

Answers

Winter 2014 Math 125 Final Exam

1. (a) $\frac{3}{4}e^{-2} - \frac{5}{4}$
(b) $\frac{\sqrt{2}}{8}$
2. (a) $\frac{1}{2}x - \frac{1}{4}\sin(2x) - \frac{1}{3}\cos^3(x) + C$
(b) $\frac{1}{3}\ln|\sqrt{x+5}-2| - \ln|\sqrt{x+5}+2| + \frac{2}{3}\ln|\sqrt{x+5}+1| + C$
3. $\frac{\pi}{4}e^{-2}$
4. $\frac{59}{6}$
5. $\int_1^6 2\pi(y+1)\left((y-1) - \left(\frac{y-1}{2}\right)\right) dy + \int_6^9 2\pi(y+1)\left(\left(7 - \frac{y}{3}\right) - \left(\frac{y-1}{2}\right)\right) dy$
6. $9800\pi\left(\frac{\pi^2}{16} + \frac{1}{4}\right)$ joules
7. (a) $\int_0^{\pi/3} \sqrt{1+4\cos^2(2x)} dx$
(b) $\frac{\pi}{24}(\sqrt{5} + 3\sqrt{2} + 6) \approx 1.63346$
8. $\bar{x} = \frac{2\sqrt{3}}{\pi}; \quad \bar{y} = 0$
9. $y = 4\sqrt{x^2+9}e^{\tan^{-1}(x/3)} - 2$
10. $b = \frac{3}{1 - e^{-8/5}} \approx 3.7589$ grams per liter