Student: Libbi Sykora **Submitted:** 11/05/14 9:25pm	**Instructor:** Daniel Swenson **Course:** Math 225 Calculus III (Fall 2014) **Book:** Briggs/Cochran: Calculus	**Assignment:** Chapter 14 Quiz

1. Evaluate the following double integral over the region R.

$$\iint_R (x + 4y)\, dA;\ R = \{(x,y) : 1 \le x \le 4,\ 1 \le y \le 5\}$$

$\iint_R (x + 4y)\, dA =$ 174

(Type an exact answer.)

YOU ANSWERED: 84

2. Find the volume of the solid under the graph of the function over the given rectangle.

$$f(x, y) = 8 - 5x^2 - 2y^2;\ R = \{(x, y) : 0 \le x \le 1,\ 0 \le y \le 1\}$$

The volume is $\frac{17}{3}$. (Type an integer or a fraction.)

3. Evaluate the following integral as it is written.

$$\int_0^1 \int_{x^2}^{3x} 3xy\, dy\, dx$$

$\int_0^1 \int_{x^2}^{3x} 3xy\, dy\, dx = \frac{25}{8}$ (Simplify your answer.)

4. Evaluate the following integral, where R is the region in quadrants 1 and 4 bounded by the semicircle of radius 7 centered at (0,0).

$$\iint_R x^4 y\, dA$$

$\iint_R x^4 y\, dA =$ 0 (Simplify your answer.)

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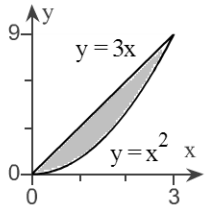
5. Reverse the order of integration in the following integral.

$$\int_0^9 \int_{y/3}^{\sqrt{y}} f(x,y)\ dx\ dy$$

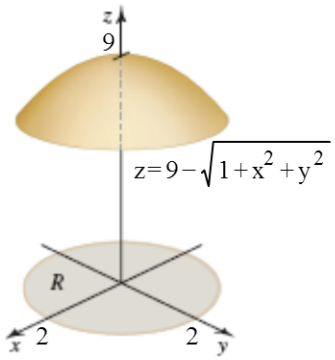


Choose the correct reversed integral below.

- A. $\int_0^3 \int_{x^2}^{3x} f(x,y)\ dy\ dx$
- B. $\int_{x^2}^{3x} \int_0^3 f(x,y)\ dx\ dy$
- C. $\int_{x^2}^{3x} \int_0^3 f(x,y)\ dy\ dx$
- D. $\int_0^9 \int_{x^2}^{3x} f(x,y)\ dy\ dx$

6. Find the volume V of the solid below the hyperboloid $z = 9 - \sqrt{1 + x^2 + y^2}$ and above the following region.

$$R = \{(r,\theta): 0 \le r \le 2, 0 \le \theta \le 2\pi\}$$



$V = \dfrac{110 - 10\sqrt{5}}{3}\pi$ units^3

(Type an exact answer, using π as needed.)

YOU ANSWERED: $\dfrac{38\pi - 10\pi\sqrt{5}}{3}$

7. Sketch the given region of integration R and evaluate the integral over R using polar coordinates.

$$\iint_R e^{x^2+y^2}\,dA;\ R = \{(x,y): x^2 + y^2 \le 49\}$$

$\iint_R e^{x^2+y^2}\,dA = \pi(e^{49} - 1)$

(Type an exact answer, using π as needed.)

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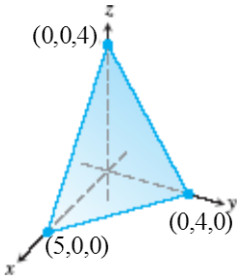
8. Find the volume of the given solid region in the first octant bounded by the plane $16x + 20y + 20z = 80$ and the coordinate planes, using triple integrals.



Complete the triple integral below used to find the volume of the given solid region. Note the order of integration dz dy dx.

$$V = \int_0^{5} \int_0^{4-\frac{4}{5}x} \int_0^{4-\frac{4}{5}x-y} dz\, dy\, dx$$

The volume of the solid is $\frac{40}{3}$ unit(s)^3.

(Type an integer or a simplified fraction.)

9. Evaluate the following integral.

$$\int_1^{\ln 5} \int_1^{\sqrt{z}} \int_{\ln(4y)}^{\ln(5y)} e^{x+y^2-z}\, dx\, dy\, dz$$

$$\int_1^{\ln 5} \int_1^{\sqrt{z}} \int_{\ln(4y)}^{\ln(5y)} e^{x+y^2-z}\, dx\, dy\, dz = \frac{\ln 5}{2} + \frac{e^1}{10} - 1$$

(Type an exact answer.)

10. Find the coordinates of the center of mass of the following plane region with variable density.

The triangular plate in the first quadrant bounded by $y = x$, $x = 0$, and $y = 2 - x$ with $\rho(x,y) = 6x + 6y + 3$.

The plate's center of mass is located at $\left(\frac{4}{11}, \frac{12}{11}\right)$.

(Simplify your answer. Type an ordered pair. Use integers or fractions for any numbers in the expression.)

YOU ANSWERED: $\left(\frac{29}{62}, \frac{55}{62}\right)$

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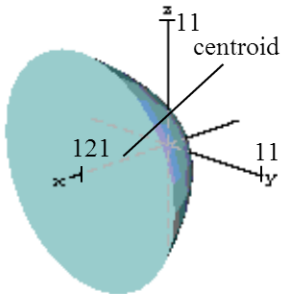
11. Find the center of mass of the following solid, assuming constant density. Sketch the region and indicate the location of the centroid. Use symmetry when possible and choose a convenient coordinate system.

The region bounded by the paraboloid $z = x^2 + y^2$ and the plane $z = 121$.

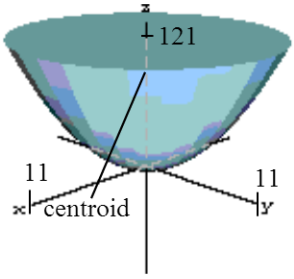
The center of mass is located at $\left(0, 0, \frac{242}{3}\right)$. (Type exact answers in simplified form.)

Choose the correct graph below.

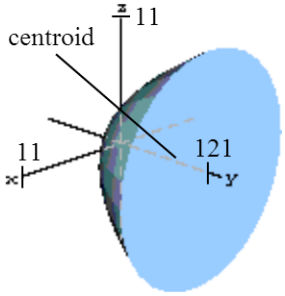
○ A.



✓ B.



○ C.



12. Solve the following relations for x and y, and compute the Jacobian J(u,v).

$u = 2x - y,\ v = x + y$

The function for x in terms of u and v is $x = \frac{1}{3}u + \frac{1}{3}v$.

The function for y in terms of u and v is $y = -\frac{1}{3}u + \frac{2}{3}v$.

The Jacobian of the transformation is $J(u,v) = \frac{1}{3}$.

(Type an integer or a simplified fraction.)

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13. To evaluate the following integrals carry out these steps.

a. Sketch the original region of integration R in the xy-plane and the new region S in the uv-plane using the given change of variables.

b. Find the limits of integration for the new integral with respect to u and v.

c. Compute the Jacobian.

d. Change variables and evaluate the new integral.

$\iint_R xy\,dA$, where R is the square with vertices (0,0), (1,1), (2,0), and (1, − 1); use $x = u + v$, $y = u - v$.

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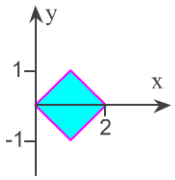
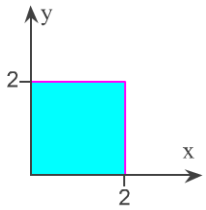
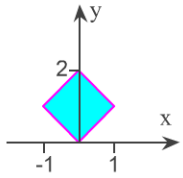
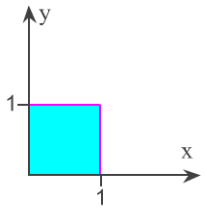
a. Sketch the original region of integration R in the xy-plane. Choose the correct graph below.

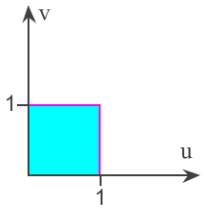
A. 

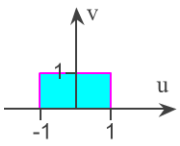
B. 

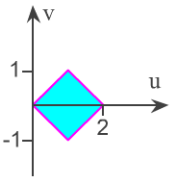
C. 

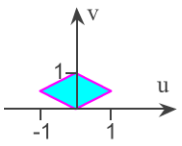
D. 

Sketch the new region S in the uv-plane. Choose the correct answer below.

A. 

B. 

C. 

D. 

b. Find the limits of integration.

$0 \le u \le 1$

$0 \le v \le 1$

(Simplify your answers.)

c. J(u,v) = -2 (Simplify your answer.)

d. $\iint_R xy\,dA$ = 0 (Simplify your answer.)

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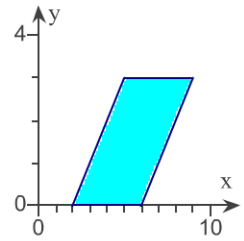
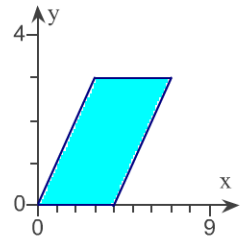
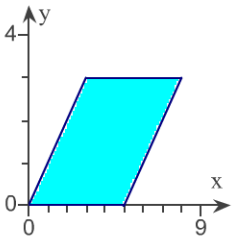
14. Evaluate the following integral using a change of variables of your choice. Sketch the original and new regions of integration, R and S.

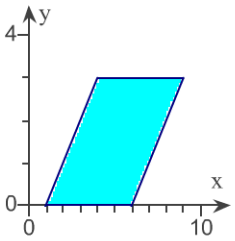
$$\int_0^3 \int_y^{y+5} \sqrt{x-y}\ dxdy$$

Sketch the original region, R, in the uv-plane. Choose the correct graph below.

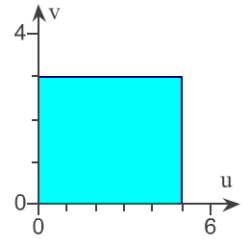
A. 

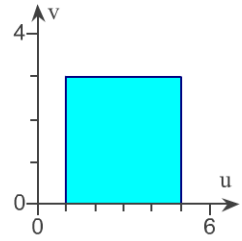
B. 

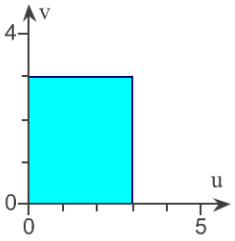
C. 

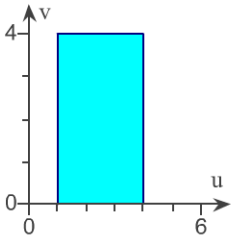
D. 

Sketch S = {(u,v): $0 \le u \le 5$, $0 \le v \le 3$}, S, in the xy-plane. Choose the correct graph below.

A. 

B. 

C. 

D. 

$$\int_0^3 \int_y^{y+5} \sqrt{x-y}\ dxdy = 10\sqrt{5}$$

(Type an exact answer, using radicals as needed.)