

ANSWERS TO SOME PROBLEMS OF ASSIGNMENT DUE ON 11/6

1(b) $\int_2^4 \int_{y^2-3}^{y+1} dx dy = \dots 36.$

2(a) area = $|(2, 5, 1)| \int_0^5 \int_0^{2-.4x} dy dx = 5\sqrt{30}.$

2(c) use polar coordinates and the change of variable formula: $\int_1^3 \int_0^{2\pi} \sqrt{4\rho^2+1} \rho d\theta d\rho = \frac{\pi}{6}(17\sqrt{17} - 5\sqrt{5}).$

2(d) use spherical coordinates: $\int_0^{\pi/4} \int_0^{2\pi} 4 \sin \phi d\theta d\phi = 8\pi(1 - \sqrt{2}/2).$ You can also solve the problem using polar coordinates.

3(a) use polar coordinates to get $\int_1^3 \int_0^{2\pi} \ln(\rho^2) \rho d\theta d\rho = \pi(9 \ln 9 - 8).$

3(b) $\int \int_{u^2+v^2 \leq 1} 2u dudv = 0.$ The integral can be computed directly, or using polar coordinates.