

$$1. \quad L(x, y, \lambda) = 16 - (x^2 + y^2) + \lambda(2x - y + 4)$$

$$\frac{dL}{dx} = -2x + 2\lambda = 0$$

$$x = \lambda$$

$$\frac{dL}{dy} = -2y - \lambda = 0$$

$$y = -\lambda/2$$

$$L\left(\lambda, -\frac{\lambda}{2}, \lambda\right) = 16 - \left(\lambda^2 + \left(-\frac{\lambda}{2}\right)^2\right) + \lambda\left(2\lambda - \left(-\frac{\lambda}{2}\right) + 4\right)$$

$$= 16 - \left(\lambda^2 + \frac{\lambda^2}{4}\right) + 2\lambda^2 + \frac{\lambda^2}{2} + 4\lambda$$

$$= 16 - \left(\frac{5\lambda^2}{4}\right) + \frac{8\lambda^2}{4} + \frac{2\lambda^2}{4} + 4\lambda$$

$$= 16 + \frac{5}{4}\lambda^2 + 4\lambda$$

$$\frac{dL}{d\lambda} = \frac{5}{2}\lambda + 4 = 0$$

$$\boxed{\lambda = -8/5}$$

$$\frac{5}{2}\lambda = -4$$

$$\lambda = \frac{2}{5}(-4) = -\frac{8}{5}$$

$$\boxed{x = -8/5}$$

$$y = 8/10 = \boxed{4/5}$$