WebAssign
Hw 25 (15.9): Triple Int. in Spherical Coord. (Homework)

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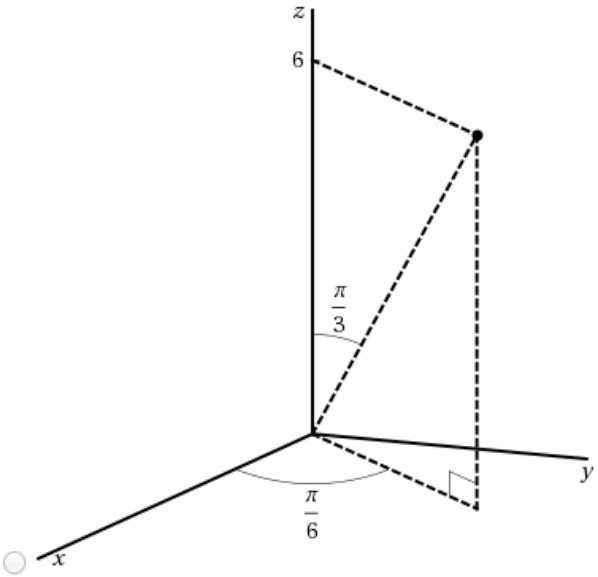
MA 261 Fall 2012, section 121, Fall 2012
Instructor: David Daniels

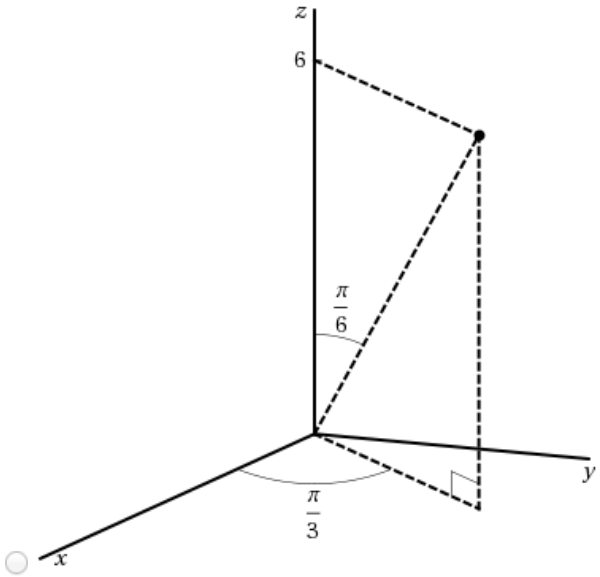
Current Score : 20 / 20 **Due :** Thursday, October 25 2012 11:00 PM EDT

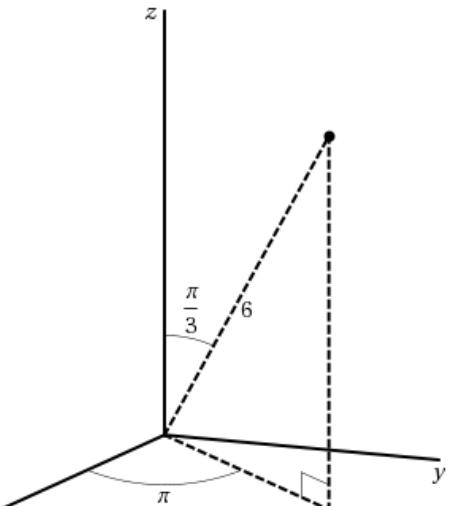
1. 2/2 points | Previous Answers SCalcET7 15.9.001.

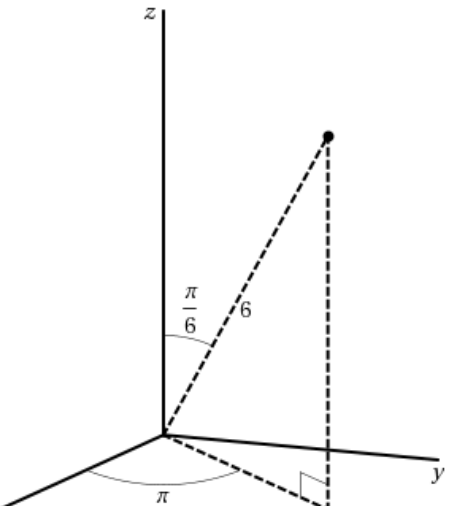
Plot the point whose spherical coordinates are given. Then find the rectangular coordinates of the point.

(a) (6, $\pi/3$, $\pi/6$)



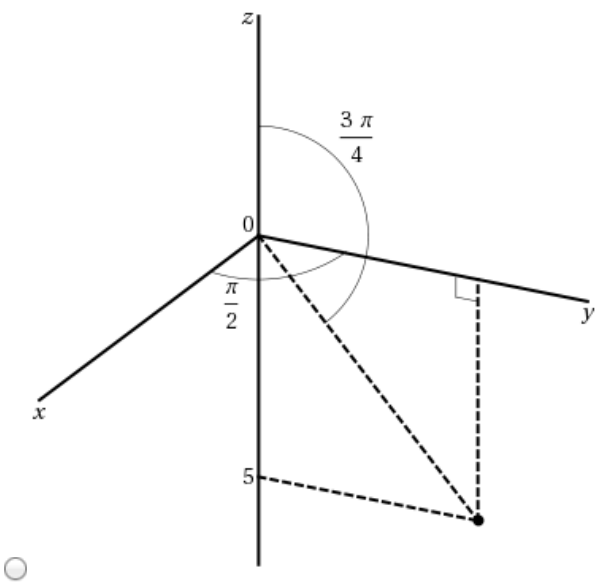


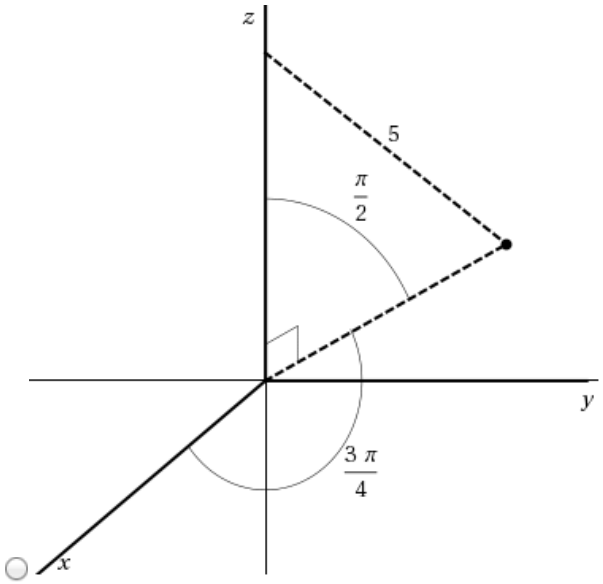


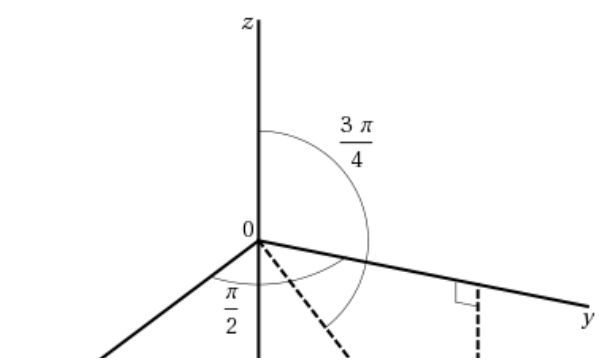


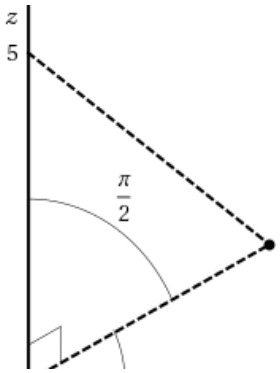
$(x, y, z) = \left(\quad \right)$

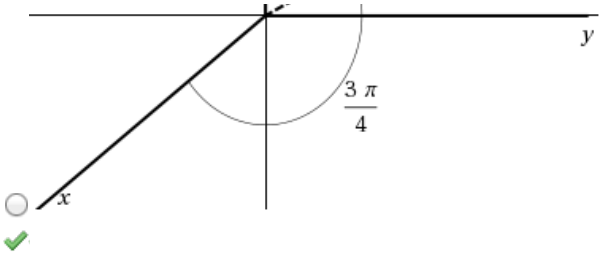
(b) (5, $\pi/2$, $3\pi/4$)











$(x, y, z) = \left($ ✓ $\right)$

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2. 2/2 points | Previous Answers SCalcET7 15.9.003.

Change from rectangular to spherical coordinates. (Let $\rho \geq 0$, $0 \leq \theta \leq 2\pi$, and $0 \leq \phi \leq \pi$.)

(a) $(0, -7, 0)$

$(\rho, \theta, \phi) = \left($

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(b) $(-1, 1, -\sqrt{2})$

$(\rho, \theta, \phi) = \left($

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3. 2/2 points | Previous Answers SCalcET7 15.9.009.

Write the equation in spherical coordinates.

(a) $2z^2 = 9x^2 + 9y^2$

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(b) $x^2 + 7z^2 = 7$

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4. 2/2 points | Previous Answers SCalcET7 15.9.016.

(a) Find inequalities that describe a hollow ball with diameter 90 cm and thickness 0.6 cm. (Assume the ball is centered at the origin of the coordinate system.)

- ○ $44.4 \le \rho \le 45,\ \pi \le \theta \le 2\pi,\ 0 \le \phi \le \pi/2$
- ◉ $44.4 \le \rho \le 45,\ 0 \le \theta \le 2\pi,\ 0 \le \phi \le \pi$
- ○ $89.4 \le \rho \le 90,\ \pi \le \theta \le 2\pi,\ 0 \le \phi \le \pi/2$
- ○ $89.4 \le \rho \le 90,\ 0 \le \theta \le 2\pi,\ 0 \le \phi \le \pi$
- ○ $0.6 \le \rho \le 45,\ 0 \le \theta \le \pi,\ 0 \le \phi \le \pi/2$

(b) Suppose the ball is cut in half. Write inequalities that describe one of the halves. (Select all that apply.)

- ☑ $44.4 \le \rho \le 45,\ 0 \le \theta \le 2\pi,\ 0 \le \phi \le \pi/2$
- ☐ $44.4 \le \rho \le 45,\ 0 \le \theta \le 2\pi,\ 0 \le \phi \le \pi$
- ☑ $44.4 \le \rho \le 45,\ 0 \le \theta \le \pi,\ 0 \le \phi \le \pi$
- ☐ $44.4 \le \rho \le 45,\ 0 \le \theta \le 3\pi/2,\ 0 \le \phi \le \pi$
- ☐ $44.4 \le \rho \le 45,\ 0 \le \theta \le \pi,\ 0 \le \phi \le \pi/2$

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5. 2/2 points | Previous Answers SCalcET7 15.9.017.MI.

Evaluate the integral. Then sketch the solid whose volume is given by the integral.

$$\int_0^{\pi/6}\int_0^{\pi/2}\int_0^{1}\rho^2\sin\phi\,d\rho\,d\theta\,d\phi$$

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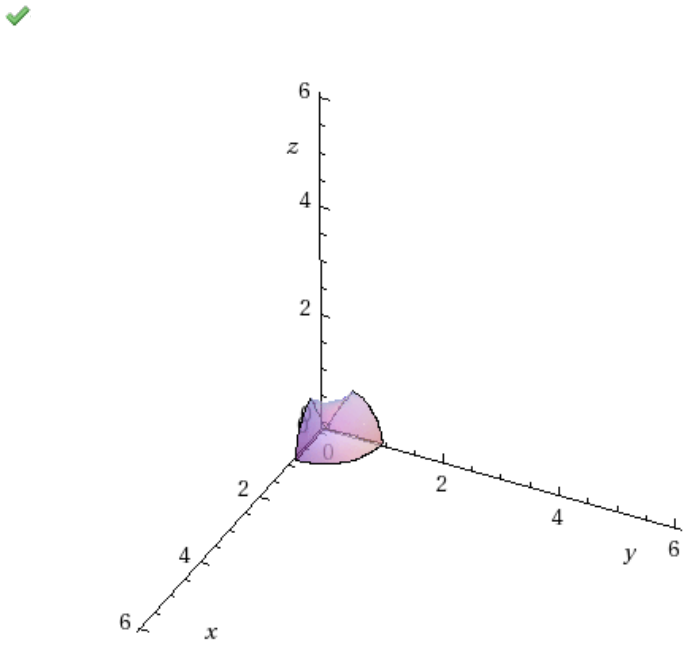

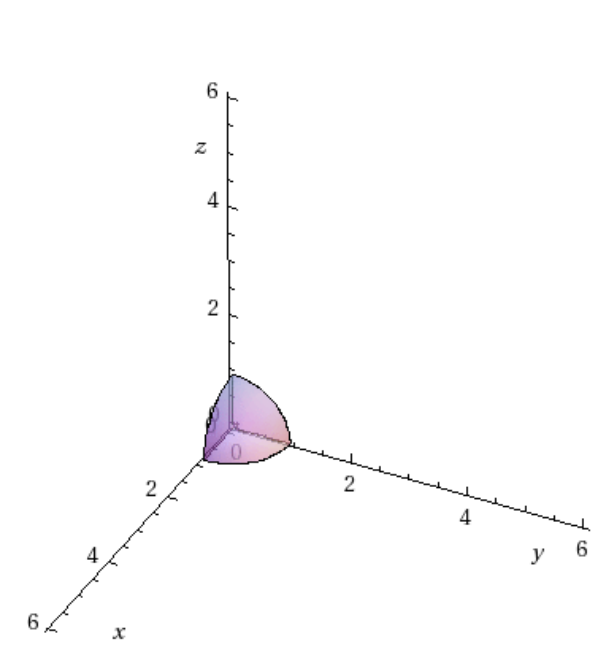

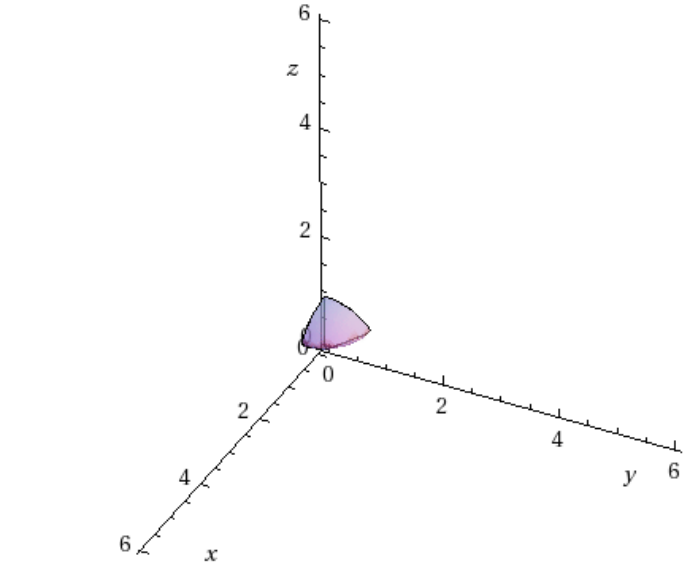

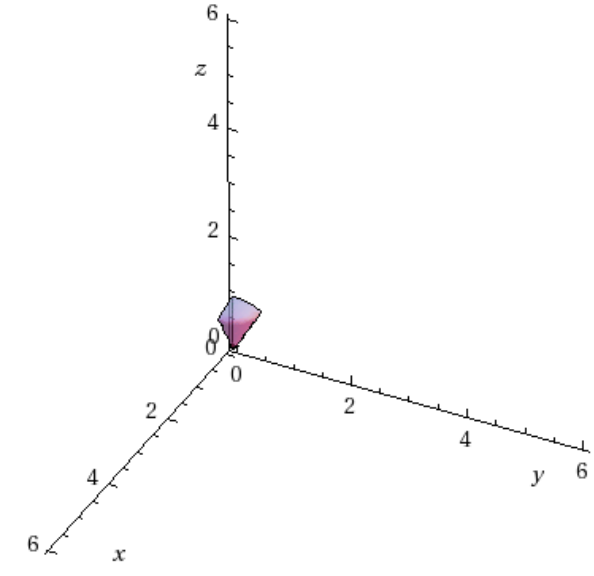

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6. 2/2 points | Previous Answers SCalcET7 15.9.019.

Set up the triple integral of an arbitrary continuous function $f(x, y, z)$ in cylindrical coordinates over the solid shown.

$\iiint_E f(x, y, z)\, dV =$

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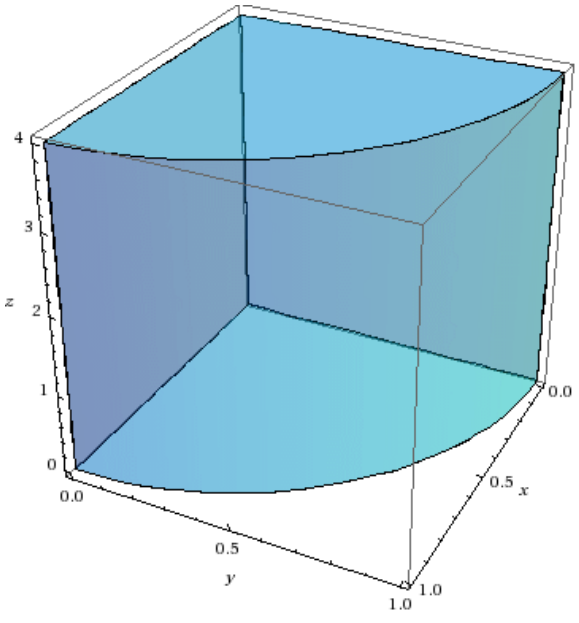
$dz\, dr\, d\theta$



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7. 2/2 points | Previous Answers SCalcET7 15.9.020.

Set up the triple integral of an arbitrary continuous function $f(x, y, z)$ in spherical coordinates over the solid shown. (Assume $a = 4$ and $b = 9$.)

$$\iiint_E f(x, y, z)\, dV =$$

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$$\int_0^{\pi/2} f\left(\right.$$

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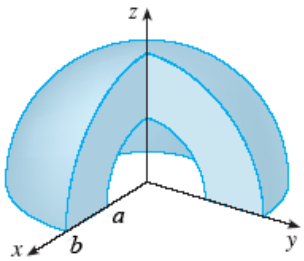
$$d\rho\, d\theta\, d\varphi$$



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8. 2/2 points | Previous Answers SCalcET7 15.9.023.

Use spherical coordinates.

Evaluate $\iiint_E (x^2 + y^2)\, dV$, where E lies between the spheres $x^2 + y^2 + z^2 = 9$ and $x^2 + y^2 + z^2 = 25$.

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9. 2/2 points | Previous Answers SCalcET7 15.9.036.

Use cylindrical or spherical coordinates, whichever seems more appropriate.

Find the volume of the smaller wedge cut from a sphere of radius 2 by two planes that intersect along a diameter at an angle of $\pi/3$.

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10. 2/2 points | Previous Answers SCalcET7 15.9.039.

Evaluate the integral by changing to spherical coordinates.

$$\int_0^{10} \int_0^{\sqrt{100 - x^2}} \int_{\sqrt{x^2 + y^2}}^{\sqrt{200 - x^2 - y^2}} xy \, dz \, dy \, dx$$

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