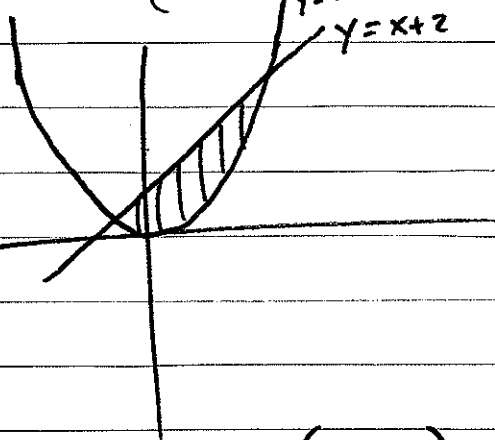


PS 21 Selected Answers / Partial Solutions

① $\rho(x,y) = kx$



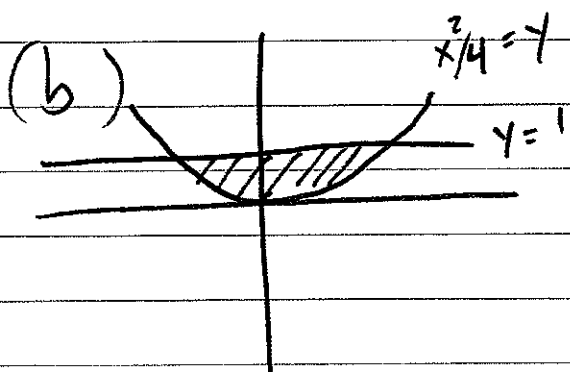
$$m = \int_{-1}^2 \int_{x^2}^{x+2} kx \, dy \, dx$$

$$= \frac{9k}{4}$$

$$(\bar{x}, \bar{y}) = \frac{1}{m} (M_y, M_x) = \frac{4}{9} \left(\frac{45}{8}, \frac{63}{20} \right)$$

② $(\bar{x}, \bar{y}) = \left(\frac{3}{8}, \frac{3\pi}{16} \right)$

③ (a) $I_0 = I_x + I_y = \iint_R (x^2 + y^2) \rho(x,y) \, dA$



$$I_0 = \rho \int_{-2}^2 \int_{x^2/4}^1 (x^2 + y^2) \, dy \, dx$$

$$= \frac{344}{105}$$