POCHODNE

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Obliczyć pochodną podanej funkcji (w jednym kroku, bez upraszczania i wyznaczania dziedziny).

1) $y = x\left(\operatorname{arccot}\sqrt{2^x - e^{-x^2}}\right)^7 + \dfrac{\cos\frac{1-2x}{\sqrt{3}}}{x - \ln\frac{1}{x}}$

2) $y = \dfrac{x + \sin^3 2x}{x - \cos^2 3x} - \ln^2\dfrac{2}{x} \cdot \arcsin\sqrt{1 - 3^{x^2+x}}$

3) $y = \sqrt{\ln\tan^3\dfrac{2-3x}{5}} \cdot \dfrac{x + 2\arcsin e^{-x}}{\cosh\frac{1}{x}}$

4) $y = \dfrac{x + \ln\sqrt{x+1}}{\sqrt[3]{x}\cdot\sin 3x} + \arccos^3\dfrac{1}{x}$

5) $y = \dfrac{1 + \ln\sqrt{x-1}}{\sqrt[3]{x}\cdot\cos^2 2x} - \arcsin\dfrac{2}{x}$

6) $y = \dfrac{1 + \ln\sqrt{2x-1}}{\sqrt[4]{x}\cdot\cos^2 2x} + \arctan\dfrac{1}{x}$

7) $y = \dfrac{\sqrt{x - 2^{-x}}\cdot\ln\tan 2x}{x - (\arcsin\frac{1}{x})^5}$

8) $y = \cot\dfrac{1-2x}{\sqrt{5}}\cdot\ln 2 - x\arcsin\left(\dfrac{x - 2^{x^2}}{1 + 3^{-x}}\right)^4$

9) $y = \tan\dfrac{1+2x}{\sqrt{5}}\cdot\cos 1 - x\arccos\left(\dfrac{1 - 2^{x^2}}{x + 3^{-x}}\right)^3$

10) $y = \arccos\left(\dfrac{x + e^x}{1 - e^{-x}}\right)^5 + \sqrt{\ln\dfrac{1}{x}}\cdot\tan\dfrac{1-x}{\sqrt{2}}$

11) $y = \arctan\dfrac{1}{x} + \ln^3(2x-1)\cdot\sin\sqrt{\dfrac{1-2x}{2^{x^2}}}$

12) $y = \dfrac{\ln^2 \frac{1}{x+1}}{\sqrt{3}} - \dfrac{3^{-x} \arctan \sqrt{x}}{\sin^2(\frac{3x-1}{2})^7}$

13) $y = x \sin 1 + \dfrac{\arcsin \frac{1}{x} - 2^{x^3} \ln(x + \sqrt{\tan \frac{x}{2}})}{\cos^2 x^6}$

14) $y = \dfrac{\sin \frac{1}{x} \cdot \arccos(3^{-x} - x^4)}{3x + \ln 3 - \tan^7(\ln \sqrt{5x})}$

15) $y = \ln^3 \left(x + \sqrt{x^2 - \dfrac{1}{x}} \right) - \dfrac{1 + \arcsin(2x)^5}{\sqrt{x} \cos^2 \frac{x}{\sqrt{3}}}$

16) $y = \dfrac{\arccos \sqrt{e^{-2x} + 1}}{x^{\ln 3} \cdot \tan^3(x+1)^7} + \dfrac{\ln \frac{1}{x}}{2}$

17) $y = \tanh \dfrac{1-x}{\sqrt{3}} - \sin^5 \left(\dfrac{\ln(x^2 + x)}{1 - e^{-2x}} \right)^3 \cdot \arccos \sqrt{\dfrac{1}{x} - 2^x}$

18) $y = x \ln^7(\cos x) - \left(\cosh \dfrac{2x+3}{\sqrt{5}} + \dfrac{\arcsin \frac{1}{x}}{\sqrt{3x - e^{x-x^2}}} \right)^6$

19) $y = \dfrac{\tanh 5x}{\sqrt{2}} + \dfrac{\arccos^3 \frac{1}{x}}{2^{-3x+1} \cdot \ln(x - \sqrt{1-x})}$

20) $y = \cos^7(3x-1)^2 + \dfrac{2^{x^2} \cdot \ln(x + \sqrt{\tan \frac{x+1}{\sqrt{2}}})}{\arcsin \sqrt{1-x}}$

21) $y = \dfrac{\left(2 \arctan \frac{1}{x} + 3^{-x^2} \right)^5}{\ln(x - \sqrt{x}) \cdot \cos 3x}$

22) $y = \dfrac{\sqrt[3]{3^{-x} - x^2} + \ln \frac{1}{x}}{x \arcsin^3(\cot \frac{1-x}{\sqrt{2}})}$

23) $y = \dfrac{2 \cos 5x}{\sqrt{2}} + \dfrac{\ln^3 \frac{1}{x}}{2^{3x^2 - x} \cdot \arccos \sqrt{1-x}}$

24) $y = \dfrac{\sqrt{x^2 - 3^x} - \frac{1}{x}\arcsin\sqrt{x}}{x + \ln^3 \cos\frac{2x-1}{3}}$

25) $y = \dfrac{\operatorname{arccot}\sqrt{x} - x\ln^2 \tan\frac{1-3x}{2}}{\sqrt{\frac{1}{x} - e^{-3x}}}$

26) $y = \ln^7 \dfrac{x + \cos x}{x - \sin 2x} - \dfrac{\arctan\frac{1}{x}}{\sqrt{xe^x - 3^{-2x}}}$

27) $y = x\sqrt{\ln(e^{-x} + 2^x)} + \dfrac{\sqrt[3]{x}\arcsin 2x}{\tan\frac{1-2x}{3}}$

28) $y = \cot\dfrac{5x-2}{\sqrt{3}} + \dfrac{\sqrt{x}\ln^2\frac{1}{x}}{\arcsin(1-x)}$

29) $y = \ln(\sin x + \cos 1) - \dfrac{\sqrt{\arctan x^2}\cos^3 x}{3x - e^{-x^2+x}}$

30) $y = \tan\left(\dfrac{\ln(x^2 - x)}{1 - e^{-x}}\right)^5 \cdot \arcsin\sqrt{\dfrac{1}{x} - 2^x}$

31) $y = \dfrac{x\sin^7 x^3 - \arctan\sqrt{\frac{1-2x}{3}}}{\ln^2\frac{1}{x}}$

32) $y = (\tan x)\ln 2 - \dfrac{\arcsin\sqrt{1-2x}}{\cos\frac{x}{2}\cdot\ln(\frac{1}{x} - e^{3x})}$

33) $y = \ln\dfrac{1}{x + 2^x}\cdot\cos 1 + \dfrac{x\sqrt{\sin 2x - x^4}}{\arctan\sqrt{x}}$

34) $y = \ln^2\left(x + \sqrt{x^2 - \dfrac{2}{x}}\right) - \dfrac{1 + \arctan(2x)^5}{\sqrt{x}\sin^2\frac{x}{\sqrt{3}}}$

35) $y = \dfrac{x + \ln\sin 2x}{x - 3x^2} - \cos\dfrac{2}{x}\cdot\arcsin\sqrt{1 - 3^{x^2}}$

36) $y = \tan\dfrac{1-x}{\sqrt{3}} - \ln^3\left(\dfrac{x^2+x}{1-e^{-2x}}\right) \cdot \arcsin\sqrt{\dfrac{1}{x} - 2^x}$

37) $y = x\ln^3(\cos x - x)^4 - \dfrac{\cos\frac{2x+3}{\sqrt{5}} + \arcsin\frac{1}{x}}{\sqrt{3x + e^{-x^2}}}$

38) $y = \ln^3\left(\dfrac{\tanh 5x}{\sqrt{2}}\right)^4 + \dfrac{x\arccos\sqrt{1-\frac{1}{x}}}{\sqrt{1-2x}}$

39) $y = \cos^3(3x-1)^5 + \dfrac{2^{x+x^2}\cdot\ln(x+\sqrt{\frac{x+1}{\sqrt{2}}})}{\arcsin\sqrt{1-x}}$

40) $y = \sin 10 + \dfrac{\left(2\operatorname{arccot}\frac{1}{x} + 3^{-x^2}\right)^5}{\ln(x-\sqrt{x})\cdot\tan 3x}$

41) $y = x\ln x - \dfrac{\arcsin\sqrt{x}}{2^{-x^2+x} + \cos\frac{3+2x}{\sqrt{2}}}$

42) $y = \sqrt[3]{x^2}\ln 2 + \dfrac{\ln\tan 2x - x\arcsin\sqrt{x+1}}{(\frac{1}{x} - e^{x^2})^3}$

43) $y = x\arctan\dfrac{1}{x} - \dfrac{3^{-x} + \sqrt{\frac{2-x}{\sqrt{3}}}}{\ln(x^2 + \cos^2 x^3)}$

44) $y = \left(\dfrac{3}{x} - 2^{x^3}\right)^6 + \dfrac{\ln\sin\frac{2x+1}{\sqrt{5}} - x\arcsin\sqrt{x+2}}{\sqrt[4]{x^5}}$

45) $y = \arctan\dfrac{\sin 2x - \cos x^4}{\cosh^3 x} - (\arccos\sqrt{x+2^x})\cdot\ln\sin\dfrac{2x+1}{\sqrt{5}}$

Odpowiedzi:

1) $y' = \left(\operatorname{arccot}\sqrt{2^x - e^{-x^2}}\right)^7 + x \cdot 7\left(\operatorname{arccot}\sqrt{2^x - e^{-x^2}}\right)^6 \left(-\frac{1}{1+2^x-e^{-x^2}}\right) \cdot \frac{1}{2\sqrt{2^x-e^{-x^2}}} \cdot \left[2^x \ln 2 - e^{-x^2}(-2x)\right] +$

$$+\frac{-\sin\frac{1-2x}{\sqrt{3}} \cdot \left(-\frac{2}{\sqrt{3}}\right)\left(x - \ln\frac{1}{x}\right) - \cos\frac{1-2x}{\sqrt{3}}\left[1 - x\left(-\frac{1}{x^2}\right)\right]}{\left(x - \ln\frac{1}{x}\right)^2}$$

2) $y' = \dfrac{(1+3\sin^2 2x \cdot \cos 2x \cdot 2)(x - \cos^2 3x) - (x + \sin^3 2x)\left[1 - 2\cos 3x \cdot (-\sin 3x) \cdot 3\right]}{(x-\cos^2 3x)^2} -$

$$+\left\{2\ln\frac{2}{x} \cdot \frac{x}{2} \cdot \left(-\frac{2}{x^2}\right) \cdot \arcsin\sqrt{1-3^{x^2+x}} + \ln^2\frac{2}{x} \cdot \frac{1}{\sqrt{1-(1-3^{x^2+x})}} \cdot \frac{1}{2\sqrt{1-3^{x^2+x}}} \cdot \left[-3^{x^2+x}\ln 3 \cdot (2x+1)\right]\right\}$$

3) $y' = \dfrac{3\tan^2\frac{2-3x}{5} \cdot \frac{1}{\cos^2\frac{2-3x}{5}} \cdot \left(-\frac{3}{5}\right)}{2\sqrt{\ln\tan^3\frac{2-3x}{5} \cdot \tan^3\frac{2-3x}{5}}} \cdot \dfrac{x + 2\arcsin e^{-x}}{\cosh\frac{1}{x}} + \sqrt{\ln\tan^3\dfrac{2-3x}{5}} \cdot \dfrac{\left(1 + 2 \cdot \frac{-e^{-x}}{\sqrt{1-e^{-2x}}}\right) \cdot \cosh\frac{1}{x} - (x + 2\arcsin e^{-x}) \cdot \sinh\frac{1}{x} \cdot \left(-\frac{1}{x^2}\right)}{\left(\cosh\frac{1}{x}\right)^2}$

4) $y' = \dfrac{\left(1 + \frac{1}{\sqrt{x+1}} \cdot \frac{1}{2\sqrt{x+1}}\right)\sqrt[3]{x}\sin 3x - \left(x + \ln\sqrt{x+1}\right)\left(\frac{1}{3}x^{-\frac{2}{3}}\sin 3x + \sqrt[3]{x} \cdot \cos 3x \cdot 3\right)}{\sqrt[3]{x^2}\sin^2 3x} + 3\arccos^2\dfrac{1}{x} \cdot \dfrac{-1}{\sqrt{1-\frac{1}{x^2}}} \cdot \left(-\dfrac{1}{x^2}\right)$

5) $y' = \dfrac{\frac{1}{\sqrt{x-1}} \cdot \frac{1}{2\sqrt{x-1}} \cdot \sqrt[3]{x} \cdot \cos^2 2x - (1 + \ln\sqrt{x-1}) \cdot \left[\frac{1}{3}x^{-\frac{2}{3}}\cos^2 2x + \sqrt[3]{x} \cdot 2\cos 2x \cdot (-\sin 2x) \cdot 2\right]}{\sqrt[3]{x^2} \cdot \cos^4 2x} - \dfrac{1}{\sqrt{1-\frac{4}{x^2}}} \cdot \left(-\dfrac{2}{x^2}\right)$

6) $y' = \dfrac{\frac{1}{\sqrt{2x-1}} \cdot \frac{1}{2\sqrt{2x-1}} \cdot 2 \cdot \sqrt[4]{x} \cdot \cos^2 2x - (1 + \ln\sqrt{2x-1}) \cdot \left[\frac{1}{4}x^{-\frac{3}{4}} \cdot \cos^2 2x + \sqrt[4]{x} \cdot 2\cos 2x \cdot (-\sin 2x) \cdot 2\right]}{(\sqrt[4]{x} \cdot \cos^2 2x)^2} + \dfrac{1}{1 + \left(\frac{1}{x}\right)^2} \cdot \left(-\dfrac{1}{x^2}\right)$

7) $y' = \dfrac{\left\{\frac{1}{2\sqrt{x-2^{-x}}}\left[1-2^{-x}\ln 2\cdot(-1)\right]\ln\tan 2x+\sqrt{x-2^{-x}}\cdot\frac{1}{\tan 2x}\cdot\frac{1}{\cos^2 2x}\cdot 2\right\}\left[x-\left(\arcsin\frac{1}{x}\right)^5\right]-\sqrt{x-2^{-x}}\cdot\ln\tan 2x\cdot\left[1-5\left(\arcsin\frac{1}{x}\right)^4\cdot\frac{1}{\sqrt{1-\frac{1}{x^2}}}\cdot\left(-\frac{1}{x^2}\right)\right]}{\left[x-\left(\arcsin\frac{1}{x}\right)^5\right]^2}$

8) $y' = \ln 2\cdot\dfrac{-1}{\sin^2\frac{1-2x}{\sqrt{5}}}\cdot\left(-\dfrac{2}{\sqrt{5}}\right)-\left\{\arcsin\left(\dfrac{x-2^{x^2}}{1+3^{-x}}\right)^4+x\cdot\dfrac{1}{\sqrt{1-\left(\frac{x-2^{x^2}}{1+3^{-x}}\right)^8}}\cdot 4\left(\dfrac{x-2^{x^2}}{1+3^{-x}}\right)^3\cdot\dfrac{(1-2^{x^2}\ln 2\cdot 2x)(1+3^{-x})-(x-2^{x^2})\cdot 3^{-x}\ln 3\cdot(-1)}{(1+3^{-x})^2}\right\}$

9) $y' = \cos 1\cdot\dfrac{1}{\cos^2\frac{1+2x}{\sqrt{5}}}\cdot\dfrac{2}{\sqrt{5}}-\left\{\arccos\left(\dfrac{1-2^{x^2}}{x+3^{-x}}\right)^3+x\cdot\dfrac{-1}{\sqrt{1-\left(\frac{1-2^{x^2}}{x+3^{-x}}\right)^6}}\cdot 3\left(\dfrac{1-2^{x^2}}{x+3^{-x}}\right)^2\cdot\dfrac{(-2^{x^2}\ln 2\cdot 2x)(x+3^{-x})-(1-2^{x^2})[1+3^{-x}\ln 3\cdot(-1)]}{(x+3^{-x})^2}\right\}$

10) $y' = \dfrac{-5\left(\frac{x+e^x}{1-e^{-x}}\right)^4\cdot\frac{(1+e^x)(1-e^{-x})-(x+e^x)(-e^{-x})(-1)}{(1-e^{-x})^2}}{\sqrt{1-\left(\frac{x+e^x}{1-e^{-x}}\right)^{10}}}+\dfrac{1}{2\sqrt{\ln\frac{1}{x}}}\cdot x\cdot\dfrac{-1}{x^2}\cdot\tan\dfrac{1-x}{\sqrt{2}}+\sqrt{\ln\dfrac{1}{x}}\cdot\dfrac{1}{\cos^2\frac{1-x}{\sqrt{2}}}\cdot\left(-\dfrac{1}{\sqrt{2}}\right)$

11) $y' = \dfrac{1}{1+\left(\frac{1}{x}\right)^2}\cdot\left(-\dfrac{1}{x^2}\right)+3\ln^2(2x-1)\cdot\dfrac{1}{2x-1}\cdot 2\cdot\sin\sqrt{\dfrac{1-2x}{2^{x^2}}}+\ln^3(2x-1)\cdot\cos\sqrt{\dfrac{1-2x}{2^{x^2}}}\cdot\dfrac{1}{2\sqrt{\frac{1-2x}{2^{x^2}}}}\cdot\dfrac{-2\cdot 2^{x^2}-(1-2x)\cdot 2^{x^2}\ln 2\cdot 2x}{2^{2x^2}}$

12) $y' = \dfrac{1}{\sqrt{3}}\cdot 2\ln\dfrac{1}{x+1}\cdot(x+1)\cdot\left(-\dfrac{1}{(x+1)^2}\right)+$

$-\dfrac{\left[3^{-x}\ln 3\cdot(-1)\cdot\arctan\sqrt{x}+3^{-x}\cdot\frac{1}{1+x}\frac{1}{2\sqrt{x}}\right]\cdot\sin^2\left(\frac{3x-1}{2}\right)^7-3^{-x}\cdot\arctan\sqrt{x}\cdot 2\sin\left(\frac{3x-1}{2}\right)^7\cdot\cos\left(\frac{3x-1}{2}\right)^7\cdot 7\left(\frac{3x-1}{2}\right)^6\cdot\frac{3}{2}}{\sin^4\left(\frac{3x-1}{2}\right)^7}$

13) $y' = \sin 1 + \frac{1}{\cos^4 x^6}\left\{\left[\frac{1}{\sqrt{1-\frac{1}{x^2}}}\cdot\left(-\frac{1}{x^2}\right) - \left[2^{x^3}\ln 2\cdot 3x^2\cdot\ln\left(x+\sqrt{\tan\frac{x}{2}}\right) + 2^{x^3}\cdot\frac{1}{x+\sqrt{\tan\frac{x}{2}}}\cdot\left(1+\frac{1}{2\sqrt{\tan\frac{x}{2}}}\cdot\frac{1}{\cos^2\frac{x}{2}}\cdot\frac{1}{2}\right)\right]\right]\cdot\cos^2 x^6 -$

$+\left[\arcsin\frac{1}{x} - 2^{x^3}\cdot\ln\left(x+\sqrt{\tan\frac{x}{2}}\right)\right]\cdot 2\cos x^6\cdot(-\sin x^6)\cdot 6x^5\Big\}$

14) $y' = \dfrac{\left[\cos\frac{1}{x}\cdot\left(-\frac{1}{x^2}\right)\cdot\arccos(3^{-x}-x^4) + \sin\frac{1}{x}\cdot\left(-\frac{1}{\sqrt{1-(3^{-x}-x^4)^2}}\right)\cdot(3^{-x}\ln 3\cdot(-1)-4x^3)\right]\cdot\left[3x+\ln 3-\tan^7(\ln\sqrt{5x})\right]}{(3x+\ln 3-\tan^7(\ln\sqrt{5x}))^2} +$

$-\dfrac{\sin\frac{1}{x}\cdot\arccos(3^{-x}-x^4)\left[3-7\tan^6(\ln\sqrt{5x})\cdot\frac{1}{\cos^2(\ln\sqrt{5x})}\cdot\frac{1}{\sqrt{5x}}\cdot\frac{1}{2\sqrt{5x}}\cdot 5\right]}{(3x+\ln 3-\tan^7(\ln\sqrt{5x}))^2}$

15) $y' = 3\ln^2\left(x+\sqrt{x^2-\frac{1}{x}}\right)\cdot\frac{1}{x+\sqrt{x^2-\frac{1}{x}}}\cdot\left[1+\frac{1}{2\sqrt{x^2-\frac{1}{x}}}\cdot\left(2x+\frac{1}{x^2}\right)\right] -$

$+\dfrac{\frac{1}{\sqrt{1-(2x)^{10}}}\cdot 5\cdot(2x)^4\cdot 2\cdot\sqrt{x}\cdot\cos^2\frac{x}{\sqrt{3}} - [1+\arcsin(2x)^5]\cdot\left[\frac{1}{2\sqrt{x}}\cdot\cos^2\frac{x}{\sqrt{3}} + \sqrt{x}\cdot 2\cos\frac{x}{\sqrt{3}}\cdot\left(-\sin\frac{x}{\sqrt{3}}\right)\cdot\frac{1}{\sqrt{3}}\right]}{x\cos^4\frac{x}{\sqrt{3}}}$

16) $y' = \dfrac{1}{\left[x^{\ln 3}\cdot\tan^3(x+1)^7\right]^2}\Bigg\{-\dfrac{1}{\sqrt{1-(e^{-2x}+1)}}\cdot\dfrac{1}{2\sqrt{e^{-2x}+1}}\cdot e^{-2x}\cdot(-2)\cdot x^{\ln 3}\cdot\tan^3(x+1)^7 -$

$+\arccos\sqrt{e^{-2x}+1}\cdot\left[\ln 3\cdot x^{\ln 3-1}\cdot\tan^3(x+1)^7 + x^{\ln 3}\cdot 3\tan^2(x+1)^7\cdot\dfrac{1}{\cos^2(x+1)^7}\cdot 7(x+1)^6\right]\Bigg\} + \frac{1}{2}\cdot x\cdot\left(-\frac{1}{x^2}\right)$

17) $y' = \frac{1}{\cosh^2(\frac{1-x}{\sqrt{3}})} \cdot \left(-\frac{1}{\sqrt{3}}\right) -$

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

$$\left. + \sin^5\left(\frac{\ln(x^2+x)}{1-e^{-2x}}\right)^3 \cdot \frac{-1}{\sqrt{1-(\frac{1}{x}-2^x)}} \cdot \frac{1}{2\sqrt{\frac{1}{x}-2^x}} \cdot \left(-\frac{1}{x^2} - 2^x \cdot \ln 2\right) \right\}$$

18) $y' = \ln^7(\cos x) + x \cdot 7\ln^6(\cos x) \cdot \frac{-\sin x}{\cos x} - 6\left(\cosh\frac{2x+3}{\sqrt{5}} + \frac{\arcsin\frac{1}{x}}{\sqrt{3x-e^{x-x^2}}}\right)^5 \cdot$

$$\cdot \left\{ \sinh\frac{2x+3}{\sqrt{5}} \cdot \frac{2}{\sqrt{5}} + \frac{1}{3x-e^{x-x^2}} \cdot \left[\frac{1}{\sqrt{1-(\frac{1}{x})^2}} \cdot \left(-\frac{1}{x^2}\right) \cdot \sqrt{3x-e^{x-x^2}} - \arcsin\frac{1}{x} \cdot \frac{1}{2\sqrt{3x-e^{x-x^2}}} \cdot \left(3 - e^{x-x^2}\cdot(1-2x)\right) \right] \right\}$$

19) $y' = \frac{1}{\cosh^2 5x} \cdot \frac{5}{\sqrt{2}} + \frac{1}{(2^{-3x+1}\cdot\ln(x-\sqrt{1-x}))^2} \cdot$

$$\cdot \left\{ 3\arccos^2\frac{1}{x} \cdot \frac{-1}{\sqrt{1-(\frac{1}{x})^2}} \cdot \left(-\frac{1}{x^2}\right) \cdot 2^{-3x+1} \cdot \ln(x-\sqrt{1-x}) - \arccos^3\frac{1}{x} \cdot \left[2^{-3x+1}\cdot\ln 2\cdot(-3)\cdot\ln(x-\sqrt{1-x}) + 2^{-3x+1}\cdot\frac{1}{x-\sqrt{1-x}} \cdot \left(1 - \frac{-1}{2\sqrt{1-x}}\right) \right] \right\}$$

20) $y' = 7\cos^6(3x-1)^2 \cdot \left(-\sin(3x-1)^2\right) \cdot 2(3x-1)\cdot 3 + \frac{1}{(\arcsin\sqrt{1-x})^2} \cdot$

$$\cdot \left\{ \left[2^{x^2}\ln 2\cdot 2x\cdot\ln\left(x+\sqrt{\tan\frac{x+1}{\sqrt{2}}}\right) + 2^{x^2}\cdot\frac{1}{x+\sqrt{\tan\frac{x+1}{\sqrt{2}}}} \cdot \left(1 + \frac{1}{2\sqrt{\tan\frac{x+1}{\sqrt{2}}}} \cdot \frac{1}{\cos^2\frac{x+1}{\sqrt{2}}} \cdot \frac{1}{\sqrt{2}}\right) \right] \arcsin\sqrt{1-x} \; - \right.$$

$$\left. + 2^{x^2}\cdot\ln\left(x+\sqrt{\tan\frac{x+1}{\sqrt{2}}}\right) \cdot \frac{1}{\sqrt{1-(1-x)}} \cdot \frac{1}{2\sqrt{1-x}} \cdot (-1) \right\}$$

21) $y' = \frac{1}{(\ln(x-\sqrt{x})\cdot\cos 3x)^2}\cdot\left\{5\left(2\arctan\frac{1}{x}+3^{-x^2}\right)^4\cdot\left[2\cdot\frac{1}{1+\frac{1}{x^2}}\cdot(-\frac{1}{x^2})+3^{-x^2}\ln 3\cdot(-2x)\right]\cdot\ln(x-\sqrt{x})\cdot\cos 3x-\left(2\arctan\frac{1}{x}+3^{-x^2}\right)^5\cdot\right.$

$\left.\cdot\left[\frac{1}{x-\sqrt{x}}\cdot\left(1-\frac{1}{2\sqrt{x}}\right)\cdot\cos 3x+\ln(x-\sqrt{x})\cdot(-\sin 3x)\cdot 3\right]\right\}$

22) $y' = \frac{1}{(x\arcsin^3(\cot\frac{1-x}{\sqrt{2}}))^2}\cdot\left\{\left[\frac{1}{3\sqrt[3]{(3^{-x}-x^2)^2}}\cdot\left(3^{-x}\cdot\ln 3\cdot(-1)-2x\right)+x\cdot\left(-\frac{1}{x^2}\right)\right]\cdot x\arcsin^3(\cot\frac{1-x}{\sqrt{2}})-\right.$

$\left.+\left(\sqrt[3]{3^{-x}-x^2}+\ln\frac{1}{x}\right)\cdot\left[\arcsin^3(\cot\frac{1-x}{\sqrt{2}})+x\cdot 3\arcsin^2(\cot\frac{1-x}{\sqrt{2}})\cdot\frac{1}{\sqrt{1-(\cot\frac{1-x}{\sqrt{2}})^2}}\cdot\frac{-1}{\sin^2(\frac{1-x}{\sqrt{2}})}\cdot\left(-\frac{1}{\sqrt{2}}\right)\right]\right\}$

23) $y' = \frac{2}{\sqrt{2}}\cdot(-\sin 5x)\cdot 5+\frac{1}{(2^{3x^2-x}\cdot\arccos\sqrt{1-x})^2}\cdot\left\{3\ln^2\frac{1}{x}\cdot x\cdot(-\frac{1}{x^2})\cdot 2^{3x^2-x}\cdot\arccos\sqrt{1-x}-\right.$

$\left.+\ln^3\frac{1}{x}\cdot\left[2^{3x^2-x}\cdot\ln 2\cdot(6x-1)\cdot\arccos\sqrt{1-x}+2^{3x^2-x}\cdot\frac{-1}{\sqrt{1-(1-x)}}\cdot\frac{1}{2\sqrt{1-x}}\cdot(-1)\right]\right\}$

24) $y' = \frac{1}{(x+\ln^3\cos\frac{2x-1}{3})^2}\cdot\left\{\left[\frac{1}{2\sqrt{x^2-3^x}}\cdot(2x-3^x\ln 3)-\left(-\frac{1}{x^2}\cdot\arcsin\sqrt{x}+\frac{1}{x}\cdot\frac{1}{\sqrt{1-x}}\cdot\frac{1}{2\sqrt{x}}\right)\right]\cdot\left(x+\ln^3\cos\frac{2x-1}{3}\right)-\right.$

$\left.+\left(\sqrt{x^2-3^x}-\frac{1}{x}\arcsin\sqrt{x}\right)\cdot\left[1+3\ln^2\cos\frac{2x-1}{3}\cdot\frac{1}{\cos\frac{2x-1}{3}}\cdot\left(-\sin\frac{2x-1}{3}\right)\cdot\frac{2}{3}\right]\right\}$

25) $y' = \frac{1}{\frac{1}{x}-e^{-3x}}\left\{\left[-\frac{1}{1+x}\cdot\frac{1}{2\sqrt{x}}-\left(\ln^2\tan\frac{1-3x}{2}+x\cdot 2\ln\tan\frac{1-3x}{2}\cdot\frac{1}{\tan\frac{1-3x}{2}}\cdot\frac{1}{\cos^2\frac{1-3x}{2}}\cdot\left(-\frac{3}{2}\right)\right)\right]\sqrt{\frac{1}{x}-e^{-3x}}-\right.$

$\left.+\left(\operatorname{arccot}\sqrt{x}-x\ln^2\tan\frac{1-3x}{2}\right)\frac{1}{2\sqrt{\frac{1}{x}-e^{-3x}}}\left[-\frac{1}{x^2}-e^{-3x}\cdot(-3)\right]\right\}$

26) $y' = 7\ln^6 \dfrac{x+\cos x}{x-\sin 2x} \cdot \dfrac{x-\sin 2x}{x+\cos x} \cdot \dfrac{(1-\sin x)(x-\sin 2x)-(x+\cos x)(1-\cos 2x\cdot 2)}{(x-\sin 2x)^2} -$

$$+ \frac{\frac{1}{1+\frac{1}{x^2}} \cdot \left(-\frac{1}{x^2}\right) \sqrt{xe^x - 3^{-2x}} - \arctan\frac{1}{x} \cdot \frac{1}{2\sqrt{xe^x-3^{-2x}}} \left[e^x + xe^x - 3^{-2x}\ln 3 \cdot (-2)\right]}{xe^x - 3^{-2x}}$$

27) $y' = \sqrt{\ln(e^{-x}+2^x)} + x \cdot \dfrac{1}{2\sqrt{\ln(e^{-x}+2^x)}} \cdot \dfrac{1}{e^{-x}+2^x}\left[e^{-x}\cdot(-1) + 2^x \ln 2\right] + \dfrac{\left(\frac{1}{3}x^{-\frac{2}{3}}\arcsin 2x + \sqrt[3]{x}\cdot\frac{1}{\sqrt{1-4x^2}}\cdot 2\right)\tan\frac{1-2x}{3} - \sqrt[3]{x}\arcsin 2x \cdot \frac{1}{\cos^2\frac{1-2x}{3}}\cdot\left(-\frac{2}{3}\right)}{\tan^2\frac{1-2x}{3}}$

28) $y' = -\dfrac{1}{\sin^2\frac{5x-2}{\sqrt{3}}} \cdot \dfrac{5}{\sqrt{3}} + \dfrac{\left[\frac{1}{2\sqrt{x}}\ln^2\frac{1}{x} + \sqrt{x}\cdot 2\ln\frac{1}{x}\cdot x\cdot\left(-\frac{1}{x^2}\right)\right]\arcsin(1-x) - \sqrt{x}\ln^2\frac{1}{x}\cdot\frac{1}{\sqrt{1-(1-x)^2}}\cdot(-1)}{\arcsin^2(1-x)}$

29) $y' = \dfrac{1}{\sin x + \cos 1}\cdot\cos x - \dfrac{\left[\frac{1}{2\sqrt{\arctan x^2}}\cdot\frac{1}{1+x^4}\cdot 2x\cdot\cos^3 x + \sqrt{\arctan x^2}\cdot 3\cos^2 x\cdot(-\sin x)\right]\left(3x - e^{-x^2+x}\right) - \sqrt{\arctan x^2}\cdot\cos^3 x\left[3 - e^{-x^2+x}\cdot(-2x+1)\right]}{\left(3x-e^{-x^2+x}\right)^2}$

30) $y' = \dfrac{1}{\cos^2\left(\frac{\ln(x^2-x)}{1-e^{-x}}\right)^5}\cdot 5\left(\dfrac{\ln(x^2-x)}{1-e^{-x}}\right)^4 \cdot \dfrac{\frac{1}{x^2-x}\cdot(2x-1)(1-e^{-x}) - \ln(x^2-x)\cdot(-e^{-x})\cdot(-1)}{(1-e^{-x})^2}\cdot\arcsin\sqrt{\dfrac{1}{x}-2^x} +$

$$+ \tan\left(\frac{\ln(x^2-x)}{1-e^{-x}}\right)^5 \cdot \frac{1}{\sqrt{1-\left(\frac{1}{x}-2^x\right)}}\cdot\frac{1}{2\sqrt{\frac{1}{x}-2^x}}\cdot\left(\frac{-1}{x^2}-2^x\cdot\ln 2\right)$$

31) $$y' = \frac{\left[\sin^7 x^3 + x \cdot 7\sin^6 x^3 \cdot \cos x^3 \cdot 3x^2 - \frac{1}{1+\frac{1-2x}{3}} \cdot \frac{1}{2\sqrt{\frac{1-2x}{3}}} \cdot \left(-\frac{2}{3}\right)\right] \cdot \ln^2 \frac{1}{x} - \left(x\sin^7 x^3 - \arctan\sqrt{\frac{1-2x}{3}}\right) \cdot 2\ln\frac{1}{x} \cdot x \cdot \left(-\frac{1}{x^2}\right)}{\ln^4 \frac{1}{x}}$$

32) $$y' = \frac{1}{\cos^2 x} \cdot \ln 2 - \frac{\frac{1}{\sqrt{1-(1-2x)}} \cdot \frac{1}{2\sqrt{1-2x}} \cdot (-2) \cdot \cos\frac{x}{2} \cdot \ln\left(\frac{1}{x} - e^{3x}\right) - \arcsin\sqrt{1-2x} \cdot \left[-\sin\frac{x}{2} \cdot \frac{1}{2} \cdot \ln\left(\frac{1}{x} - e^{3x}\right) + \cos\frac{x}{2} \cdot \frac{1}{\frac{1}{x}-e^{3x}} \cdot \left(-\frac{1}{x^2} - 3e^{3x}\right)\right]}{\left(\cos\frac{x}{2} \cdot \ln\left(\frac{1}{x} - e^{3x}\right)\right)^2}$$

33) $$y' = (x + 2^x) \cdot \frac{-1}{(x+2^x)^2} \cdot (1 + 2^x \ln 2)\cos 1 + \frac{\left[(\sqrt{\sin 2x - x^4} + x \cdot \frac{1}{2\sqrt{\sin 2x - x^4}} \cdot (2\cos 2x - 4x^3)\right] \cdot \arctan\sqrt{x} - x\sqrt{\sin 2x - x^4} \cdot \frac{1}{1+x} \cdot \frac{1}{2\sqrt{x}}}{\arctan^2\sqrt{x}}$$

34) $$y' = 2\ln\left(x + \sqrt{x^2 - \frac{2}{x}}\right) \cdot \frac{1}{x + \sqrt{x^2 - \frac{2}{x}}} \cdot \left[1 + \frac{1}{2\sqrt{x^2 - \frac{2}{x}.}}\left(2x + \frac{2}{x^2}\right)\right] +$$

$$- \frac{\frac{1}{1+(2x)^{10}} \cdot 5(2x)^4 \cdot 2 \cdot \sqrt{x}\sin^2\frac{x}{\sqrt{3}} - \left(1 + \arctan(2x)^5\right)\left[\frac{1}{2\sqrt{x}} \cdot \sin^2\frac{x}{\sqrt{3}} + \sqrt{x} \cdot 2\sin\frac{x}{\sqrt{3}} \cdot \cos\frac{x}{\sqrt{3}} \cdot \frac{1}{\sqrt{3}}\right]}{x \cdot \sin^4\frac{x}{\sqrt{3}}}$$

35) $$y' = \frac{\left(1 + \frac{1}{\sin 2x} \cdot \cos 2x \cdot 2\right)(x - 3x^2) - (x + \ln\sin 2x) \cdot (1 - 6x)}{(x - 3x^2)^2} - \Bigg\{ -\sin\frac{2}{x} \cdot \left(-\frac{2}{x^2}\right) \cdot \arcsin\sqrt{1 - 3^{x^2}} +$$

$$+ \cos\frac{2}{x} \cdot \frac{1}{\sqrt{1-(1-3^{x^2})}} \cdot \frac{1}{2\sqrt{1-3^{x^2}}} \cdot \left(-3^{x^2}\ln 3 \cdot 2x\right)\Bigg\}$$

36) $y' = \dfrac{1}{\cos^2\left(\frac{1-x}{\sqrt{3}}\right)} \cdot \left(-\dfrac{1}{\sqrt{3}}\right) - \left\{3\ln^2\left(\dfrac{x^2+x}{1-e^{-2x}}\right) \cdot \dfrac{1-e^{-2x}}{x^2+x} \cdot \dfrac{(2x+1)\left(1-e^{-2x}\right) - \left(x^2+x\right)\left(-e^{-2x}\cdot(-2)\right)}{\left(1-e^{-2x}\right)^2} \cdot \arcsin\sqrt{\dfrac{1}{x}-2^x} + \right.$

$\left. + \ln^3\left(\dfrac{x^2+x}{1-e^{-2x}}\right) \cdot \dfrac{1}{\sqrt{1-\left(\frac{1}{x}-2^x\right)}} \cdot \dfrac{1}{2\sqrt{\frac{1}{x}-2^x}} \cdot \left(-\dfrac{1}{x^2} - 2^x\ln 2\right)\right\}$

37) $y' = \ln^3(\cos x - x)^4 + x \cdot 3\ln^2(\cos x - x)^4 \cdot \dfrac{1}{(\cos x - x)^4} \cdot 4(\cos x - x)^3(-\sin x - 1) +$

$- \dfrac{\left[-\sin\frac{2x+3}{\sqrt{5}} \cdot \frac{2}{\sqrt{5}} + \frac{1}{\sqrt{1-\frac{1}{x^2}}} \cdot \left(-\frac{1}{x^2}\right)\right] \cdot \sqrt{3x+e^{-x^2}} - \left(\cos\frac{2x+3}{\sqrt{5}} + \arcsin\frac{1}{x}\right) \cdot \frac{1}{2\sqrt{3x+e^{-x^2}}} \cdot \left[3 + e^{-x^2}\cdot(-2x)\right]}{3x+e^{-x^2}}$

38) $y' = 3\ln^2\left(\dfrac{\tanh 5x}{\sqrt{2}}\right)^4 \cdot \dfrac{1}{\left(\frac{\tanh 5x}{\sqrt{2}}\right)^4} \cdot 4\left(\dfrac{\tanh 5x}{\sqrt{2}}\right)^3 \cdot \dfrac{1}{\sqrt{2}} \cdot \dfrac{1}{\cosh^2 5x} \cdot 5 +$

$+ \dfrac{\left(\arccos\sqrt{1-\frac{1}{x}} + x\frac{-1}{\sqrt{1-\left(1-\frac{1}{x}\right)}} \cdot \frac{1}{2\sqrt{1-\frac{1}{x}}} \cdot \frac{1}{x^2}\right) \cdot \sqrt{1-2x} - x\arccos\sqrt{1-\frac{1}{x}} \cdot \frac{1}{2\sqrt{1-2x}} \cdot (-2)}{1-2x}$

39) $y' = 3\cos^2(3x-1)^5 \cdot \left[-\sin(3x-1)^5\right] \cdot 5(3x-1)^4 \cdot 3 +$

$+ \dfrac{\left[2^{x^2+x}\ln 2 \cdot (2x+1) \cdot \ln\left(x+\sqrt{\frac{x+1}{\sqrt{2}}}\right) + 2^{x^2+x} \cdot \frac{1}{x+\sqrt{\frac{x+1}{\sqrt{2}}}} \cdot \left(1 + \frac{1}{2\sqrt{\frac{x+1}{\sqrt{2}}}} \cdot \frac{1}{\sqrt{2}}\right)\right] \arcsin\sqrt{1-x} - 2^{x+x^2} \cdot \ln\left(x+\sqrt{\frac{x+1}{\sqrt{2}}}\right) \cdot \frac{1}{\sqrt{1-(1-x)}} \cdot \frac{1}{2\sqrt{1-x}} \cdot (-1)}{\arcsin^2\sqrt{1-x}}$

40) $y' = \dfrac{5\left(2\operatorname{arccot}\frac{1}{x}+3^{-x^2}\right)^4\left[2\cdot\frac{-1}{1+\frac{1}{x^2}}\left(-\frac{1}{x^2}\right)+3^{-x^2}\ln 3\,(-2x)\right]\cdot\ln\left(x-\sqrt{x}\right)\cdot\tan 3x}{\left[\ln\left(x-\sqrt{x}\right)\cdot\tan 3x\right]^2}+$

$$-\frac{\left(2\operatorname{arccot}\frac{1}{x}+3^{-x^2}\right)^5\cdot\left[\frac{1}{x-\sqrt{x}}\cdot\left(1-\frac{1}{2\sqrt{x}}\right)\cdot\tan 3x+\ln\left(x-\sqrt{x}\right)\cdot\frac{1}{\cos^2 3x}\cdot 3\right]}{\left[\ln\left(x-\sqrt{x}\right)\cdot\tan 3x\right]^2}$$

41) $y' = \ln x + x\cdot\dfrac{1}{x} - \dfrac{\frac{1}{\sqrt{1-x}}\cdot\frac{1}{2\sqrt{x}}\left(2^{-x^2+x}+\cos\frac{3+2x}{\sqrt{2}}\right)-\arcsin\sqrt{x}\cdot\left[2^{-x^2+x}\ln 2\cdot(-2x+1)-\sin\frac{3+2x}{\sqrt{2}}\cdot\frac{2}{\sqrt{2}}\right]}{\left(2^{-x^2+x}+\cos\frac{3+2x}{\sqrt{2}}\right)^2}$

42) $y' = \dfrac{2}{3}x^{-\frac{1}{3}}\cdot\ln 2+\dfrac{\left[\frac{1}{\tan 2x}\cdot\frac{1}{\cos^2 2x}\cdot 2-\left(\arcsin\sqrt{x+1}+x\cdot\frac{1}{\sqrt{1-(x+1)}}\cdot\frac{1}{2\sqrt{x+1}}\right)\right]\cdot\left(\frac{1}{x}-e^{x^2}\right)^3}{\left(\frac{1}{x}-e^{x^2}\right)^6}+$

$$-\frac{\left(\ln\tan 2x-x\cdot\arcsin\sqrt{x+1}\right)\cdot 3\left(\frac{1}{x}-e^{x^2}\right)^2\cdot\left(-\frac{1}{x^2}-e^{x^2}\cdot 2x\right)}{\left(\frac{1}{x}-e^{x^2}\right)^6}$$

43) $y' = \operatorname{arctan}\dfrac{1}{x}+x\cdot\dfrac{1}{1+\frac{1}{x^2}}\cdot\left(-\dfrac{1}{x^2}\right)-\dfrac{\left[3^{-x}\ln 3\cdot(-1)+\frac{1}{2\sqrt{\frac{2-x}{\sqrt{3}}}}\cdot\left(-\frac{1}{\sqrt{3}}\right)\right]\cdot\ln\left(x^2+\cos^2 x^3\right)-\left(3^{-x}+\sqrt{\frac{2-x}{\sqrt{3}}}\right)\cdot\frac{1}{x^2+\cos^2 x^3}\cdot\left[2x+2\cos x^3\cdot(-\sin x^3)\cdot 3x^2\right]}{\ln^2\left(x^2+\cos^2 x^3\right)}$

44) $y' = 6\left(\frac{3}{x} - 2^{x^3}\right)^5 \cdot \left(-\frac{3}{x^2} - 2^{x^3}\ln 2 \cdot 3x^2\right) +$

$$+ \frac{\left[\frac{1}{\sin\frac{2x+1}{\sqrt{5}}} \cdot \cos\frac{2x+1}{\sqrt{5}} \cdot \frac{2}{\sqrt{5}} - \left(\arcsin\sqrt{x+2} + x \cdot \frac{1}{\sqrt{1-(x+2)}} \cdot \frac{1}{2\sqrt{x+2}}\right)\right] \cdot \sqrt[4]{x^5} - \left(\ln\sin\frac{2x+1}{\sqrt{5}} - x\arcsin\sqrt{x+2}\right) \cdot \frac{5}{4} \cdot \sqrt[4]{x}}{\sqrt[4]{x^{10}}}$$

45) $y' = \frac{1}{1 + \left(\frac{\sin 2x - \cos x^4}{\cosh^3 x}\right)^2} \cdot \frac{(2\cos 2x + \sin x^4 \cdot 4x^3)\cosh^3 x - (\sin 2x - \cos x^4) \cdot 3\cosh^2 x \sinh x}{\cosh^6 x} +$

$$- \left[-\frac{1}{\sqrt{1-(x+2^x)}} \cdot \frac{1}{2\sqrt{x+2^x}} \cdot (1 + 2^x \ln 2) \cdot \ln\sin\frac{2x+1}{\sqrt{5}} + \arccos\sqrt{x+2^x} \cdot \frac{1}{\sin\frac{2x+1}{\sqrt{5}}} \cdot \cos\frac{2x+1}{\sqrt{5}} \cdot \frac{2}{\sqrt{5}}\right]$$