33te Mathe HÜ am 02.02.23

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4: 196a-c)

a) $x^3 - y^3 + 7x = 1$

$3x^2 - 3y^2 y' + 7 = 0$

b) $x \cdot \sin(y) + y \cdot \cos(x) = 0$

$\sin(y) + x\cos(y) \cdot y' + y' \cdot \cos(x) - y \cdot \sin(x) = 0$

c) $x \cdot y - e^x + e^y = 1$

$y + xy' - e^x + y' e^y = 0$

Lösung:

a) $3x^2 - 3y^2 y' + 7 = 0 \quad | -3x^2 | -7 | : 3y^2$

$y' = \frac{3x^2 - 7}{3y^2}$

b) $\sin(y) + x \cdot \cos(y) \cdot y' + y' \cdot \cos(x) - y \cdot \sin(x) = 0 \quad | -\sin(y) | + y \cdot \sin(x)$

$x \cdot \cos(y) \cdot y' + \cos(x) \cdot y' = -\sin(y) + y \cdot \sin(x)$

$y' (x \cdot \cos(y) + \cos(x)) = -\sin(y) + y \cdot \sin(x) \quad | : (x \cdot \cos(y) + \cos(x))$

$y' = \frac{\sin(y) + y \cdot \sin(x)}{x \cdot \cos(y) + \cos(x)}$

$y + xy' - e^x - y' e^y = 0 \quad | -y | + e^x$

$y' (x + e^y) = -y + e^x \quad | :$

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