

Answers

Winter 2010 Math 125 Final Exam

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

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

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

(b) $3 \sin^{-1} \left(\frac{x - 3}{3} \right) - \sqrt{6x - x^2} + C$

3. $\ln 2$

4. (a) $A = 2 \int_0^h 50e^{-(y/50)^2} dy$

(b) $h = 50 - t^3$

(c) $\frac{dA}{dt} = -300t^2 e^{-((50-t^3)/50)^2}$

5. $\frac{9\pi^2}{4} - 4\pi$

6. $\left[\int_{-8}^{-5} 800g\pi(-y)(y + 8)^2 dy + \int_{-5}^0 800g\pi(-y) \left(\frac{y + 11}{2} \right)^2 dy \right]$ joules,

where $g = 9.8 \text{ m/s}^2$ is the acceleration due to gravity

7. $\frac{3\pi}{4}$

8. (a) $L = \int_0^{\pi/3} \sqrt{1 + \sec^4 x} dx$

(b) $L \approx 2.06633$

9. $y = 2e^{(\tan x - 1)} - 2$

10. About 40.6 years ago