

Extra Problem (implicit differentiation)

$$\sqrt{1 + \sin^3(xy^2)} = y$$

$$[1 + (\sin(xy^2))^3]^{1/2} = y$$

$$\frac{1}{2} [1 + \sin^3(xy^2)]^{-1/2} \cdot 3(\sin(xy^2))^2 \cdot \cos(xy^2) \cdot [x2yy' + y^2] = y'$$

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$$A [x2yy' + y^2] = y'$$

$$2Axyy' + Ay^2 = y'$$

$$Ay^2 = y' - 2Axyy'$$

$$Ay^2 = y'(1 - 2Axy)$$

$$\frac{Ay^2}{1 - 2Axy} = y' \quad \text{You could leave this answer.}$$

$$\frac{\frac{3}{2} \sin^2(xy^2) \cos(xy^2)}{\sqrt{1 + \sin^3(xy^2)}} y^2$$

$$1 - \frac{x \cdot \frac{3}{2} \sin^2(xy^2) \cos(xy^2)}{\sqrt{1 + \sin^3(xy^2)}} xy = y'$$

This is a compound fraction. Multiply by 1 as

$$\frac{2\sqrt{1 + \sin^3(xy^2)}}{2\sqrt{1 + \sin^3(xy^2)}} \cdot \text{We get}$$

$$\frac{3y^2 \sin^2(xy^2) \cos(xy^2)}{2\sqrt{1 + \sin^3(xy^2)} - 6xy \sin^2(xy^2) \cos(xy^2)} = y'$$