

MATH 180
Midterm Practice Problems – Answers
Summer 2009

1. (a) $\frac{1}{2}e^{x^2} + C$
(b) $\frac{1}{4}\tan^{-1}(4x) + C$
(c) $\frac{1}{2}\sqrt{t^4 + 9} + C$
(d) $\frac{1}{3}\tan^3 \theta + C$
(e) $\frac{1}{3}$
(f) 0
(g) 2π
2. (a) $\sqrt{1 + x^2}$
(b) $\frac{\sin x}{2\sqrt{x}}$
(c) 1
3. $\frac{8}{3}$
4. (a) 12π
(b) 3π
5. $t = \frac{\ln(1/10)}{\ln(4/5)}$ years
6. $\frac{8}{3}$
7. $\frac{8}{3}$
8. (a) $-x - \ln|x - 2| + \ln|x + 2| + C$
(b) $\frac{1}{2}t^2 \ln t - \frac{1}{4}t^2 + C$
(c) $\tan \theta - \theta + C$
(d) $\frac{1}{2}x^2 \tan^{-1} x + \frac{1}{2}\tan^{-1} x - \frac{1}{2}x + C$
(e) $-\cos \theta + \frac{\cos^3 \theta}{3} + C$
(f) $\tan^{-1}\left(\frac{x+1}{2}\right) + C$

$$(g) \quad -\sin^{-1} v - \frac{\sqrt{1-v^2}}{v} + C$$

$$(h) \quad -\frac{\cos^4 \phi}{4} + C$$

$$9. \quad 100e^{-0.6} \text{ grams}$$

$$10. \quad V = \frac{\sqrt{3}}{12} a^2 h$$

$$11. \quad (a) \quad 8\pi$$

$$(b) \quad \frac{32\pi}{5}$$

$$12. \quad (a) \quad -2 \cos(\sqrt{x}) + C$$

$$(b) \quad \frac{1}{3} \sin^{-1}(3x) + C$$

$$(c) \quad x \tan^{-1} x - \frac{1}{2} \ln(x^2 + 1) + C$$

$$13. \quad 1$$

$$14. \quad \frac{64\pi}{5}$$