4]{x^3} + 1\right)x^3$.

2. $y = \dfrac{3\sqrt[3]{x^2} - \cos 3x}{2\sin 3x}$.

3. $y = \arccos(\sin x^2 - \cos x^2)$.

4. $y = \dfrac{a^2 + 9\sqrt[3]{x^2 - 1}}{\arccos x}$.

5. $y = \log_2 tg(x/2) - ctgx \cdot \ln(\sin x)$.

Вариант 19.

1. $y = \dfrac{2}{(x+2)^3} + \dfrac{3}{x^2 - 1}$.

2. $y = \dfrac{2 + 4\sin 2x}{3 - 2\cos 3x}$.

3. $y = x^3 \cos 2x \cdot arctg 2x$.

4. $y = \dfrac{\log_9 x}{9} + x^2 3^{2x}$.

5. $y = \dfrac{a^x}{1 + a^{2x}} + arcctg a^{-x}$.

Вариант 20.

1. $y = \dfrac{3}{5 - 3x^2} + \dfrac{x^2}{5\sqrt{x}}$.

2. $y = \dfrac{(2 - x^2) + 2\cos 2x}{3\sin 2x}$.

3. $y = arctg 4x \cdot \left(\sqrt[5]{x^3} - 1\right)$.

4. $y = \dfrac{x^2}{2^x} - \dfrac{4^x - 1}{tgx}$.

5. $y = 2\ln\left(2x - 3\sqrt{1 - 4x^2}\right)$.

Вариант 21.

1. $y = \dfrac{2 - \sqrt[3]{2x}}{2 + \sqrt[3]{2x}}$.

2. $y = \dfrac{3\cos 2x + x^2}{1 + 2x^3}$.

3. $y = (x^3 - arctg 3x)(arcctgx - 2x)$.

4. $y = 4^{2x} \arccos 4x - \dfrac{e^x}{x^2}$.

5. $y = \sqrt[3]{2 + \log_2 \sin 3x}$.

Вариант 22.

1. $y = \dfrac{\sqrt{x} - \sqrt[3]{x}}{1 + \sqrt{2x}}$.

2. $y = \dfrac{1}{4} tg^4 3x + \dfrac{2}{\cos^2 3x}$.

3. $y = \dfrac{3\sin^2 2x - \cos 2x}{xtgx}$.

4. $y = 3^x \arccos 3x - \arcsin^3 3x$.

5. $y = \ln\left(\dfrac{5x - 3}{2x + 7}\right)^4$.

Вариант 23.

1. $y = \dfrac{2}{x^2 + 1} + \dfrac{\sqrt[5]{x}}{x}$.

2. $y = \dfrac{\sqrt{tg 3x}}{x + 3}$.

3. $y = x^2 \arccos 2x + \left(\dfrac{1}{\cos 2x}\right)^3$.

4. $y = \dfrac{\log_5 3x}{5^{3x}}$.

5. $y = arctg^3(3 - x^3) \cdot ctg\sqrt[3]{3x}$.

Вариант 24.

1. $y = \sqrt[3]{x^5} - \dfrac{2}{\sqrt[5]{x^3}}$.

2. $y = \sqrt[3]{\cos 3x} - \dfrac{\sin^3 3x^2}{3}$.

3. $y = (x \arcsin 2x)^4 + tg\sqrt{2x}$.

4. $y = \dfrac{ctg 5x \cdot \ln 5x}{5^x}$.

5. $y = \dfrac{\arccos 2x}{\sqrt{1 - 4x^2}} + \dfrac{1}{2}\ln\left(\dfrac{1 - x}{1 + x}\right)$.

Вариант 25.

1. $y = \dfrac{\sqrt{x} - 2x}{1 + \sqrt[4]{x}}$.
2. $y = 2(-\sin^2 3x) + \cos^2 3x$.
3. $y = \dfrac{3x^3}{\sqrt{arctgx^3}}$.
4. $y = ctg^2(ctgx) - 2tg(tg^2 x)$.
5. $y = \ln\cos arctg\left(\dfrac{e^x - e^{-5x}}{2}\right)$.

Вариант 26.

1. $y = \dfrac{-x^2 + 2x + 3}{x^3 - 2}$.
2. $y = 3x^2 \sin x^2 + \cos^2 3x$.
3. $y = \dfrac{\arcsin\sqrt[3]{x}}{2 - x^3}$.
4. $y = (\cos x - 2^x)(e^x + \log_2 x)$.
5. $y = 2^{tg\frac{2}{x}}$.

Вариант 27.

1. $y = \dfrac{\sqrt{x^2 + 7x + 5}}{x^2 - 3x}$.
2. $y = x^2 \cdot \sin 2x \cdot arctgx^2$.
3. $y = \dfrac{\sqrt{x}\cos x}{2 - tg2x}$.
4. $y = \sqrt{e^x - 1} - arctg\sqrt{e^x - 1}$.
5. $y = \dfrac{1}{\sqrt[3]{x}} \cdot \left(e^{x^2} - arctgx^2\right)$.

Вариант 28.

1. $y = \dfrac{\sqrt[3]{x^2} - x}{x + \sqrt[3]{x^2}}$.
2. $y = \dfrac{x^3}{(\cos x - \sin x)^2}$.
3. $y = \arcsin^2 3x \cdot \arccos^2 3x$.
4. $y = \dfrac{e^{-2x} tg2x}{1 - \ln 2x}$.
5. $y = arctg5^{-x} + tgx^{-5}$.

Вариант 29.

1. $y = \dfrac{\sqrt[3]{x} - 2}{x + \sqrt[3]{x^2 + 2}}$.
2. $y = \dfrac{\sin x}{x} + \dfrac{x}{\cos x}$.
3. $y = 2x^2 \arcsin x^2$.
4. $y = (\ln x - \log_2 x)\sqrt[5]{x^2}$.
5. $y = 10^{5\sin x} + 5^{10\cos x}$.

Вариант 30.

1. $y = \dfrac{1 - x^3 + x^2}{\sqrt{x}}$.
2. $y = \dfrac{2\cos^2 x}{3x + \sin 2x}$.
3. $y = tg3x \cdot \sqrt[3]{\sin 3x}$.
4. $y = ctg^2(ctgx) - tg(tg^2 x)$.
5. $y = \arccos\sqrt{2x^2 + 1} \cdot \sqrt{1 - 2x^2}$.

Вариант 31.

1. $y = \dfrac{\sqrt[4]{x} - 3x}{x^2 + 2\sqrt{x} + 1}$.

2. $y = \dfrac{ctg3x}{2\sqrt{x} - 1}$.

3. $y = \dfrac{\arccos x + 2x}{\arccos x - 2x}$.

4. $y = 6\cos x \cdot (e^{4x} - 4)$.

5. $y = 4arctg^4 \dfrac{2x^2 - 3}{\sqrt{7}}$.

Вариант 32.

1. $y = \dfrac{x^2 + 2}{5(x^2 - 1)} + \sqrt[3]{x}$.

2. $y = \dfrac{\sqrt[3]{x^5}}{tg^2 x + 3}$.

3. $y = (ctgx - 2)\arcsin x^3$.

4. $y = \dfrac{\sqrt[4]{x+1}}{\log_3 x + e^{2x}}$.

5. $y = \cos\cos 2^{\cos\frac{1}{x}}$.

Вариант 33.

1. $y = \dfrac{1 - x^4}{1 + x^4} + \dfrac{5}{\sqrt{2x}}$.

2. $y = \dfrac{2\cos^3 4x}{ctgx - 4x}$.

3. $y = (3x + tgx)\arcsin\dfrac{1}{x}$.

4. $y = \dfrac{\sin^2 x}{1 + 2ctgx} + \dfrac{\cos^2 x}{1 + 2tgx}$.

5. $y = \dfrac{1 - \ln 5x}{1 + \ln 5x}$.

Вариант 34.

1. $y = \dfrac{4}{1 - 5x^3} - \sqrt[3]{5x}$.

2. $y = \sqrt{tgx} \cdot \sin x^3 + \ln 2^{3x^2}$.

3. $y = \sqrt[6]{(3x^3 - 1)arcctg3x}$.

4. $y = \dfrac{x^4 + 2^{x - 2x^2}}{e^{3\sqrt{x}}}$.

5. $y = \log_4 \sqrt[7]{\cos 4x + \sin 2x}$.

Вариант 35.

1. $y = \dfrac{x^2 + 2x - 1}{3x^3 + 1} - \sqrt[3]{9x}$.

2. $y = \dfrac{3\sqrt[3]{x^2} - \cos 3x}{2\sin 3x}$.

3. $y = \dfrac{\arcsin^2 3x}{1 - x^2}$.

4. $y = \dfrac{a^2 + 9\sqrt[3]{x^2 - 1}}{\arccos x}$.

5. $y = \lg\sqrt{1 + x^2} + arcctg4x + \dfrac{3x^2}{3x^3 - 2}$.