

Answers

Winter 2008 Math 125 Final Exam

1. a. $\frac{1}{2}x^2 \sin(x^2) + \frac{1}{2} \cos(x^2) + C$

b. $\frac{(1 + \sqrt{\ln x})^4}{2} + C$

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

b. $2 \ln \left| \frac{2 - \sqrt{3 - 2x - x^2}}{x+1} \right| + \sqrt{3 - 2x - x^2} + C$

3. converges to 1

4. a. $v(t) = 1 - e^{3-t}$

b. $5 + e^{-2} - e^3$

c. $e^{-2} + e^3 - 3$

5. $7\pi/6$

6. $(62.5)\pi \cdot 544 \approx 106,800$ ft-lb.

7. a. $\int_1^3 \sqrt{1 + \frac{1}{x^2}} dx$

b. $\frac{1}{6} \left[\sqrt{2} + \frac{4}{3}\sqrt{13} + \sqrt{5} + \frac{4}{5}\sqrt{29} + \frac{1}{3}\sqrt{10} \right] \approx 2.303$

8. coordinates of centroid: $(0, \frac{64}{35})$

9. $y = -3e^{\frac{1}{3}\tan(x^3)}$

10. a. $V(t) = 100 - 5t$

b. $\frac{dS}{dt} = -15 \left(\frac{S(t)}{100 - 5t} \right)$

c. $S(t) = (0.002)(100 - 5t)^3$

d. $t = \frac{1}{5} \left(100 - \left(\frac{1000}{0.002} \right)^{\frac{1}{3}} \right) \approx 4.126$ hours after noon