Производные, часть 5

11.4.36. $x+y+z=e^z, F=x+y+z-e^z$

$F'_x=1, F'_y=1, F'_z=1-e^z$

$$\frac{\partial z}{\partial x}=-\frac{F'_x}{F'_z}=-\frac{1}{1-e^z}=\frac{1}{e^z-1}=\frac{1}{x+y+z-1}$$

$$\frac{\partial z}{\partial y}=-\frac{F'_y}{F'_z}=-\frac{1}{1-e^z}=\frac{1}{e^z-1}=\frac{1}{x+y+z-1}$$

$$dz=\frac{1}{e^2-1}dx+\frac{1}{e^2-1}dy=\frac{dx+dy}{x+y+z-1}$$

11.4.37. $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1, F=\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}-1$

$$F'_x=\frac{2x}{a^2}, F'_y=\frac{2y}{b^2}, F'_z=\frac{2z}{c^2}$$

$$\frac{\partial z}{\partial x}=-\frac{F'_x}{F'_z}=-\frac{2x}{a^2}*\frac{c^2}{2z}=-\frac{c^2x}{a^2z}$$

$$\frac{\partial z}{\partial y}=-\frac{F'_y}{F'_z}==-\frac{2y}{b^2}*\frac{c^2}{2z}=-\frac{c^2y}{b^2z}$$

$$dz=-\frac{c^2x}{a^2z}dx-\frac{c^2y}{b^2z}dy$$