

MATH 2850 Sec 003
 ELEMENTARY MULTIVARIABLE CALCULUS
 QUIZ 5
 March 20, 2013

Name (Last, First) Key

1. Evaluate the iterated integral. Show your work.

$$\int_0^{\pi/6} \int_0^1 \int_{-2}^3 y \sin z \, dx \, dy \, dz$$

$$= \int_0^{\pi/6} \int_0^1 y \sin z \, x \Big|_{-2}^3 \, dy \, dz$$

$$= 5 \int_0^{\pi/6} \sin z \, \frac{y^2}{2} \Big|_0^1 \, dz = \frac{5}{2} \int_0^{\pi/6} \sin z \, dz$$

$$= -\frac{5}{2} \cos z \Big|_0^{\pi/6} = \boxed{\frac{5}{2} \left(1 - \frac{\sqrt{3}}{2}\right)}$$

2. Find the equation of the following circle in **cylindrical** coordinates.

$$(x-1)^2 + (y-1)^2 = 2$$

$$r^2 (\cos \theta - 1)^2 + r^2 (\sin \theta - 1)^2 = 2$$

$$r^2 \cos^2 \theta - 2r \cos \theta + 1 + r^2 \sin^2 \theta - 2r \sin \theta + 1 = 2$$

$$r^2 - 2r \cos \theta - 2r \sin \theta = 0$$

$$r^2 = 2r \cos \theta + 2r \sin \theta$$

$$\boxed{r = 2 \cos \theta + 2 \sin \theta}$$