$x^2 + y^2 = 4$; write the equation of the tangent at $(\sqrt{3}, 1)$

$2x\frac{dx}{dx} + 2y\frac{dy}{dx} = 0$

$-2x\frac{dx}{dx}$

$\frac{2y\frac{dy}{dx}}{2y} = \frac{-2x}{2y}$

$\frac{dy}{dx} = -\frac{x}{y} = \frac{-\sqrt{3}}{1}$

$y - y_1 = m(x - x_1)$

$y - 1 = -\sqrt{3}(x - \sqrt{3})$

83. $(y-2)^2 = 4(x-3)$ $(4,0)$

$2(y-2)' \frac{dy}{dx} = 4 \frac{dx}{dx}$

$u = y-2$ $y = u^2$

$\frac{du}{dy} = 1$ $2u$

$2(y-2)'$

$\frac{dy}{dx} = \frac{4}{2(y-2)}$

$= -1$

$y - y_1 = m(x - x_1)$

$y = -1(x-4)$

Ex. $\cos 2y + \cos x = 1$

$u = 2y \quad y = \cos u$

$du = 2 \quad dy = -\sin u$

$-2\sin(2y)$

$-2\sin(2y)\frac{dy}{dx} - \sin x \frac{dx}{dx} = 0$

$$\frac{-2\sin(2y)\frac{dy}{dx}}{-2\sin(2y)} = \frac{\sin x}{-2\sin(2y)}$$

Ex. $\tan(x+y) = 3$

$u = x+y \quad y = \tan u$

$du = 1\frac{dx}{dx} + 1\frac{dy}{dx} \quad \frac{dy}{du} = \sec^2 u$

$$\left(1 + \frac{dy}{dx}\right)\sec^2(x+y) = 0$$

$$\sec^2(x+y) + \sec^2(x+y)\frac{dy}{dx} = 0$$

$$\frac{\sec^2(x+y)\frac{dy}{dx}}{\sec^2(x+y)} = \frac{-\sec^2(x+y)}{\sec^2(x+y)}$$

$$\frac{dy}{dx} = -1$$

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