

ESP Kouba  
Worksheet 13½  
Solutions

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$$1.) a.) x^2 - y^2 = 36 \xrightarrow{D} 2x - 2y y' = 0 \rightarrow$$

$$2y y' = 2x \rightarrow y' = x/y.$$

$$b.) \cos(xy^2) = y^3 + x \xrightarrow{D}$$

$$- \sin(xy^2) \cdot [x \cdot 2y y' + y^2 \cdot 1] = 3y^2 y' + 1 \rightarrow$$

$$- 2xy y' \sin(xy^2) - y^2 \sin(xy^2) = 3y^2 y' + 1 \rightarrow$$

$$- 2xy y' \sin(xy^2) - 3y^2 y' = 1 + y^2 \sin(xy^2) \rightarrow$$

$$y' [-2xy \sin(xy^2) - 3y^2] = 1 + y^2 \sin(xy^2) \rightarrow$$

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

$$c.) (x-y)^4 = \tan(xy) \xrightarrow{D}$$

$$4(x-y)^3 (1-y') = \sec^2(xy) \cdot (x y' + 1 \cdot y) \rightarrow$$

$$4(x-y)^3 - 4(x-y)^3 y' = x \sec^2(xy) \cdot y' + y \sec^2(xy) \rightarrow$$

$$4(x-y)^3 - y \sec^2(xy) = 4(x-y)^3 y' + x \sec^2(xy) y' \rightarrow$$

$$y' = \frac{4(x-y)^3 - y \sec^2(xy)}{4(x-y)^3 + x \sec^2(xy)}$$

$$d.) \frac{x^2}{y^3+1} = \frac{x-1}{y+1} \rightarrow$$

$$x^2 y + x^2 = x y^3 - y^3 + x - 1 \xrightarrow{D}$$

$$x^2 y' + 2x \cdot y + 2x = x \cdot 3y^2 y' + y^3 - 3y^2 y' + 1 \rightarrow$$

$$x^2 y' - 3xy^2 y' + 3y^2 y' = y^3 + 1 - 2xy - 2x \rightarrow$$

$$y' = \frac{y^3 + 1 - 2xy - 2x}{x^2 - 3xy^2 + 3y^2}$$