Section 5.2

34. **(a)** 4 **(b)** -2π **(c)** $\dfrac{9}{2} - 2\pi$

52. $F(0)$, $F(1)$. $F(3)$, and $F(4)$ are negative. $F(2) = 0$ so $F(2)$ is the largest.

Section 5.3

2. **(a)** $g(0) = 0,\ g(1) = \dfrac{1}{2},\ g(2) = 0,\ g(3) = -\dfrac{1}{2},\ g(4) = 0,\ g(5) = \dfrac{3}{2},\ g(6) = 4$

(c) g has a maximum value at $x = 7$ and maximum value is $g(7) \approx 6.2$.

g has a minimum value at $x = 3$ and minimum value is $g(3) = -\dfrac{1}{2}$.

3. **(c)** g has a maximum value at $x = 3$ and maximum value is $g(3) = 7$.

g has a minimum value at $x = 0$ and minimum value is $g(0) = 0$.

14. $h'(x) = \dfrac{\sqrt{x}}{2(x^2+1)}$ **18.** $y' = -\sqrt{1+\sin^2 x}\ \cos x$ **42.** $\dfrac{\pi}{3}$

66. Increasing on $(-2, 0) \cup (2, \infty)$, decreasing on $(-\infty, -2) \cup (0, 2)$,

concave down on $(-1, 1)$ and concave up on $(-\infty, -1) \cup (1, \infty)$.

Inflection points are at $x = -1,\ x = 1$.

73. **(a)** Local maxima at $x = 1$ and $x = 5$. Local minima at $x = 3$ and $x = 7$.

(b) Absolute maxima at $x = 9$. Absolute minima at $x = 7$.

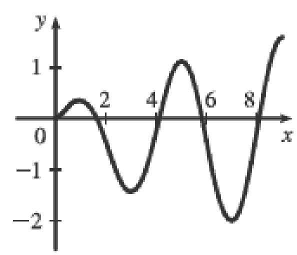
(c) Concave down on $(1/2, 2) \cup (4, 6) \cup (8, 9)$.

Concave up on $(0, 1/2) \cup (2, 4) \cup (6, 8)$.

Points of inflection are at $x = 1/2.\ 2,\ 4,\ 6,$ *and* 8.

g is decreasing on $(1, 3) \cup (5, 7)$ and increasing on $(0, 1) \cup (3, 5) \cup (7, 9)$

(d)



Section 5.4

28. -1 **32.** $1 - \ln 4$ **36.** $\sqrt{2} - 1$ **60.** **(a)** $\dfrac{2}{3}$ m **(b)** 4 m

Section 5.5

4. $\dfrac{1}{3}\sin^3\theta + C$ **24.** $\dfrac{2}{5}(x+2)^{5/2} - \dfrac{4}{3}(x+2)^{3/2} + C$ **30.** $-\cot x + C$

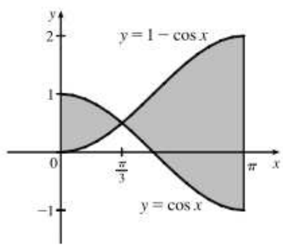
46. $\dfrac{2}{7}(2+x)^{7/2} - \dfrac{8}{5}(2+x)^{5/2} + \dfrac{8}{3}(2+x)^{3/2} + C$ **68.** $\dfrac{10}{3}$

Review Chapter 5

38. $\dfrac{15}{4}$ **48.** $g'(x) = \dfrac{\cos^3 x}{1+\sin^4 x}$ **58.** **(a)** $\dfrac{175}{6}$ meters **(b)** $\dfrac{177}{6}$ meters

Section 6.1

24. $\displaystyle\int_0^{\pi/3} (2\cos x - 1)\ dx + \int_{\pi/3}^{\pi} (1 - 2\cos x)\ dx = 2\sqrt{3} + \frac{\pi}{3}$



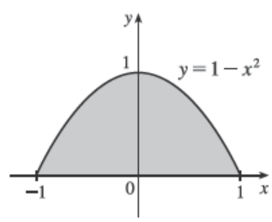
Section 6.2

14. $\displaystyle V = \pi \int_0^{\pi/4} \left[(\cos x + 1)^2 - (\sin x + 1)^2\right]\ dx = \pi \int_0^{\pi/4} (\cos(2x) + 2\cos x - 2\sin x)\ dx = \left(2\sqrt{2} - \frac{3}{2}\right)\pi$

28. $\displaystyle \pi \int_0^1 (y^2 - y^8)\, dy$

30. $\displaystyle \pi \int_0^1 \left[(1-x)^2 - (1 - \sqrt[4]{x})^2\right]\ dx = \pi \int_0^1 (x^2 - 2x - \sqrt{x} + 2\sqrt[4]{x})\, dx$

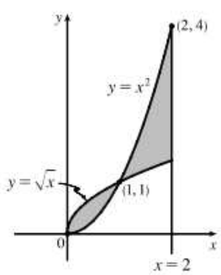
58. $\displaystyle V = \int_0^1 4(1-y)\, dy = 2$

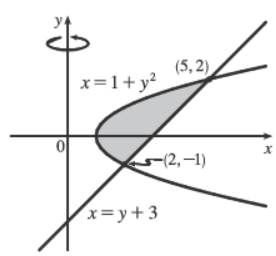


Review Chapter 6

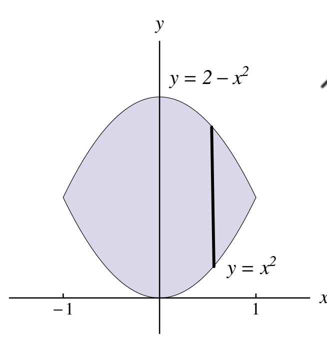
6. $\displaystyle A = \int_0^1 \left(\sqrt{x} - x^2\right)\ dx = \frac{10}{3} - \frac{4}{3}\sqrt{2}$

8. $\displaystyle \pi \int_{-1}^{2} \left[(y+3)^3 - (1+y^2)^2\right]\ dy = \frac{117}{5}\pi$





24. $\displaystyle \int_{-1}^{1} \left(2 - 2x^2\right)^2\ dx = \frac{64}{15}$



Section 7.1

12. $y\tan^{-1}(2y) - \frac{1}{4}\ln(1+4y^2) + C$ **24.** $3 - \frac{6}{e}$

Section 7.2

8. $\pi + \frac{3}{8}\sqrt{3}$

12. $\int_0^{\pi/2}(2-\sin\theta)^2\,d\theta = \int_0^{\pi/2}(2-4\sin\theta+\sin^2\theta) = \int_0^{\pi/2}(2-4\sin\theta+\frac{1}{2}-\frac{1}{2}\cos 2\theta) = \frac{9}{4}\pi - 4$

22. $\frac{1}{5}\tan^5\theta + \frac{1}{3}\tan^3\theta + C$ **28.** $\frac{1}{7}\sec^7 x - \frac{2}{5}\sec^5 x + \frac{1}{3}\sec^3 x + C$ **62.** $\frac{3}{8}\pi^2$

Additional Homework Problems

A5:

1. **(a)** displacement= $\int_1^4 \boldsymbol{v}(t)\,dt = \int_1^4 \left(t - \frac{8}{t^2}\right)\,dt = \frac{3}{2}$ cm

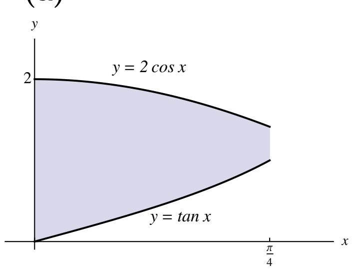
(b) distance= $\int_1^2 -\boldsymbol{v}(t)\,dt + \int_2^4 \boldsymbol{v}(t)\,dt = \int_1^2 \left(-t + \frac{8}{t^2}\right)\,dt + \int_2^4 \left(t - \frac{8}{t^2}\right)\,dt = \frac{13}{2}$ cm

A7:

1. **(a)** displacement= $\int_1^4 \mathbf{v}(t)\,dt = \int_1^4 \left(t-1)e^{-t}\right)\,dt = -\frac{2}{e^2}$ meters

(b) distance= $\int_0^1 -\mathbf{v}(t)\,dt + \int_1^2 \mathbf{v}(t)\,dt = \int_0^1 \left(-(t-1)e^{-t}\right)\,dt + \int_1^2 \left((t-1)e^{-t}\right)\,dt = \frac{2}{e} - \frac{2}{e^2}$ meters

3. **(a)**



(b) $V = \int_0^{\pi/4} (2\cos x - \tan x)\,dx = \sqrt{2} - \ln(\sqrt{2}) = \sqrt{2} - \frac{1}{2}\ln 2,$

(c) $V = \int_0^{\pi/4} (2\cos x - \tan x)^2\,dx = \frac{\pi}{4} + 2\sqrt{2} - 2,$

(d) $V = \pi\int_0^{\pi/4} (4\cos^2 x - \tan^2 x)\,dx = \frac{3}{4}\pi^2$

5. **(a)** $V = \int_0^{\pi/4} \frac{1}{2}\tan^2 x\,dx = \frac{1}{2}\left(1 - \frac{\pi}{4}\right)$ **(b)** $V = \int_0^{\pi/4} \pi\tan^2 x\,dx = \pi\left(1 - \frac{\pi}{4}\right)$

(c) $V = \int_0^{\pi/4} \pi\left[1^2 - (1-\tan x)^2\right]\,dx = \pi[\ln 2 - 1 + \frac{\pi}{4}],$