Calc III - Ch 15 – Part 2 - Required Practice **ANSWERS ONLY**

15.6

#1. (i) (ii) (iii) $\frac{27}{4}$

#2. $\frac{1}{4e}$

#3. $\frac{65}{28}$

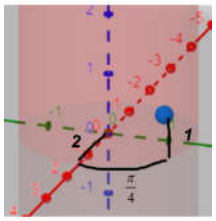
#4. $\int_{-3}^{3}\int_{x^2}^{9}\int_{0}^{4}(1)\,dz\,dy\,dx$

#5. (i) $\int_{0}^{1}\int_{0}^{1-z}\int_{0}^{y^2} f(x,y,z)\,dx\,dy\,dz$

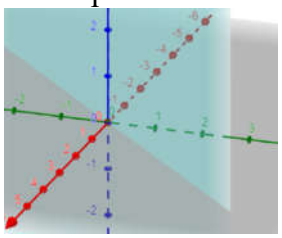
(ii) $\int_{0}^{1}\int_{0}^{1-\sqrt{x}}\int_{\sqrt{x}}^{1-z} f(x,y,z)\,dy\,dz\,dx$

15.7

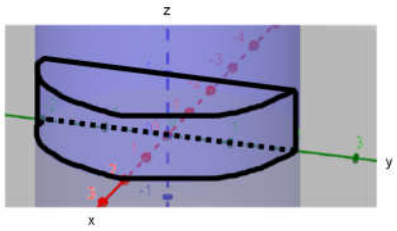
#1.



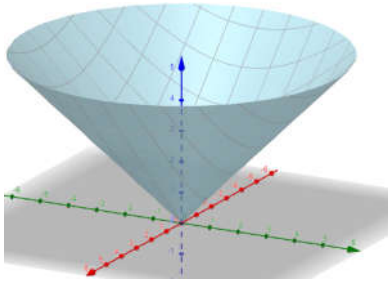
#2. A plane



#3.



#4.

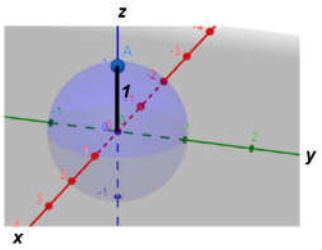


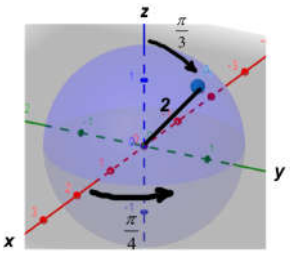
#5. $\frac{2}{35}$

#6. $\frac{2\pi}{5}$

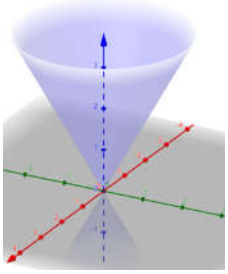
15.8

#1. (i) $(0,0,1)$ (ii) $\left(\frac{\sqrt{2}}{2},\frac{\sqrt{6}}{2},\sqrt{2}\right)$



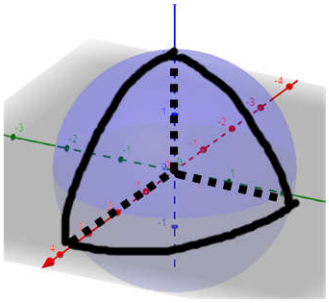


#2. A cone



#3. A sphere, centered at (0, 0.5, 0) with radius=0.5.

#4.



#5. (i) $\rho^2\left(\cos^2\phi-\sin^2\phi\right)=0$

which is equivalent to:

$\rho=0 \;\; or \;\; \phi=\frac{\pi}{4},\frac{3\pi}{4}$

(ii) $\rho^2\left(\sin^2\phi\cos^2\theta+\cos^2\phi\right)=9$

#6. $\frac{9\pi}{2}\left(1-\frac{\sqrt{3}}{2}\right)$

#7. $\int_0^{\pi/2}\int_0^3\int_0^2 f\left(r\cos\theta,r\sin\theta,z\right) r\,dz\,dr\,d\theta$

#8. $\frac{312500\pi}{7}$

#9. $\frac{64\pi}{3}\left(1-\sqrt{3}\right)$

#10. 10π

#11. $\frac{1}{2}\left(\frac{8\sqrt{2}}{15}-\frac{2}{3}\right)$

Ch 15 Part 2 Test Review

#1. $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} \left(x^2\right) dz\, dy\, dx$

#2. $\int_0^1 \int_0^{x} \int_0^{x-y} \left(xyz\right) dz\, dy\, dx$

#3. $\int_{-2}^{2} \int_{x^2}^{4} \int_0^{-\frac{1}{2}y+2} f\left(x,y,z\right) dz\, dy\, dx$

$\int_0^4 \int_{-\sqrt{y}}^{\sqrt{y}} \int_0^{-\frac{1}{2}y+2} f\left(x,y,z\right) dz\, dx\, dy$

$\int_{-2}^{2} \int_0^{2-\frac{1}{2}x^2} \int_{x^2}^{4-2z} f\left(x,y,z\right) dy\, dz\, dx$

$\int_0^2 \int_{-\sqrt{4-2z}}^{\sqrt{4-2z}} \int_{x^2}^{4-2z} f\left(x,y,z\right) dy\, dx\, dz$

$\int_0^2 \int_0^{4-2x} \int_{-\sqrt{y}}^{\sqrt{y}} f\left(x,y,z\right) dx\, dy\, dz$

$\int_0^4 \int_0^{2-\frac{1}{2}y} \int_{-\sqrt{y}}^{\sqrt{y}} f\left(x,y,z\right) dx\, dz\, dy$

#4. $\int_0^1 \int_0^{y^2} \int_0^{1-y} f\left(x,y,z\right) dz\, dx\, dy$

$\int_0^1 \int_0^{(1-z)^2} \int_{\sqrt{x}}^{1-z} f\left(x,y,z\right) dy\, dx\, dz$

$\int_0^1 \int_0^{1-\sqrt{x}} \int_{\sqrt{x}}^{1-z} f\left(x,y,z\right) dy\, dz\, dx$

$\int_0^1 \int_0^{1-z} \int_0^{y^2} f\left(x,y,z\right) dx\, dy\, dz$

$\int_0^1 \int_0^{1-y} \int_0^{y^2} f\left(x,y,z\right) dx\, dz\, dy$

#5. $\int_0^1 \int_{\sqrt{y}}^{1} \int_0^{y} f\left(x,y,z\right) dz\, dx\, dy$

$\int_0^1 \int_z^1 \int_{\sqrt{y}}^{1} f\left(x,y,z\right) dx\, dy\, dz$

$\int_0^1 \int_0^y \int_{\sqrt{y}}^{1} f\left(x,y,z\right) dx\, dz\, dy$

$\int_0^1 \int_{\sqrt{z}}^1 \int_z^{x^2} f\left(x,y,z\right) dy\, dx\, dz$

$\int_0^1 \int_0^{x^2} \int_z^{x^2} f\left(x,y,z\right) dy\, dz\, dx$

#6. $\int_0^{2\pi} \int_0^1 \int_0^{2r} \left(r\cos\theta\right)^2 r\, dz\, dr\, d\theta$

#7. $\int_0^{2\pi} \int_0^1 \int_{-\sqrt{4-r^2}}^{\sqrt{4-r^2}} (1)\, r\, dz\, dr\, d\theta$

#8. $\int_0^{2\pi}\int_0^{3}\int_{r^2}^{36-3r^2} (1)\, r\, dz\, dr\, d\theta$

#9. $\int_0^{\pi}\int_0^{\pi}\int_3^{4} \left(\rho\sin\phi\cos\theta\right)^2\ \rho^2\sin\phi\, d\rho\, d\phi\, d\theta$

#10.
$\int_0^{2\pi}\int_0^{\pi/3}\int_2^{4}\left(\rho^2\sin^2\phi\cos\phi\sin\theta\cos\theta\right)\rho^2\sin\phi\, d\rho\, d\phi\, d\theta$

#11. $\int_0^{\pi/2}\int_0^{\pi/2}\int_0^{3}\left(\rho^3\cos\phi\right)\rho^2\sin\phi\, d\rho\, d\phi\, d\theta$

#12. $\int_0^{2\pi}\int_0^{1}\int_0^{1-r^2}\left(r^2\cos^2\theta\sin^2\theta\right) r\, dz\, dr\, d\theta$

#13. $\int_0^{\pi}\int_0^{2}\int_0^{r\sin\theta}\left(rz\sin\theta\right) r\, dz\, dr\, d\theta$

#14. $\int_0^{2}\int_0^{y}\int_0^{1-\frac{1}{2}y} (1)\, dz\, dx\, dy$

#15. $\int_0^{2\pi}\int_0^{2}\int_0^{3-\sin\theta} (1)\, r\, dz\, dr\, d\theta$

#16. $\int_0^{2\pi}\int_0^{1}\int_{r^2}^{r}(1)\, r\, dz\, dr\, d\theta$

#17.
$\int_{-\pi/2}^{\pi/2}\int_0^{\pi}\int_0^{2}\left(\rho^3\sin^2\phi\sin^2\theta\right)\rho^2\sin\phi\, d\rho\, d\phi\, d\theta$