

1. a.  $\frac{x^2}{2} \arcsin x - \frac{1}{4} \arcsin x + \frac{x\sqrt{1-x^2}}{4} + C$

b.  $\frac{\sin^5(3t)}{15} - \frac{\sin^7(3t)}{21} + C$

2.  $\frac{5}{6} + \ln\left(\frac{8}{3}\right)$

3.  $1 - \cos(1)$

4.  $-\frac{2}{\sqrt{\pi}}$

5.  $21\frac{1}{2}$

6. a.  $\frac{8}{\pi} - \frac{\pi}{2}$

b.  $V = \pi \int_0^1 [\sin(\pi x/2) + 2]^2 dx - \pi \int_0^1 (x^2 + 2)^2 dx$

7. 652.5 foot-pounds

8. 483 miles

9. a.  $\left(\frac{9}{\ln(10)}, \frac{27}{40 \cdot \ln(10)}\right)$

b. centroid does not lie inside the region

10. a.  $\frac{dy}{dx} = \frac{y}{2x}$

b.  $y = \sqrt{x/3}$