Name: ID #: Section #:

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(1) [**3** Points] Evaluate $\iint_D y^2 \, dA$, where D is the triangular region with vertices $(0,0)$, $(1,1)$ and $(2,0)$.

(2) [**3** Points] Evaluate the integral by reversing the order of integration

$$\int_0^{\sqrt{\pi}} \int_x^{\sqrt{\pi}} \cos\left(y^2\right) \; dydx$$

(**3**) [**4** Points] Use polar coordinates to find the volume of the solid in the first octant bounded by the hyperboloid $-2x^2 - 2y^2 + z^2 = 1$ and the plane $z = 3$.

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(1) [**3** Points] Evaluate $\iint_D x\cos y\; dA$, where D is the region bounded by $y = 0, y = x^2$ and $x = \sqrt{\pi}$.

(2) [**3** Points] Evaluate the integral by reversing the order of integration

$$\int_0^4 \int_{\sqrt{x}}^2 \frac{2}{1+y^3}\; dydx$$

(**3**) [**4** Points] Use polar coordinates to find the volume of the solid bounded by the paraboloid $z = 1 + 2x^2 + 2y^2$ and the plane $z = 5$ in the first octant.

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(**1**) [**4** Points] Find the volume of the solid bounded by the cylinder $y^2 + z^2 = 4$ and the planes $x = 2y, x = 0, z = 0$ in the first octant.

(**2**) [**3** Points] Evaluate the integral by reversing the order of integration

$$\int_0^1 \int_{3x}^3 e^{y^2}\, dydx$$

(**3**) [**3** Points] Evaluate the integral by changing to polar coordinates:

$$\iint\limits_R \frac{x^2}{x^2+y^2}\, dA,$$

where R is the region that lies between the circles $x^2+y^2=4$ and $x^2+y^2=1$ above the x-axis.