

29.1 & 29.2 Functions of Two Variables



Surface of a right circular cylinder

$$S.A = 2\pi r^2 + 2\pi r h$$

$$A(r, h) = 2\pi r^2 + 2\pi r h$$

$$\begin{aligned} A(2, 5) &= 2\pi(2)^2 + 2\pi(2)5 \\ &= 8\pi + 20\pi \\ &= 28\pi \end{aligned}$$

p.887

$$(10) \quad F(x, y) = x^2 - 5y + y^2$$

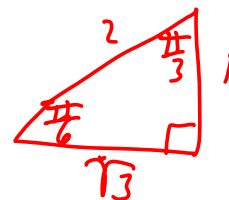
$$F(2, -2) = (2)^2 - 5(-2) + (-2)^2 = 4 + 10 + 4 = 18$$

$$F(-3, -3) = (-3)^2 - 5(-3) + (-3)^2 = 9 + 15 + 9 = 33$$

$$(12) \quad f(r, \theta) = 2r(r \tan \theta - \sin 2\theta)$$

$$\begin{aligned} f(3, \frac{\pi}{4}) &= 2(3) \left[3 \cdot \tan \frac{\pi}{4} - \sin 2\left(\frac{\pi}{4}\right) \right] \\ &= 6 \left[3 \cdot 1 - 1 \right] = 6 \left[2 \right] = 12 \end{aligned}$$

$$\begin{aligned} f(3, \frac{3\pi}{4}) &= 2(3) \left[3 \cdot \tan \frac{3\pi}{4} - \sin 2\left(\frac{3\pi}{4}\right) \right] \\ &= 6 \left[3 \cdot (-1) - (-1) \right] = 6 \left[-3 + 1 \right] = -12 \end{aligned}$$



$$\textcircled{20}^* g(y, z) = 4yz - z^2 + 4y$$

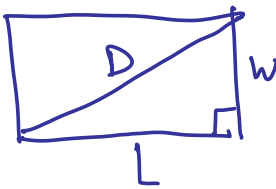
$$g(y+1, z+2) - g(y, z) = [4(y+1)(z+2) - (z+2)^2 + 4(y+1)] - [4yz - z^2 + 4y]$$

$$= 4(yz + 2y + z + 2) - (z^2 + 4z + 4) + 4(y+1) - 4yz + z^2 - 4y$$

$$= \cancel{4yz} + 8y + \cancel{4z} + 8 - \cancel{z^2} - \cancel{4z} - 4 + \cancel{4y} + 4 - \cancel{4yz} + \cancel{z^2} - \cancel{4y}$$

$$= 8y + 8 \text{ or } 8(y+1)$$

④ Express Diagonal as function of Length & Width



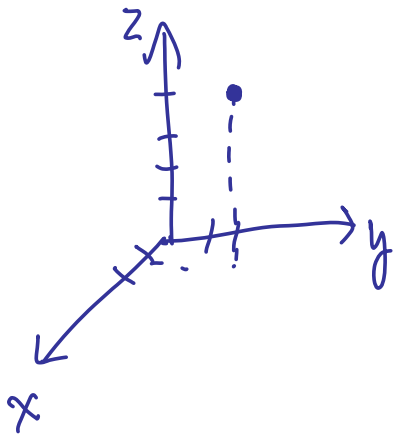
$$D^2 = w^2 + L^2$$

$$D = \sqrt{w^2 + L^2}$$

$$D(w, L) = \sqrt{w^2 + L^2}$$

29.2 Graphs in Three Dimensions

$$\begin{array}{ccc} x & y & z \\ (1, & 2, & 4) \end{array}$$



$$z = \frac{\sin(2x^2 + y^2)}{x^2 + 1}$$