MATH 251: Quiz 4

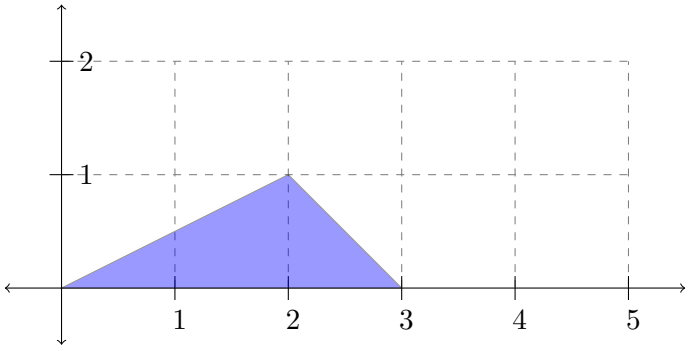
June 25, 2015

Name: _____

1. Integrate $f(x, y, z) = 2x + 3yz$ over the rectangular prism $0 \leq x \leq 2$, $1 \leq y \leq 5$, $0 \leq z \leq 1$.

2. Integrate $f(x, y) = 2xy$ over the region between the graphs of $y = 2x$ and $y = x^2$.

3. Integrate $f(x, y) = x + 2y$ over the triangle pictured below.



4. Integrate $f(x, y, z) = x$ over the region in the first octant $[x \geq 0,\ y \geq 0,\ z \geq 0]$ bounded from above by the plane $x + 2y + z = 6$.

5. Convert $(x, y, z) = (0, 3, 4)$ to both cylindrical and spherical coordinates.

6. Convert the following equations to spherical coordinates.

(a) $z^2 = x^2 + y^2$.

(b) $z = x^2 + y^2$.

(c) $x^2 + y^2 + z^2 = 4$.

Conversion Formulas

Cylindrical		**Spherical**	
$x = r\cos(\theta)$	$r = \sqrt{x^2 + y^2}$	$x = \rho\cos(\theta)\sin(\phi)$	$\rho = \sqrt{x^2 + y^2 + z^2}$
$y = r\sin(\theta)$	$\tan(\theta) = \frac{y}{x}$	$y = \rho\sin(\theta)\sin(\phi)$	$\tan(\theta) = \frac{y}{x}$
$z = z$	$z = z$	$z = \rho\cos(\phi)$	$\cos(\phi) = \frac{z}{\rho}$