А) $z=x^{lny}, M\left(e;e^{2}\right)$

Рассматривая у как постоянную величину, получим

$$\frac{∂z}{∂x}=lny\*\frac{x^{lny}}{x}; \frac{∂z}{∂x}=lne^{2}\*\frac{e^{lne^{2}}}{e}=2\*\frac{e^{2}}{e}=2e $$

Рассмотрим х как постоянную величину,

$$ \frac{∂z}{∂y}=x^{lny}\*lnx\*\frac{1}{y}; \frac{∂z}{∂y}=e^{lne^{2}}\*lne\*\frac{1}{e^{2}}=e^{2}\*1\*\frac{1}{e^{2}}=1$$

Б) $u=\frac{\cos((x-y)z)}{x^{2}+y^{2}} P(3;-1;2)$

$$\frac{∂u}{∂x}=z\*\frac{-\sin(\left(x-y\right)\*\left(x^{2}+y^{2}\right)-)\cos(\left(x-y\right)\*2x)}{\left(x^{2}+y^{2}\right)^{2}}$$

$$\frac{∂u}{∂x}=2\*\frac{-10\sin(4-6\cos(4))}{100}=-0,2\sin(4)-0,12\cos(4)$$

$$ \frac{∂u}{∂y}=z\*\frac{\sin(\left(x-y\right)\left(x^{2}+y^{2}\right)-)\cos(\left(x-y\right)\*2y)}{\left(x^{2}+y^{2}\right)^{2}}$$

$$\frac{∂u}{∂y}=2\*\frac{10\sin(4)+2\cos(4)}{100}=0,2\sin(4)+0,04\cos(4)$$

$$\frac{∂u}{∂z}=\frac{\cos((x-y))}{x^{2}+y^{2}}, \frac{∂u}{∂z}=\frac{\cos(4)}{10}$$

В) $F\left(x;y\right)=0. Найти \frac{dy}{dx}. $ $F\left(x;y\right)=tg\left(x^{2}y^{3}\right)-2xy+y^{2x}+3x=0$

$$\frac{dy}{dx}=-\frac{∂F/∂x}{∂F/∂y}$$

$$\frac{∂F}{∂x}=\frac{2xy^{3}}{cos^{2}\left(x^{2}y^{3}\right)}-2y+2\*y^{2x}\*lny+3$$

 $\frac{∂F}{∂y}=\frac{3x^{2}y^{2}}{cos^{2}\left(x^{2}y^{3}\right)}-2x+2x\*y^{2x-1}$

$$\frac{dy}{dx}=-\frac{2xy^{3}-2y\*cos^{2}\left(x^{2}y^{3}\right)+2\*y^{2x}\*lny\*cos^{2}\left(x^{2}y^{3}\right)+3cos^{2}\left(x^{2}y^{3}\right)}{3x^{2}y^{2}-2x\*cos^{2}\left(x^{2}y^{3}\right)+2x\*y^{2x-1}\*cos^{2}\left(x^{2}y^{3}\right)}$$

 Г) $x^{3}y-2xy+z^{2}y^{3}=0 \frac{∂z}{∂x}=-\frac{∂F/∂x}{∂F/∂z},$ $\frac{∂z}{∂y}=-\frac{∂F/∂y}{∂F/∂z}$

$$\frac{∂F}{∂x}=3x^{2}y-2y; \frac{∂F}{∂y}=x^{3}-2x+3z^{2}y^{2}; \frac{∂F}{∂z}=2zy^{3}$$

$$\frac{∂z}{∂x}=-\frac{3x^{2}y-2y}{2zy^{3}}; \frac{∂z}{∂y}=-\frac{x^{3}-2x+3z^{2}y^{2}}{2zy^{3}} $$