2008 Q5

5. A curve is defined by the equation \( xy^2 + 3x^2y = 4 \) for \( x > 0 \) and \( y > 0 \).

Use implicit differentiation to find \( \frac{dy}{dx} \).

Hence find an equation of the tangent to the curve where \( x = 1 \).

Answers

\[
\frac{dy}{dx} = \frac{-y^2 - 6xy}{2xy + 3x^2}
\]

\( 5y + 7x = 12 \)