$$\frac{3x^2+y^2}{y^2}.dx = \frac{2x^3+5y}{y^3}.dy$$

$$\underbrace{\frac{3x^2+y^2}{y^2}}_{P(x,y)}.dx + \underbrace{\left(-\frac{2x^3+5y}{y^3}\right)}_{Q(x,y)}.dy = 0$$

$$\frac{\partial P}{\partial y} \overset{?}{=} \frac{\partial Q}{\partial x} \Leftrightarrow -\frac{6x^2}{y^3} \overset{!}{=} -\frac{6x^2}{y^3}$$

Het is dus een exacte diff. vgl.

Oplossing: $F(x,y)=C$

1e manier om $F(x,y)$ te bepalen:

$$F(x,y) = \int P(x,y).dx + c(y)$$

$$= \int \frac{3x^2+y^2}{y^2}.dx + c(y)$$

$$= \frac{x.(x^2+y^2)}{y^2} + c(y) = \frac{x^3}{y^2} + x + c(y)$$

2e manier om $F(x,y)$ te bepalen:

$$F(x,y) = \int Q(x,y) \cdot dy + c(x)$$

$$= \int -\frac{2x^3+5y}{y^3} \cdot dy + c(x)$$

$$= \frac{5y+x^3}{y^2} + c(x) = \underline{\frac{x^3}{y^2}} + \underline{\frac{5}{y}} + \underline{c(x)}$$

Hieruit de finale $F(x,y)$ samenstellen:

$$F(x,y) = \underline{\frac{x^3}{y^2}} + \underline{x} + \underline{\frac{5}{y}}$$

De oplossing is dus: $F(x,y) = C$

$$\Downarrow$$

$$\frac{x^3}{y^2} + x + \frac{5}{y} = C$$