Quiz 8

If \( y^2x - 2y = 8 \) and \( y = 4, \frac{dx}{dt} = \frac{3}{2} \), find \( \frac{dy}{dt} \).

Solution:

First, find \( x \). We know that \( y = 4 \) so \((4)^2x - 2(4) = 8\) shows us that \( x = 1 \).

Next, differentiate.

\[ 2y \frac{dy}{dt} x + y^2 \frac{dx}{dt} - 2 \frac{dy}{dt} = 0 \]

Solve for \( \frac{dy}{dt} \).

\[ \frac{dy}{dt} = \frac{-y^2 \frac{dx}{dt}}{2y - 2} \]

Substitute to find \( \frac{dy}{dt} \).

\[ \frac{dy}{dt} = \frac{-3(4)^2}{2-4-1-2} = -4 \]