$$\iint_R 5(x+y) \ dA = 5 \int_{\pi/2}^{3\pi/2} \int_1^4 (r\cos\theta + r\sin\theta)\, r \, dr \, d\theta = 5 \int_{\pi/2}^{3\pi/2} \int_1^4 r^2(\cos\theta + \sin\theta) \, dr \, d\theta$$

$$= 5 \left(\int_{\pi/2}^{3\pi/2} (\cos\theta + \sin\theta) \, d\theta \right) \left(\int_1^4 r^2 \, dr \right) = 5 \left[\sin\theta - \cos\theta \right]_{\pi/2}^{3\pi/2} \left[\frac{1}{3}r^3 \right]_1^4$$

$$= 5(-1 - 0 - 1 + 0)\left(\frac{64}{3} - \frac{1}{3} \right) = -210$$