

Answers

Spring 2013 Math 125 Final Exam

1. (a) $\frac{1}{2}x^2 + x + 3 \ln|x - 1| + 2 \ln|x + 3| + C$

(b) $\ln \left| \frac{t - 3 + \sqrt{t^2 - 6t + 13}}{2} \right| + C$

2. (a) $\frac{2}{3}$

(b) $\frac{4}{e}$

3. $27 - 24 \ln 2$

4. (b) $\frac{27\pi}{2}$

(c) Shells: $\int_0^9 2\pi(10 - y) \left(\sqrt{y} - \frac{y}{3} \right) dy$

Washers: $\int_0^3 \pi (10 - x^2)^2 - \pi (10 - 3x)^2 dx$

5. 378,000 ft-lb

6. (a) diverges for $k = -1$

(b) converges for $k > -1$; diverges for $k < -1$

7. (a) $\frac{3\sqrt{26}}{4}$ ft/sec

(b) $\frac{1}{4} (1 + \sqrt{26} + 3\sqrt{2} + \sqrt{170} + \sqrt{19}) \approx 6.935$ ft

8. (a) $A = \frac{20}{3}$; (b) $\bar{x} = 0$; (c) $\bar{y} = \frac{14}{5}$

9. $y = 2 \sin \left(\sqrt{x^2 - 1} + \frac{\pi}{6} - 1 \right)$

10. (a) $\frac{dA}{dt} = 0.10A + 12M$

(b) $A = 120M (e^{t/10} - 1)$

(c) $M = \$2183.15$