Работа состоит из нескольких заданий. Второе число задания (после точки) соответствует номеру первой буквы фамилии студента в алфавите, **Ъ и Ь знаки пропускаются** (например, у Алешиной это задания 1.1, 2.1, 3.1 и т.д., у Бурлакова – 1.2, 2.2, 3.2 и т.д., у Яковлевой – 1.31, 2.31, 3.31 и т.д.).

Производные

1. Найти производную.

1.1. $y=\frac{2(3x^3+4x^2-x-2)}{15\sqrt{1+x}}$.

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

1.3. $y=\frac{x^4-8x^2}{2(x^2-4)}$.

1.4. $y=\frac{2x^2-x-1}{3\sqrt{2+4x}}$.

1.5. $y=\frac{(1+x^8)\sqrt{1+x^8}}{12x^{12}}$.

1.6. $y=\frac{x^2}{2\sqrt{1-3x^4}}$.

1.7. $y=\frac{(x^2-6)\sqrt{(4+x^2)^3}}{120x^5}$.

1.8. $y=\frac{(x^2-8)\sqrt{x^2-8}}{6x^3}$.

1.9. $y=\frac{4+3x^3}{x\sqrt[3]{(2+x^3)^2}}$.

1.10. $y=\frac{x^6+x^3-2}{\sqrt{1-x^3}}$.

1.11. $y=\frac{(x^2-2)\sqrt{4+x^2}}{124x^3}$.

1.12. $y=\frac{1+x^2}{2\sqrt{1+2x^2}}$.

1.13. $y=\frac{\sqrt{x-1}(3x+2)}{4x^2}$.

1.14. $y=\frac{\sqrt{(1+x^2)^3}}{3x^3}$.

1.15. $y=\frac{128-8x^3-x^6}{\sqrt{8-x^3}}$.

1.16. $y=\frac{\sqrt{2x+3}(x-2)}{x^2}$.

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

1.18. $y=\frac{(2x^2+3)\sqrt{x^2-3}}{9x^3}$.

1.19. $y=\frac{x-1}{(x^2+5)\sqrt{x^2+5}}$.

1.20. $y=\frac{(2x+1)\sqrt{x^2-x}}{x^2}$.

1.21. $y=2\sqrt{\frac{1-\sqrt{x}}{1+\sqrt{x}}}$.

1.22. $y=\frac{1}{(x+2)\sqrt{x^2+4x+5}}$.

1.23. $y=3\frac{\sqrt[3]{x^2+x+1)}}{x+1}$.

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

1.25. $y=(x+7)/(6\sqrt{x^2+x+7})$.

1.26. $y=(x\sqrt{x+1})/(x^2+x+1)$.

1.27. $y=(x^2+2)/(2\sqrt{1-x^4})$.

1.28. $y=((x+3)\sqrt{2x-1})/(2x+7)$.

1.29. $y=(3x+\sqrt{x})/(\sqrt{x^2+2})$.

1.30. $y=\frac{x-1}{(x^2+5)\sqrt{x^2+5}}$.

1.31. $y=\frac{4+3x^3}{x\sqrt[3]{(2+x^3)^2}}$.

2. Найти производную

2.1. $y = \sin\sqrt{3} + \frac{1}{3}\frac{\sin^2 3x}{\cos 6x}$.

2.2. $y = \cos\ln 2 - \frac{1}{3}\frac{\cos^2 3x}{\sin 6x}$.

2.3. $y = tg\lg\frac{1}{3} + \frac{1}{4}\frac{\sin^2 4x}{\cos 8x}$.

2.4. $y = ctg\sqrt[3]{5} - \frac{1}{8}\frac{\cos^2 4x}{\sin 8x}$.

2.5. $y = \frac{\cos\sin 5\cdot\sin^2 2x}{2\cos 4x}$.

2.6. $y = \frac{\sin\cos 3\cdot\cos^2 2x}{4\sin 4x}$.

2.7. $y = \frac{\cos\ln 7\cdot\sin^2 7x}{7\cos 14x}$.

2.8. $y = \cos ctg2 - \frac{1}{16}\frac{\cos^2 8x}{\sin 16x}$.

2.9. $y = ctg\cos 2 + \frac{1}{6}\frac{\sin^2 6x}{\cos 12x}$.

2.10. $y = \sqrt[3]{ctg2} - \frac{1}{20}\frac{\cos^2 10x}{\sin 20x}$.

2.11. $y = \frac{1}{3}\cos tg\frac{1}{2} + \frac{1}{10}\frac{\sin^2 10x}{\cos 20x}$.

2.12. $y = \ln\sin\frac{1}{2} - \frac{1}{24}\frac{\cos^2 12x}{\sin 24x}$.

2.13. $y = 8\sin ctg3 + \frac{1}{5}\frac{\sin^2 5x}{\cos 10x}$.

2.14. $y = \frac{\cos ctg3\cdot\cos^2 14x}{28\sin 28x}$.

2.15. $y = \frac{\cos tg(1/3)\cdot\sin^2 15x}{15\cos 30x}$.

2.16. $y = \frac{\sin tg(1/7)\cdot\cos^2 16x}{32\cos 32x}$.

2.17. $y = \frac{ctg\sin(1/3)\cdot\sin^2 17x}{17\cos 34x}$.

2.18. $y = \frac{\sqrt[5]{ctg2}\cdot\cos^2 18x}{36\sin 36x}$.

2.19. $y = \frac{tg\ln 2\cdot\sin^2 19x}{19\cos 38x}$.

2.20. $y = ctg\cos 5 - \frac{1}{40}\frac{\cos^2 20x}{\sin 40x}$.

2.21. $y = \sqrt{tg4} + \frac{\sin^2 21x}{21\cos 42x}$.

2.22. $y = \cos\ln 13 + \frac{1}{44}\frac{\cos^2 22x}{\sin 44x}$.

2.23. $y = \ln\cos\frac{1}{3} + \frac{\sin^2 23x}{23\cos 46x}$.

2.24. $y = ctg\sin\frac{1}{13} - \frac{1}{48}\frac{\cos^2 24x}{\sin 48x}$.

2.25. $y = \sin\ln\frac{1}{2} + \frac{\sin^2 25x}{25\cos 50x}$

2.26. $y = \sqrt[3]{\cos\sqrt{2}} - \frac{1}{52}\frac{\cos^2 26x}{\sin 52x}$.

2.27. $y = \sqrt[7]{tg\cos 2} + \frac{\sin^2 27x}{27\cos 54x}$.

2.28. $y = \sin\sqrt[3]{tg2} - \frac{\cos^2 28x}{56\sin 56x}$.

2.29. $y = \cos^2\sin 3 + \frac{\sin^2 29x}{29\cos 58x}$.

2.30. $y = \sin^3\cos 2 - \frac{\cos^2 30x}{60\sin 60x}$.

2.31. $y = ctg\cos 2 + \frac{1}{6}\frac{\sin^2 6x}{\cos 12x}$.

3. Найти производную

3.1. $y = (arctgx)^{(1/2)\ln arctgx}$.

3.2. $y = (\sin\sqrt{x})^{\ln\sin\sqrt{x}}$.

3.3. $y = (\sin x)^{5e^x}$.

3.4. $y = (\arcsin x)^{e^x}$.

3.5. $y = (\ln x)^{3^x}$.

3.6. $y = x^{\arcsin x}$.

3.7. $y = (ctg3x)^{2e^x}$.

3.8. $y = x^{e^{tgx}}$.

3.9. $y = (tgx)^{4e^x}$.

3.10. $y = (\cos 5x)^{e^x}$.

3.11. $y = (x\sin x)^{8\ln(x\sin x)}$.

3.12. $y = (x^3 + 4)^{tgx}$.

3.13. $y = x^{\sin x^3}$.

3.14. $y = (x^4 + 5)^{ctgx}$.

3.15. $y = (\sin x)^{5x/2}$.

3.16. $y = (x^2 + 1)^{\cos x}$.

3.17. $y = 19^{x^{19}}\, x^{19}$.

3.18. $y = x^{3^x}\cdot 2^x$.

3.19. $y = (\sin\sqrt{x})^{e^{1/x}}$.

3.20. $y = x^{e^{ctgx}}$.

3.21. $y = x^{e^{\cos x}}$.

3.22. $y = x^{2^x} \cdot 5^x$.

3.23. $y = x^{e^{\sin x}}$.

3.24. $y = (tgx)^{(\ln tgx)/4}$.

3.25. $y = x^{e^{arctgx}}$.

3.26. $y = x^{29^x} \cdot 29^x$.

3.27. $y = (\cos 2x)^{(\ln\cos 2x)/4x}$.

3.28. $y = (\ln x)^{3^x}$.

3.29. $y = (x^4 + 5)^{ctgx}$.

3.30. $y = x^{e^{\cos x}}$.

3.31. $y = (x^3 + 4)^{tgx}$.

4. Найти производную.

4.1. $y = \frac{(x^2-6)\sqrt{(4+x^2)^3}}{120x^5}$.

4.2. $y = \frac{(x^2-8)\sqrt{x^2-8}}{6x^3}$.

4.3. $y = \frac{4+3x^3}{x\sqrt[3]{(2+x^3)^2}}$.

4.4. $y = \sqrt[3]{\frac{(1+x^{3/4})^2}{x^{3/2}}}$

4.5. $y = \frac{x^6+x^3-2}{\sqrt{1-x^3}}$.

4.6. $y = \frac{(x^2-2)\sqrt{4+x^2}}{124x^3}$.

4.7. $y = \frac{1+x^2}{2\sqrt{1+2x^2}}$.

4.8. $y = \frac{\sqrt{x-1}(3x+2)}{4x^2}$.

4.9. $y = \frac{\sqrt{(1+x^2)^3}}{3x^3}$.

4.10. $y = \frac{128-8x^3-x^6}{\sqrt{8-x^3}}$.

4.11. $y = \frac{\sqrt{2x+3}(x-2)}{x^2}$.

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

4.13. $y = \frac{(2x^2+3)\sqrt{x^2-3}}{9x^3}$.

4.14. $y = \frac{x-1}{(x^2+5)\sqrt{x^2+5}}$.

4.15. $y = \frac{(2x+1)\sqrt{x^2-x}}{x^2}$.

4.16. $y = 2\sqrt{\frac{1-\sqrt{x}}{1+\sqrt{x}}}$.

4.17. $y = \frac{1}{(x+2)\sqrt{x^2+4x+5}}$.

4.18. $y = 3\frac{\sqrt[3]{x^2+x+1)}}{x+1}$.

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

4.20. $y = (x+7)/(6\sqrt{x^2+x+7})$.

4.21. $y = (x\sqrt{x+1})/(x^2+x+1)$.

4.22. $y = (x^2+2)/(2\sqrt{1-x^4})$.

4.23. $y = ((x+3)\sqrt{2x-1})/(2x+7)$.

4.24. $y = (3x+\sqrt{x})/(\sqrt{x^2+2})$.

4.25. $y = \frac{2(3x^3+4x^2-x-2)}{15\sqrt{1+x}}$.

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

4.27. $y = \frac{x^4-8x^2}{2(x^2-4)}$.

4.28. $y = \frac{2x^2-x-1}{3\sqrt{2+4x}}$.

4.29. $y=\frac{(1+x^8)\sqrt{1+x^8}}{12x^{12}}$.

4.30. $y=\frac{x^2}{2\sqrt{1-3x^4}}$.

4.31. $y=\frac{\sqrt{(1+x^2)^3}}{3x^3}$.

5. Найти производную.

5.1. $y=\ln\sin\frac{1}{2}-\frac{1}{24}\frac{\cos^2 12x}{\sin 24x}$.

5.2. $y=8\sin ctg3+\frac{1}{5}\frac{\sin^2 5x}{\cos 10x}$.

5.3. $y=\frac{\cos ctg3\cdot\cos^2 14x}{28\sin 28x}$.

5.4. $y=\frac{\cos tg(1/3)\cdot\sin^2 15x}{15\cos 30x}$.

5.5. $y=\frac{\sin tg(1/7)\cdot\cos^2 16x}{32\cos 32x}$.

5.6. $y=\frac{ctg\sin(1/3)\cdot\sin^2 17x}{17\cos 34x}$.

5.7. $y=\frac{\sqrt[5]{ctg2}\cdot\cos^2 18x}{36\sin 36x}$.

5.8. $y=\frac{tg\ln 2\cdot\sin^2 19x}{19\cos 38x}$.

5.9. $y=ctg\cos 5-\frac{1}{40}\frac{\cos^2 20x}{\sin 40x}$.

5.10. $y=\sqrt{tg4}+\frac{\sin^2 21x}{21\cos 42x}$.

5.11. $y=\cos\ln 13+\frac{1}{44}\frac{\cos^2 22x}{\sin 44x}$.

5.12. $y=\ln\cos\frac{1}{3}+\frac{\sin^2 23x}{23\cos 46x}$.

5.13. $y=ctg\sin\frac{1}{13}-\frac{1}{48}\frac{\cos^2 24x}{\sin 48x}$.

5.14. $y=\sin\ln\frac{1}{2}+\frac{\sin^2 25x}{25\cos 50x}$

5.15. $y=\sqrt[3]{\cos\sqrt{2}}-\frac{1}{52}\frac{\cos^2 26x}{\sin 52x}$.

5.16. $y=\sqrt[7]{tg\cos 2}+\frac{\sin^2 27x}{27\cos 54x}$.

5.17. $y=\sin\sqrt[3]{tg2}-\frac{\cos^2 28x}{56\sin 56x}$.

5.18. $y=\cos^2\sin 3+\frac{\sin^2 29x}{29\cos 58x}$.

5.19. $y=\sin^3\cos 2-\frac{\cos^2 30x}{60\sin 60x}$.

5.20. $y=\sin\sqrt{3}+\frac{1}{3}\frac{\sin^2 3x}{\cos 6x}$.

5.21. $y=\cos\ln 2-\frac{1}{3}\frac{\cos^2 3x}{\sin 6x}$.

5.22. $y=tg\lg\frac{1}{3}+\frac{1}{4}\frac{\sin^2 4x}{\cos 8x}$.

5.23. $y=ctg\sqrt[3]{5}-\frac{1}{8}\frac{\cos^2 4x}{\sin 8x}$.

5.24. $y=\frac{\cos\sin 5\cdot\sin^2 2x}{2\cos 4x}$.

5.25. $y=\frac{\sin\cos 3\cdot\cos^2 2x}{4\sin 4x}$.

5.26. $y=\frac{\cos\ln 7\cdot\sin^2 7x}{7\cos 14x}$.

5.27. $y=\cos ctg2-\frac{1}{16}\frac{\cos^2 8x}{\sin 16x}$.

5.28. $y=ctg\cos 2+\frac{1}{6}\frac{\sin^2 6x}{\cos 12x}$.

5.29. $y=\sqrt[3]{ctg2}-\frac{1}{20}\frac{\cos^2 10x}{\sin 20x}$.

5.30. $y=\frac{1}{3}\cos tg\frac{1}{2}+\frac{1}{10}\frac{\sin^2 10x}{\cos 20x}$.

5.31. $y=\frac{tg\ln 2\cdot\sin^2 19x}{19\cos 38x}$.

6. Найти производную.

6.1. $y=x^{e^{ctgx}}$.

6.2. $y=x^{e^{\cos x}}$.

6.3. $y=x^{2^x}\cdot 5^x$.

6.4. $y=x^{e^{\sin x}}$.

6.5. $y=(tgx)^{(\ln tgx)/4}$.

6.6. $y = x^{e^{arctgx}}$.

6.7. $y = x^{29^x} \cdot 29^x$.

6.8. $y = (\cos 2x)^{(\ln\cos 2x)/4x}$.

6.9. $y = (arctgx)^{(1/2)\ln arctgx}$.

6.10. $y = (\sin\sqrt{x})^{\ln\sin\sqrt{x}}$.

6.11. $y = (\sin x)^{5e^x}$.

6.12. $y = (\arcsin x)^{e^x}$.

6.13. $y = (\ln x)^{3^x}$.

6.14. $y = x^{\arcsin x}$.

6.15. $y = (ctg3x)^{2e^x}$.

6.16. $y = x^{e^{tgx}}$.

6.17. $y = (tgx)^{4e^x}$.

6.18. $y = (\cos 5x)^{e^x}$.

6.19. $y = (x\sin x)^{8\ln(x\sin x)}$.

6.20. $y = (x^3 + 4)^{tgx}$.

6.21. $y = x^{\sin x^3}$.

6.22. $y = (x^4 + 5)^{ctgx}$.

6.23. $y = (\sin x)^{5x/2}$.

6.24. $y = (x^2 + 1)^{\cos x}$.

6.25. $y = 19^{x^{19}} x^{19}$.

6.26. $y = x^{3^x} \cdot 2^x$.

6.27. $y = (\sin\sqrt{x})^{e^{1/x}}$.

6.28. $y = (\arcsin x)^{e^x}$.

6.29. $y = x^{29^x} \cdot 29^x$.

6.30. $y = (x^3 + 4)^{tgx}$.

6.31. $y = x^{\arcsin x}$.

7. Найти производную.

7.1. $y = \ln\sqrt[3]{\frac{x-1}{x+1}} - \frac{1}{2}(\frac{1}{2} + \frac{1}{x^2-1})arstgx.$

7.2. $y = x\ln(\sqrt{1-x} + \sqrt{1+x}) + \frac{1}{2}(\arcsin x - x).$

7.3. $y = arctg\sqrt{x^2-1} - \frac{\ln x}{\sqrt{x^2-1}}.$

7.4. $y = 3\arcsin\frac{3}{x+2} + \sqrt{x^2+4x-5}.$

7.5. $y = \sqrt{(3-x)(x+2)} + 5\arcsin\sqrt{(x+2)/5}.$

7.6. $y = x(\arcsin x)^2 + 2\sqrt{1-x^2}\arcsin x - 2x.$

7.7. $y = \frac{\sqrt{1-x^2}}{x} + \arcsin x.$

7.8. $y = x^3\arccos x - \frac{x^2+2}{3}\sqrt{1-x^2}.$

7.9. $y = \frac{\sqrt{x^2+2}}{x^2} - \frac{1}{\sqrt{2}}\ln\frac{\sqrt{2}+\sqrt{x^2+2}}{x}.$

7.10. $y = (x/4)(10-x^2)\sqrt{4-x^2} + 6\arcsin(x/2).$

7.11. $y = \arcsin\frac{1}{2x+3} + 2\sqrt{x^2+3x+2}, 2x+3>0.$

7.12. $y = x\arcsin\sqrt{\frac{x}{x+1}} - \sqrt{x} + arctg\sqrt{x}.$

7.13. $y = \frac{x\arcsin x}{\sqrt{1-x^2}} + \ln\sqrt{1-x^2}.$

7.14. $y = 4\ln\frac{x}{1+\sqrt{1-4x^2}} - \frac{\sqrt{1-4x^2}}{x^2}.$

7.15. $y = x(2x^2+5)\sqrt{x^2+1} + 3\ln(x+\sqrt{x^2+1}).$

7.16. $y = x^3 \arcsin x + \frac{x^2+2}{3}\sqrt{1-x^2}.$

7.17. $y = 3\arcsin\frac{3}{4x+1} + 2\sqrt{4x^2+2x-2}, 4x+1>0.$

7.18. $y = \sqrt{1+x^2}\,arctgx - \ln(x+\sqrt{1+x^2}).$

7.19. $y = 2\arcsin\frac{2}{3x+4} + \sqrt{9x^2+24x+12}, 3x+4>0.$

7.20. $y = x(2x^2+1)\sqrt{x^2+1} - \ln(x+\sqrt{x^2+1}).$

7.21. $y = \ln(x+\sqrt{1+x^2}) - \frac{\sqrt{1+x^2}}{x}.$

7.22. $y = \sqrt{1-3x-2x^2} + \frac{3}{2\sqrt{2}}\arcsin\frac{4x+3}{\sqrt{17}}.$

7.23. $y = \sqrt{(4+x)(1+x)} + 3\ln(\sqrt{4+x}+\sqrt{1+x}).$

7.24. $y = \ln\frac{\sqrt{x^2-x+1}}{x} + \sqrt{3}\,arctg\frac{2x-1}{\sqrt{3}}.$

7.25. $y = \frac{1}{12}\ln\frac{x^4-x^2+1}{(x^2+1)^2} - \frac{1}{2\sqrt{3}}\,arctg\frac{\sqrt{3}}{2x^2-1}.$

7.26. $y = 4\arcsin\frac{4}{2\sqrt{3}+3} + \sqrt{4x^2+12x-7}, 2x+3>0.$

7.27. $y = 2\arcsin\frac{2}{3x+1} + \sqrt{9x^2+6x-3}, 3x+1>0.$

7.28. $y = (2+3x)\sqrt{x-1} + \frac{3}{2}\,arctg\sqrt{x-1}.$

7.29. $y = \frac{1}{3}(x-2)\sqrt{x+1} + \ln(\sqrt{x+1}+1).$

7.30. $y = \sqrt{x^2+1} - \frac{1}{2}\ln\frac{\sqrt{x^2+1}-x}{\sqrt{x^2+1}+1}.$

7.31. $y = \ln(x+\sqrt{1+x^2}) - \frac{\sqrt{1+x^2}}{x}.$

8. Найти производную

8.1. $y = \dfrac{1}{24}\left(x^2+8\right)\sqrt{x^2-4} + \dfrac{x^2}{16}\arcsin\dfrac{2}{x}, \quad x>0.$

8.2. $y = \dfrac{4x+1}{16x^2+8x+3} + \dfrac{1}{\sqrt{2}}\operatorname{arctg}\dfrac{4x+1}{\sqrt{2}}.$

8.3. $y = 2x - \ln\left(1+\sqrt{1-\mathrm{e}^{4x}}\right) - \mathrm{e}^{-2x}\arcsin\left(\mathrm{e}^{2x}\right).$

8.4. $y = \sqrt{9x^2-12x+5}\operatorname{arctg}\left(3x-2\right) - \ln\left(3x-2+\sqrt{9x^2-12x+5}\right).$

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

8.6. $y=\frac{x^2}{81}\arcsin\frac{3}{x}+\frac{1}{81}\left(x^2+18\right)\sqrt{x^2-9},\quad x>0.$

8.7. $y=\frac{1}{\sqrt{2}}\operatorname{arctg}\frac{3x-1}{\sqrt{2}}+\frac{1}{3}\cdot\frac{3x-1}{3x^2-2x+1}.$

8.8. $y=3x-\ln\left(1+\sqrt{1-\mathrm{e}^{6x}}\right)-\mathrm{e}^{-3x}\arcsin\left(\mathrm{e}^{3x}\right).$

8.9. $y=\ln\left(4x-1+\sqrt{16x^2-8x+2}\right)-\sqrt{16x^2-8x+2}\operatorname{arctg}\left(4x-1\right).$

8.10. $y=\ln\frac{1+2\sqrt{-x-x^2}}{2x+1}+\frac{4}{2x+1}\sqrt{-x-x^2}.$

8.11.

$y=\left(2x+3\right)^4\cdot\arcsin\frac{1}{2x+3}+\frac{2}{3}\left(4x^2+12x+11\right)\sqrt{x^2+3x+2},\quad 2x+3>0.$

8.12. $y=\frac{x+2}{x^2+4x+6}+\frac{1}{\sqrt{2}}\operatorname{arctg}\frac{x+2}{\sqrt{2}}.$

8.13. $y=5x-\ln\left(1+\sqrt{1-\mathrm{e}^{10x}}\right)-\mathrm{e}^{-5x}\arcsin\left(\mathrm{e}^{5x}\right).$

8.14. $y=\sqrt{x^2-8x+17}\operatorname{arctg}\left(x-4\right)-\ln\left(x-4+\sqrt{x^2-8x+17}\right).$

8.15. $y=\ln\frac{1+\sqrt{-3+4x-x^2}}{2-x}+\frac{2}{2-x}\sqrt{-3+4x-x^2}.$

8.16.

$y=\left(3x^2-4x+2\right)\sqrt{9x^2-12x+3}+\left(3x-2\right)^4\arcsin\frac{1}{3x-2},\quad 3x-2>0.$

8.17. $y=\frac{1}{\sqrt{2}}\operatorname{arctg}\frac{x-1}{\sqrt{2}}+\frac{x-1}{x^2-2x+3}.$

8.18. $y=\ln\left(\mathrm{e}^{5x}+\sqrt{\mathrm{e}^{10x}-1}\right)+\arcsin\left(\mathrm{e}^{-5x}\right).$

8.19. $y=\ln\left(2x-3+\sqrt{4x^2-12x+10}\right)-\sqrt{4x^2-12x+10}\,\operatorname{arctg}(2x-3).$

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

8.21. $y=\dfrac{2}{3}\left(4x^2-4x+3\right)\sqrt{x^2-x}+(2x-1)^4\arcsin\dfrac{1}{2x-1},\quad 2x-1>0.$

8.22. $y=\dfrac{2x-1}{4x^2-4x+3}+\dfrac{1}{\sqrt{2}}\operatorname{arctg}\dfrac{2x-1}{\sqrt{2}}.$

8.23. $y=\arcsin\left(\mathrm{e}^{-4x}\right)+\ln\left(\mathrm{e}^{4x}+\sqrt{\mathrm{e}^{8x}-1}\right).$

8.24. $y=\ln\left(5x+\sqrt{25x^2+1}\right)-\sqrt{25x^2+1}\operatorname{arctg}5x.$

8.25. $y=\dfrac{2}{3x-2}\sqrt{-3+12x-9x^2}+\ln\dfrac{1+\sqrt{-3+12x-9x^2}}{3x-2}.$

8.26. $y=(3x+1)^4\arcsin\dfrac{1}{3x+1}+\left(3x^2+2x+1\right)\sqrt{9x^2+6x},\quad 3x+1>0.$

8.27. $y=\dfrac{1}{\sqrt{2}}\operatorname{arctg}\dfrac{2x+1}{\sqrt{2}}+\dfrac{2x+1}{4x^2+4x+3}.$

8.28. $y=\ln\left(\mathrm{e}^{3x}+\sqrt{\mathrm{e}^{6x}-1}\right)+\arcsin\left(\mathrm{e}^{-3x}\right).$

8.29. $y=\sqrt{49x^2+1}\operatorname{arctg}7x-\ln\left(7x+\sqrt{49x^2+1}\right).$

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

8.31. $y=\arcsin\left(\mathrm{e}^{-2x}\right)+\ln\left(\mathrm{e}^{2x}+\sqrt{\mathrm{e}^{4x}-1}\right).$

9. Найти производную.

9.1. $y=\dfrac{x\arcsin x}{\sqrt{1-x^2}}+\ln\sqrt{1-x^2}.$

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

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

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

9.5. $y = 3\arcsin\dfrac{3}{4x+1} + 2\sqrt{4x^2+2x-2}, \quad 4x+1>0.$

9.6. $y = \sqrt{1+x^2}\,\operatorname{arctg} x - \ln\left(x+\sqrt{1+x^2}\right).$

9.7. $y = 2\arcsin\dfrac{2}{3x+4} + \sqrt{9x^2+24x+12}, \quad 3x+4>0.$

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

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

9.10. $y = \sqrt{1-3x-2x^2} + \dfrac{3}{2\sqrt{2}}\arcsin\dfrac{4x+3}{\sqrt{17}}.$

9.11. $y = \sqrt{(4+x)(1+x)} + 3\ln\left(\sqrt{4+x}+\sqrt{1+x}\right).$

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

9.13. $y = \dfrac{1}{12}\ln\dfrac{x^4-x^2+1}{\left(x^2+1\right)^2} - \dfrac{1}{2\sqrt{3}}\operatorname{arctg}\dfrac{\sqrt{3}}{2x^2-1}.$

9.14. $y = 4\arcsin\dfrac{4}{2x+3} + \sqrt{4x^2+12x-7}, \quad 2x+3>0.$

9.15. $y = 2\arcsin\dfrac{2}{3x+1} + \sqrt{9x^2+6x-3}, \quad 3x+1>0.$

9.16. $y=(2+3x)\sqrt{x-1}-\frac{3}{2}\operatorname{arctg}\sqrt{x-1}.$

9.17. $y=\frac{1}{3}(x-2)\sqrt{x+1}+\ln\left(\sqrt{x+1}+1\right).$

9.18. $y=\sqrt{x^2+1}-\frac{1}{2}\ln\frac{\sqrt{x^2+1}-x}{\sqrt{x^2+1}+1}.$

9.19. $y=\ln\sqrt[3]{\frac{x-1}{x+1}}-\frac{1}{2}\left(\frac{1}{2}+\frac{1}{x^2-1}\right)\operatorname{arctg}x.$

9.20. $y=x\ln\left(\sqrt{1-x}+\sqrt{1+x}\right)+\frac{1}{2}(\arcsin x-x).$

9.21. $y=\operatorname{arctg}\sqrt{x^2-1}-\frac{\ln x}{\sqrt{x^2-1}}.$

9.22. $y=3\arcsin\frac{3}{x+2}+\sqrt{x^2+4x-5}.$

9.23. $y=\sqrt{(3-x)(2+x)}+5\arcsin\sqrt{\frac{x+2}{5}}.$

9.24. $y=x(\arcsin x)^2+2\sqrt{1-x^2}\arcsin x-2x.$

9.25. $y=\frac{\sqrt{1-x^2}}{x}+\arcsin x.$

9.26. $y=x^2\arccos x-\frac{x^2+2}{3}\sqrt{1-x^2}.$

9.27. $y=\frac{\sqrt{x^2+2}}{x^2}-\frac{1}{\sqrt{2}}\ln\frac{\sqrt{2}+\sqrt{x^2+2}}{x}.$

9.28. $y=\frac{x}{4}(10-x^2)\sqrt{4-x^2}+6\arcsin\frac{x}{2}.$

9.29. $y=\arcsin\frac{1}{2x+3}+2\sqrt{x^2+3x+2},\quad 2x+3>0.$

9.30. $y = x\arcsin\sqrt{\dfrac{x}{x+1}} - \sqrt{x} + \operatorname{arctg}\sqrt{x}.$

9.31. $y = \dfrac{\arcsin x}{\sqrt{1-x^2}} + \dfrac{1}{2}\ln\dfrac{1-x}{1+x}.$

10. Найти производную.

10.1. $y = \dfrac{1}{\sin\alpha}\ln\left(\operatorname{tg} x + \operatorname{ctg}\alpha\right).$

10.2. $y = x\cos\alpha + \sin\alpha\ln\sin\left(x-\alpha\right).$

10.3. $y = \dfrac{1}{2\sqrt{2}}\left[\sin\ln x - \left(\sqrt{2}-1\right)\cdot\cos\ln x\right]x^{\sqrt{2}+1}.$

10.4. $y = \operatorname{arctg}\left(\dfrac{\cos x}{\sqrt[4]{\cos 2x}}\right).$

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

10.6. $y = \left(a^2+b^2\right)^{-1/2}\cdot\arcsin\left(\dfrac{\sqrt{a^2+b^2}\sin x}{b}\right).$

10.7. $y = \dfrac{7^x\left(3\sin 3x + \cos 3x\cdot\ln 7\right)}{9+\ln^2 7}.$

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

10.9. $y = \dfrac{1}{a\left(1+a^2\right)}\left[\operatorname{arctg}\left(a\cos x\right) + a\ln\operatorname{tg}\dfrac{x}{2}\right].$

10.10. $y = -\dfrac{1}{3\sin^3 x} - \dfrac{1}{\sin x} + \dfrac{1}{2}\ln\dfrac{1+\sin x}{1-\sin x}.$

10.11. $y = \left(1+x^2\right)\mathrm{e}^{\operatorname{arctg} x}.$

10.12. $y = \dfrac{\operatorname{ctg} x + x}{1 - x\operatorname{ctg} x}.$

10.13. $y = \dfrac{1}{2\sin\dfrac{\alpha}{2}} \operatorname{arctg} \dfrac{2x\sin\dfrac{\alpha}{2}}{1 - x^2}.$

10.14. $y = \operatorname{arctg} \dfrac{\sqrt{\sqrt{x^4 + 1} - x^2}}{x}, \quad x > 0.$

10.15. $y = \dfrac{6^x \left(\sin 4x \cdot \ln 6 - 4\cos 4x\right)}{16 + \ln^2 6}.$

10.16. $y = \operatorname{arctg} \dfrac{\sqrt{2\operatorname{tg} x}}{1 - \operatorname{tg} x}.$

10.17. $y = \operatorname{arctg} \dfrac{2\sin x}{\sqrt{9\cos^2 x - 4}}.$

10.18. $y = \dfrac{5^x \left(2\sin 2x + \cos 2x \cdot \ln 5\right)}{4 + \ln^2 5}.$

10.19. $y = \ln \dfrac{\sqrt{2} + \operatorname{th} x}{\sqrt{2} - \operatorname{th} x}.$

10.20. $y = \dfrac{3^x \left(4\sin 4x + \ln 3 \cdot \cos 4x\right)}{16 + \ln^2 3}.$

10.21. $y = \dfrac{4^x \left(\ln 4 \cdot \sin 4x - 4\cos 4x\right)}{16 + \ln^2 4}.$

10.22. $y = \dfrac{\cos x}{\sin^2 x} - 2\cos x - 3\ln\operatorname{tg} \dfrac{x}{2}.$

10.23. $y = \dfrac{5^x \left(\sin 3x \cdot \ln 5 - 3\cos 3x\right)}{9 + \ln^2 5}.$

10.24. $y = x - \ln\left(1 + \mathrm{e}^x\right) - 2\,\mathrm{e}^{-\frac{x}{2}} \operatorname{arctg} \mathrm{e}^{\frac{x}{2}}.$

10.25. $y = \dfrac{2^x\left(\sin x + \cos x \cdot \ln 2\right)}{1 + \ln^2 2}$.

10.26. $y = \dfrac{\ln\left(\operatorname{ctg} x + \operatorname{ctg}\alpha\right)}{\sin\alpha}$.

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

10.28. $y = \dfrac{\cos x}{3\left(2 + \sin x\right)} + \dfrac{4}{3\sqrt{3}}\operatorname{arctg}\dfrac{2\operatorname{tg}\left(x/2\right) + 1}{\sqrt{3}}$.

10.29. $y = \dfrac{3^x\left(\ln 3 \cdot \sin 2x - 2\cos 2x\right)}{\ln^2 3 + 4}$.

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

10.31. $y = \sqrt{\dfrac{\operatorname{tg} x + \sqrt{2\operatorname{tg} x + 1}}{\operatorname{tg} x - \sqrt{2\operatorname{tg} x + 1}}}$.