

at $(0,0)$

18. $\sqrt{y + \cos^2 x} \approx 1 + \frac{1}{2}y \quad (0,0,1)$

$$f(x,y) = \sqrt{y + \cos^2 x}$$

$$f(x,y) \approx f_x(x-x_0) + f_y(y-y_0) + z_0$$

$$f_x = \frac{1}{2}(y + \cos^2 x)^{-\frac{1}{2}} \cdot (-\sin x \cos x) = -\sin x \cos x (y + \cos^2 x)^{-\frac{1}{2}} \Rightarrow 0$$

$$f_y = \frac{1}{2}(y + \cos^2 x)^{-\frac{1}{2}} \Rightarrow \frac{1}{2}$$

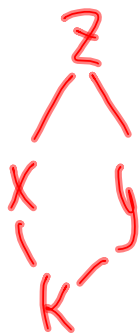
$$\text{eq. of tangent plane} \Rightarrow z - 1 = 0(x - 0) + \frac{1}{2}(y - 0)$$

$$\Rightarrow z = 1 + \frac{1}{2}y$$

Chain rule

Let $z = xy$, $x = 2k$, $y = k^2 + 1$, where $k \in \mathbb{R}$

What is $\frac{dz}{dk}$?



$$\frac{dz}{dk} = 6k^2 + 2$$

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