1.) (15 pts. each) Use implicit differentiation to determine the derivative $y' = \dfrac{dy}{dx}$

a.) $x^4 + y^5 = 3x - 7y + 5$

$\xrightarrow{D}$ $4x^3 + 5Y^4 \cdot Y' = 3 - 7Y'$

$\rightarrow$ $5Y^4 Y' + 7Y' = 3 - 4x^3$

$\rightarrow$ $Y'(5Y^4 + 7) = 3 - 4x^3$

$\rightarrow$ $Y' = \dfrac{3 - 4x^3}{5Y^4 + 7}$

b.) $xy^4 = \tan y + \sin x$

$\xrightarrow{D}$ $x \cdot 4Y^3 \cdot Y' + (1) \cdot Y^4 = \sec^2 Y \cdot Y' + \cos x$

$\rightarrow$ $4xY^3 \cdot Y' - \sec^2 Y \cdot Y' = \cos x - Y^4$

$\rightarrow$ $Y'(4xY^3 - \sec^2 Y) = \cos x - Y^4$

$\rightarrow$ $Y' = \dfrac{\cos x - Y^4}{4xY^3 - \sec^2 Y}$

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