6.136. $y = \sqrt{\varphi^2(x) + \psi^2(x)}$

$y' = \dfrac{2(\varphi(x)\varphi'(x) + \psi(x)\psi'(x))}{2\sqrt{\varphi^2(x) + \psi^2(x)}}$

6.138 $y = \psi(x)^{\varphi(x)}$ $\quad \ln y = \varphi(x) \ln \psi(x)$

$y' = \psi(x)^{\varphi(x)} \left(\varphi'(x) \ln \psi(x) + \dfrac{\varphi(x)\psi'(x)}{\psi(x)} \right)$

6.140. $y = f(\ln x)$ $\quad y' = \dfrac{f'(\ln(x))}{x}$

6.142. $y = f(e^x) e^{f(x)}$ $\quad y' = f'(e^x) e^x e^{f(x)} + f(e^x) e^{f(x)} f'(x) =$

$= e^{f(x)} (e^x f'(e^x) + f'(x) f(e^x))$

6.128. $y = (\log_x a)^x$ $\ln y = x \ln \log_x a = x \cdot \ln \frac{1}{\log_a x} = \cancel{\frac{x}{\log_a x}}$

$(\ln y)' = \ln \log_x a + \frac{1}{\log_x a} \; x \cdot \ln a$

$y' = (\log_x a)$ (

$(\ln y)' = \log_a x - \frac{x (}{\frac{x \ln a}{(\log_a x)^2}} = \frac{1}{\log_a x} - \frac{x}{\ln a (\log_a x)^2}$

$y' = (\log_x a)^x \cdot (\ln y)'$

$\ln \frac{1}{\log_a x} + x \left(\log_a x \cdot \frac{\cancel{x}}{\cancel{x} \ln a} \left(- \frac{1}{x (\log_a x)^2} \right) \cdot \frac{1}{x \ln a} \right) =$

$= \left(\ln \log_x a \; \cancel{+} - \frac{1}{x \, \cancel{x} (\ln a)} \right) (\log_x a)^x = \left(\ln \frac{1}{\log_a x} - \frac{1}{\log_a x \ln a} \right)$

6.130 $y = \left(\frac{1}{x}\right)^{\frac{1}{x}}$ $\ln y = \frac{1}{x} \ln \frac{1}{x}$

$(\ln y)' = -\frac{1}{x^2} \ln \frac{1}{x} + - \frac{1}{\cancel{x}} \frac{x}{x^2} = -$

$\left(\frac{1}{x}\right)^{\frac{1}{x}} \left(- \frac{\ln \frac{1}{x}}{x^2} - \frac{1}{x^2} \right) = \left(\frac{\ln x - 1}{x^2} \right) \left(\frac{1}{x}\right)^{\frac{1}{x}}$

<1

6.132 $y = 3^{\frac{\sin ax}{\cos bx}} + \frac{1}{3} \frac{\sin^3 ax}{\cos^3 bx}$

$\ln y = \frac{\sin ax}{\cos bx} \ln 3$ $\ln y' = \frac{\cos bx \cos ax \cdot a + \sin ax \sin bx \; b}{(\cos bx)^2} \cdot \ln 3 \cdot 3$

$\frac{\sin^3 ax}{\cos^3 bx} = \frac{3 \sin^2 ax \cdot \cos ax \cdot a \cdot \cos^3 bx + 3 \cos^2 bx \sin bx \cdot b \cdot \sin^3 ax}{\cos^6 bx}$

$= \cancel{\cos^2 bx} \left(3 \sin^2 ax \cos^2 ax \cdot a \frac{\cos bx + 3 \cancel{\cos^2 bx} \sin bx \cdot b \sin^3 ax}{\cos^6 bx} \right.$

6.114. $y = \operatorname{arctg}(\operatorname{th} x) = \dfrac{1}{1+\operatorname{th}^2 x} \cdot \dfrac{1}{\operatorname{ch}^2 x}$

6.116. $y = \arccos \dfrac{1}{\operatorname{ch} x} = -\dfrac{1}{\sqrt{1-\operatorname{ch}^2 x}} \cdot \dfrac{1}{2\operatorname{ch} x}$ $\operatorname{sh} x$

6.118 $y = \arcsin \dfrac{1}{|x|} = \dfrac{1}{\sqrt{1-\left(\frac{1}{x}\right)^2}} \cdot \left(\dfrac{1}{2x}\right) = -\dfrac{1}{\sqrt{4x^2 - \frac{4x^2}{x^2}}} = \dfrac{1}{-\sqrt{4(x^2-1)}} = \dfrac{-1}{2\sqrt{x^2-1}}$

$$\left(\frac{1}{|x|}\right)' = \begin{cases} \frac{1}{2x} & x>0 \\ -\frac{1}{2x} & x<0 \end{cases}$$

6.120 $y = |\arcsin x| =$ $\quad y' = \dfrac{1}{1+x^2}$

$$(\arcsin x)' = \begin{cases} \frac{1}{\sqrt{1-x^2}} & >0 \\ \frac{1}{\sqrt{1-x^2}} & <0 \end{cases}$$

6.122. $y = \begin{cases} 1-x & x \le 0 \\ e^{-x} & x > 0 \end{cases}$

$$y' = \begin{cases} -1 & x \le 0 \\ -e^{-x} & x > 0 \end{cases}$$

6.124. $y = \begin{cases} x^2 e^{-x^2} & |x| \le 1 \\ \frac{1}{e} & |x| > 1 \end{cases}$

$$y' = 2xe^{-x^2} + x^2 e^{-x^2} \cdot (-2x) =$$
$$= 2x\, e^{-x^2}(1 - x^2) \text{ при } |x|<$$

6.128. $y =$

6.130 $y =$

$(\ln y)' =$

6.132

$$= \frac{2\sqrt{x}+1}{2\sqrt{x}\cdot 2\sqrt{x+\sqrt{x}}} + \frac{1}{2\sqrt{x}\cdot 2\sqrt{x+\sqrt{x}}}$$

6.100 $y = \sqrt{x+\sqrt{x+\sqrt{x}}}$

$$\frac{1 + \dfrac{1+\frac{1}{2\sqrt{x}}}{2\sqrt{x+\sqrt{x}}}}{2\sqrt{x+\sqrt{x+\sqrt{x}}}} = \frac{1+2\sqrt{x}+4\sqrt{x}\sqrt{x+\sqrt{x}}}{8\sqrt{x}\sqrt{x+\sqrt{x}}\sqrt{x+\sqrt{x+\sqrt{x}}}}$$

6.102. $y = \sin(\cos^2 x)\cos(\sin^2 x) =$

$y_1\ (\sin(\cos^2 x))' = -\cos(\cos^2 x)\ \underbrace{2\cos x\ (+\sin x)}_{=\sin 2x}$

$y_2\ \cos(\sin^2 x) = -\sin(\sin^2 x)\ \underbrace{2\sin x\ (\cos x)}_{=\sin 2x}$

$\Big\}\ -\sin 2x\left(\cancel{+\cos(\cos^2 x)+\sin(\sin^2 x)}\right)$

$y' = y_1 y_2 + y_2' \cdot y_1$

6.104) $y = \left(\frac{a}{b}\right)^x \left(\frac{b}{x}\right)^a \left(\frac{x}{a}\right)^b = \cancel{a}$

$\left(\left(\frac{a}{b}\right)^x\right)' = \left(\frac{a}{b}\right)^x \cdot \ln\frac{a}{b}$

$\left(\left(\frac{b}{x}\right)^a\right)' = -\left(\frac{b}{x}\right)^a \cdot \frac{b}{2x}$

$\left(\left(\frac{x}{a}\right)^b\right)' = \left(\frac{x}{a}\right)^b \cdot \frac{1}{a}$

$$\left(\frac{a}{b}\right)^x \cdot \left(\frac{b}{x}\right)^a \cdot \left(\frac{a}{x}\right)^b \left(\frac{b-a}{x} + \ln\frac{a}{b}\right)$$

6.106. $y = \frac{1}{2\sqrt{6}} \ln \frac{x\sqrt{3}-\sqrt{2}}{x\sqrt{3}+\sqrt{2}} = y' = \frac{1}{2\sqrt{6}} \cdot \frac{x\sqrt{3}+\sqrt{2}}{x\sqrt{3}-\sqrt{2}} \cdot \left(\frac{\sqrt{3}(x\sqrt{3}+\sqrt{2}) - \sqrt{3}(x\sqrt{3}-\sqrt{2})}{(x\sqrt{3}+\sqrt{2})^2}\right) =$

$$= \frac{1}{2\sqrt{6}} \frac{(x\sqrt{3}+\sqrt{2})(2\sqrt{6})}{(x\sqrt{3}+\sqrt{2})^2 (x\sqrt{3}-\sqrt{2})} = \frac{1}{3x^2-2}$$

6.108 $y = \operatorname{arctg}(tg^2 x) = \frac{1}{(1+tg^4 x)} \cdot \frac{2\, tg x}{\cos^2 x}$

6.110. $y = \sin x^{\cos x}$ $\quad \ln y = \cos x \ln \sin x$

$\ln y' = -\sin x \ln \sin x + \frac{\cos x}{\sin x} \cos x$

$y' = \sin x^{\cos x} \left(ctg x \cos x - \sin x \ln(\sin x)\right)$

6.112. $y = \sqrt{\cos x}\ a^{\sqrt{\cos x}} = \frac{-\sin x \cdot a^{\sqrt{\cos x}}}{2\sqrt{\cos x}} + \sqrt{\cos x} \cdot a^{\sqrt{\cos x}} \frac{\ln a}{2\sqrt{\cos x}} (-\sin x) =$

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

6.90. $y = x^{x^x}$ $\ln y = x^x \ln y x$ $(\ln y)' = x(x^x \ln x + x^x)\ln x + \frac{x^x}{x}$

$y' = x^{x^x} \cdot (\ln y)'$

6.92. $y = x^{x^2} + x^{2^x} + 2^{x^x}$

$\ln y = x^2 \ln x = (\ln y)' = 2x \ln x + \frac{x^2}{x}$ $y' = (2x \ln x + x) \cdot x^{x^2}$

$\ln y = 2^x \ln x$ $y' = 2^{2^x}(2^x \ln 2 \cdot \ln x + \frac{2^x}{x})$

$y' =$ 6.90.

6.94. $y = (\arccos x)^2 \ln(\arccos x)$

$\arccos x = t$

$y = t^2 \ln t$

$y' = 2t \ln t + \frac{t^2}{t} = 2 \arccos x \ln \arccos x + \arccos x$

$y' = \frac{-2\arccos x}{\sqrt{1-x^2}} \cdot \ln \arccos x + \frac{(\arccos x)^2}{\arccos x \sqrt{1-x^2}}$

$= \frac{-2\arccos x \ln \arccos x + \arccos x}{\sqrt{1-x^2}} =$

$= \frac{\arccos x (1 - 2\ln \arccos x)}{\sqrt{1-x^2}}$

6.96. $y = \frac{1-a^{2x}}{1+a^{2x}} \operatorname{arctg} a^{-x}$

$y_1' = \left(\frac{1-a^{2x}}{1+a^{2x}}\right)' = \frac{-a^{2x} \cdot 2 \cdot \ln a (1+a^{2x}) - (1-a^{2x})(a^{2x} \cdot 2 \cdot \ln a)}{(1+a^{2x})^2}$

$y_2' (\operatorname{arctg} a^{-x})' = + \frac{1}{1+a^{-x2}} \cdot a^{-x}(-(1)) \ln a$

$y_1' y_2 + y_2' y_1$

6.98

6.100 $y = \sqrt{x} +$

6.102. $y = \sin$

$y_1 (\sin(\cos^2 x))$

$y_2 \cos(\sin^2 x) =$

$y' = y_1 y_2 +$

6.104) $y = \left(\frac{a}{b}\right)^x$

$\left(\left(\frac{a}{b}\right)^x\right)' =$

$\left(\left(\frac{b}{x}\right)^a\right)' =$

$\left(\left(\frac{x}{a}\right)^b\right)' =$

6.106. $y =$

$=$

6.108

6.110.

$\ln y$

y'

6.112.

$=$

6.68. $y=\frac{e^{-x^2}}{2x} \Rightarrow y' = \frac{e^{-x^2}\cdot \ln e\cdot(-2x)\cdot 2x - 2e^{-x^2}}{(2x)^2} = \frac{-2e^{-x^2}(2x^2+1)}{4x^2}$

6.70. $y=2^{\sqrt{\sin^2 x}} = 2^{\sqrt{\sin^2 x}}\cdot \ln 2 \cdot \frac{1}{2\sqrt{\sin^2 x}}\ \cancel{\cos}\ 2\cos x$

6.72. $\ln x \cdot \lg x - \ln a \cdot \log_a x = \frac{1}{x}\cdot \lg x + \ln x \cdot \frac{1}{x\ln 10} - \left(\ln a \cdot \frac{1}{x \ln a}\right)$

6.74. $y=e^{\sqrt{\ln(ax^2+bx+c)}} = e^{\sqrt{\dots}}\ \ln e\ \frac{1}{2\sqrt{\ln\dots}}\cdot\left(\frac{2ax+b}{ax^2+bx+c}\right)$

6.76. $y=\ln(x+\sqrt{a^2+x^2}) = \frac{1}{x+\sqrt{a^2+x^2}}\cdot\left(1+\frac{2x}{2\sqrt{a^2+x^2}}\right)$

6.82. $y=\sqrt[3]{\frac{(x+2)(x-1)^2}{x^5}} = \ln y = \frac13 \ln\left(\frac{(x+2)(x-1)^2}{x^5}\right) = \frac{x^5}{(x+2)(x-1)^2}\cdot$

$\cdot\frac{\left((x-1)^2+(x+2)\cdot 2(x-1)\right)\cdot x^5 - 5x^4(x+2)(x-1)^2}{x^{10}} =$

x^2

$\Rightarrow y' = y\cdot(\ln y)' = \frac{10-2x-2x^2}{3x^2\sqrt[3]{x^2(x+2)^2(x-1)}}$

6.84. $y = x^3\sqrt{\frac{\cancel{(x+2)}\ x-1}{(x+2)\sqrt{x-2}}} = (\ln y)' = \frac{x^3}{2}\ln\frac{x-1}{(x+2)\sqrt{x-2}} \Rightarrow (\ln y)' =$

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

$= \frac{11x^5-7x^4-58x^3+48x^2}{4\sqrt{x-1}\ \sqrt{(x+2)^3}\ \sqrt[4]{(x-2)^5}}$

6.86. $y=x^{2^x}$ $\quad \ln y = 2^x \ln x \quad (\ln y)' = 2^x\ln 2\cdot \ln x + \frac{2^x}{x}$

$y' = 2^x\left(\ln(2)\cdot\ln(x)+\frac1x\right)\cdot x^{2^x}$

6.88. $y=(\ln x)^{\frac1x} \quad \ln y = \frac1x \ln(\ln x) \quad (\ln y)' = -\frac{1}{x^2}\ln(\ln x) + \frac{1}{x(\ln x)x} =$

$\Rightarrow y' = \frac{1}{x^2}\left(\frac{1}{\ln x} - \ln(\ln(x))\right)\cdot(\ln x)^{\frac1x}$

6.48. $y = 6\cos\frac{2x}{3} = -6\sin\frac{2x}{3}\cdot\frac{2}{3} = -4\sin\frac{2x}{3}$

6.50. $y = \sqrt[4]{(1+3x^2)^3} = y' = (1+3x^2)^{\frac{3}{4}} = \frac{3}{4\sqrt[4]{(1+3x^2)}}\cdot 6x = \frac{9x}{2\sqrt[4]{1+3x^2}}$

6.52 $y = \sqrt{1+\sin 4x} - \sqrt{1-\sin 4x} = \frac{\cos 4x\cdot 4}{2\sqrt{1+\sin 4x}} - \frac{-\cos 4x\cdot(+4x)}{2\sqrt{1-\sin 4x}} =$

6.54 $y = \left(\cos^2\left(\frac{\pi}{4}-\frac{x}{2}\right)\right)^2 = y' = 2\cos\left(\frac{\pi}{4}-\frac{x}{2}\right)\cdot\left(+\sin\left(\frac{\pi}{4}-\frac{x}{2}\right)\right)\cdot\left(+\frac{1}{2}\right) =$

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

6.56 $y = x^2 e^{-2x} = 2x\cdot e^{-2x} + x^2\cdot e^{-2x}\cdot\ln e\cdot(-2) = 2x\cdot e^{-2x}(1 + x\ln e^{-1})$

6.58. $y = \frac{x}{2}\sqrt{x^2+a} + \frac{a}{2}\ln(x+\sqrt{x^2+a}) = y' = \frac{\sqrt{x^2+a}}{2} + \frac{x\cdot 2x}{2\cdot 2\sqrt{x^2+a}} + \frac{a}{2}\cdot\frac{1}{x+\sqrt{x^2+a}}\cdot(1+$

$\left(\frac{1\cdot 2x}{2\sqrt{x^2+a}}\right) = \frac{\sqrt{x^2+a}}{2} + \frac{x^2}{2\sqrt{x^2+a}} + \frac{a+ax}{2x+2\sqrt{x^2+a}} = \sqrt{x^2+a}$

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

$= \frac{1}{2}\frac{(1-x^2)}{(1+x^2)}\cdot\frac{4x}{(1-x^2)^2} = \cancel{4x}\frac{2x}{1-x^4}$

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

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

6.64 $y = \sqrt{\sin x\sqrt{x}} = \frac{1}{2\sqrt{\sin x\cdot\sqrt{x}}}\left(\cos x\sqrt{x} + \frac{\sin x}{2\sqrt{x}}\right) = \frac{\cos x\sqrt{x}}{2\sqrt{\sin x\sqrt{x}}} + \frac{\sin x}{2\sqrt{x}\cdot\sqrt{\sin x\sqrt{x}}} =$

$= \frac{\sin x}{2x} + \frac{\cos\sqrt{x}}{2\sqrt{\sin x\sqrt{x}}} = \frac{\cos x\sqrt{x}}{4\sqrt{\sin x\sqrt{x}}}$

6.66.

$y = \arccos\left(\frac{b+a\cos x}{a+b\cos x}\right) = y' = -\frac{1}{\sqrt{1-\left(\frac{b+a\cos x}{a+b\cos x}\right)^2}}\cdot\frac{(-a\sin x)\cdot(a+b\cos x)+(b+a\cos x)b\sin x}{(a+b\cos x)^2}$

$= \frac{\sqrt{a^2-b^2}}{a+b\cos x}\ \mathrm{sgn}(\sin x)$

$y = (\sqrt{x} - 1)\left(\frac{1}{\sqrt{x}} + 1\right) = y' = \frac{1}{2\sqrt{x}} \cdot \left(\frac{1}{\sqrt{x}} + 1\right) + (\sqrt{x} + 1)(2\sqrt{x}) =$

$= \frac{1}{2x} + \frac{1}{2\sqrt{x}} + 2\sqrt{x} + 2\sqrt{x} = \frac{\sqrt{x} + x + 2x \cdot 2x\sqrt{x} + 2\sqrt{x} \cdot 2x\sqrt{x}}{2x\sqrt{x}}$

$= \frac{\sqrt{x} + x + 4x^2\sqrt{x} + 4x^2}{2x\sqrt{x}} = \frac{x+1}{2x\sqrt{x}}$

6.33. $y = \frac{4}{\sqrt[4]{x^3}} - \frac{3}{\sqrt[3]{x^2}} = y' = -\frac{\cancel{3} \cdot 4}{4\sqrt[4]{x^{\cancel{7}}}} + \frac{3 \cdot 2}{3\sqrt[3]{x^5}} = -\frac{3}{2\sqrt[4]{x^{\cancel{7}}}} + \frac{2}{\sqrt[3]{x^5}}$

6.35. $y = (3\sqrt[3]{x^2} + 6\sqrt[3]{x})\sqrt[3]{x^4} = y' = \sqrt[3]{x^4} \cdot \left(\frac{2}{3 \cdot 3 \cdot \sqrt[3]{x}} + \frac{6}{3\sqrt[3]{x^2}}\right) +$

$+ \frac{4}{3}\sqrt[3]{x}\,(3\sqrt[3]{x^2} + 6\sqrt[3]{x})$

6.37. $y = x^3\,\mathrm{ctg}\,x = 3x^2 \cdot \mathrm{ctg}\,x + x^3 \cdot \left(-\frac{1}{\sin^2 x}\right)$

6.38. $y = y' = \frac{1\,\sqrt[3]{x^2}}{\cos^2 x}$ $\frac{\frac{1}{\cos^2 x}\sqrt[3]{x^2} + \frac{\mathrm{tg}\,x \cdot 2}{3\sqrt[3]{x}}}{\cancel{(\mathrm{tg}\,x)^2}\ \sqrt[3]{x^4}}$

6.39. $y = \frac{\cos x}{1 + \sin x} = y' = \frac{-\sin x \cdot (1 + \sin x) - \cos x(\cdot \cos x)}{(1 + \sin x)^2} = \frac{-\sin x - \sin^2 x - \cos^2 x}{1 + 2\sin x + \sin^2 x} =$

$=$

6.40. $y = \sqrt{x}\sin x = y' = \frac{\sin}{2\sqrt{x}} + \sqrt{x} \cdot \cos x$

6.42. $y = 3x^2 \cdot \log_2 x + \frac{x^2}{e^x} = y' = 6x \cdot \log_2 x + \frac{3x^2}{x\ln 2} + \frac{2x \cdot e^x - x^2 e^x \ln e}{e^{2x}}$

6.44. $y = \frac{\sin x - \cos x}{\sin x + \cos x} = y' = \frac{(\cos x + \sin x)(\sin x + \cos x) - (\cos x - \sin x)(\sin x - \cos x)}{(\sin x + \cos x)^2} =$

$= \cos x \cdot \cancel{\sin x} + \cos^2 x + \sin^2 x + \cancel{\cos x}\sin x - \cos x \sin x + \cos^2 x + \sin^2 x - \cos x\cancel{\sin x}$

$= \frac{2\cos^2 x + 2\sin^2 x}{\sin^2 x + 2\cos \sin x + \cos^2 x} = \frac{2}{2\cos} = \frac{1}{\cos x \cdot \sin x}$

6.46. $y = \sqrt{\frac{1-x^2}{1+x^2}} = \frac{\sqrt{1+x^2}}{2\sqrt{(1-x^2)}} \cdot \left(\frac{-2x(1+x^2) - 2x(1-x^2)}{(1+x^2)^2}\right) = \ldots\ \frac{-2x - \cancel{2x^3} - 2x + \cancel{2x^3}}{} =$

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

$x^{\frac{3}{5}} = x' = \frac{3}{5} x^{-\frac{2}{5}}$

Производные

6.21. $y = 3 - 2x + \frac{2}{3} x^4 =$

$y' = -2 + \frac{8}{3} x^3$

6.22. $y = -\frac{5x^5}{a^2}$

$y' = \frac{-25x^4 (a^2) - -5x^5 \cdot 2a}{a^4} =$

$= \frac{-25x^4}{a^2}$

6.23. $y = \frac{1}{x} - \frac{1}{x^2} - \frac{1}{x^3}$

$y' = -\frac{1}{x^2} + \frac{2}{x^3} + \frac{3}{x^4}$

6.24. $y = \frac{(x-1)}{x+1}$

$y' = \frac{1(x+1) - 1(x-1)}{(x+1)^2} = \frac{x+1-x+1}{(x+1)^2} = \frac{2}{(x+1)^2}$

6.25. $\frac{1-4x^2-x^4}{(x^3-x)^2}$

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

6.26. $y = (x^2-1)(x^2-4)(x^2+9) = y' = 2x(x^2-4)(x^2+9) + 2x(x^2-1)(x^2+9) + 2x(x^2-1)(x^2-4) =$

$= 2x(x^4 + 9x^2 - 4x^2 - 36 + x^4 + 9x^2 - x^2 - 9 + x^4 - 4x^2 - x^2 + 4) = 2x(3x^4 + 12x^2 - 41)$

6.27. $y = \frac{1+3x^2}{\sqrt{2\Pi}} = y' = \frac{6x}{\sqrt{2\Pi}}$

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

6.29. $y = \frac{a}{\sqrt[5]{x^3}} + \frac{\sqrt[3]{x^2}}{b} = y' = \frac{a\left(-\frac{3}{5} \cdot x^{-\frac{2}{3}}\right)}{\sqrt[5]{x^8}} + \frac{\frac{2}{3}}{b\sqrt[3]{x}}$

$\left(\frac{a}{x^{\frac{3}{5}}}\right)' = a x^{-\frac{3}{5}} = -\frac{3}{5} \frac{a}{\sqrt[5]{x^8}} + \frac{2}{3b\sqrt[3]{x}}$

6.30. $y = \frac{a+bx}{c+dx} = \frac{b(c+dx) - d(a+bx)}{(c+dx)^2} = \frac{bc + bdx - da - dbx}{(c+dx)^2}$

6.31. $y = \frac{2}{2x-1} - \frac{1}{x} = y' = -\frac{2 \cdot 2}{(2x-1)^2} + \frac{1}{x^2}$

6.32. $y = \frac{2+\sqrt{x}}{2-\sqrt{x}} = y' = \frac{\frac{2-\sqrt{x}}{2\sqrt{x}} + \frac{2+\sqrt{x}}{2\sqrt{x}}}{(2-\sqrt{x})^2} = \frac{4}{2\sqrt{x}(2-\sqrt{x})^2}$

6.33. $y =$

6.34.

6.35. $y =$

6.37.

6.38.

6.39.

6.40. y

6.42.

6.44.

6.46.