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STAT F300 Statistics, Dr. Short
Homework 7, Due Friday, March 10, 23:59

1. (a)

$$1 = \int_{20}^{30} \int_{20}^{30} K(x^2 + y^2)dxdy$$

$$= K \int_{20}^{30} \int_{20}^{30} x^2 dydx + K \int_{20}^{30} \int_{20}^{30} y^2 dxdy$$

$$= 10K \left.\frac{x^3}{3}\right|_{20}^{30} + 10K \left.\frac{y^3}{3}\right|_{20}^{30}$$

$$= 20K \left(\frac{30^3}{3} - \frac{20^3}{3}\right)$$

$$= 20K \frac{19{,}000}{3}$$

$$3 = 380{,}000K$$

$$K = \boxed{\frac{3}{380{,}000}}$$

(b)

$$P(X < 26, Y < 26) = \int_{20}^{26} \int_{20}^{26} K(x^2 + y^2)$$

$$= 12K \left(\frac{26^3}{3} - \frac{20^3}{3}\right)$$

$$= 12K \left(\frac{9576}{3}\right)$$

$$= \frac{36}{380{,}000} \cdot \frac{9756}{3} \approx \boxed{0.3081}$$

(c)

(d)

(e)

(f)

(h)

(j)

(i)