

Answers

Winter 2009 Math 125 Final Exam

1. (a) $\frac{1}{3} \tan(3x) + \frac{1}{9} \tan^3(3x) + C$
(b) $\frac{3\pi}{4} + \frac{9\sqrt{3}}{8}$
2. (a) $3 \ln(3 + \sin x) - 2 \ln(2 + \sin x) + C$
(b) $2 + \ln 4$
3. (a) $100/3$
(b) $116/3$
4. (a) T
(b) F; $\frac{d}{dx} \int_2^{x^2+1} \ln(t) dt = \ln(x^2 + 1) \cdot 2x$
(c) F; $L = \int_0^{\pi/4} \sqrt{1 + \sec^4 x} dx$
(d) T
5. (a) 47,300 J
(b) 21,500 J
6. 184π
7. $A = \pi/2$, $M_x = 1 - \pi/8$, $\bar{y} = \frac{M_x}{A} = \frac{2}{\pi} - \frac{1}{4}$
8. $P(t) = \left(\frac{1}{3}t^{3/2} - \frac{5}{3}\right)^2$
9. (a) $\frac{dW}{dt} = 0.01W - 100$
(b) $W(t) = 10,000 - 5,000e^{0.01t}$
(c) $2009 + 100 \ln 2 \approx 2009 + 69.3 \approx 2078$