Section 5.3

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

Section 5.5

30. $-\cot x + C$

Review Chapter 5

8. (a) $\displaystyle\int_0^1 \frac{d}{dx}\left(e^{\arctan x}\right)\,dx = \left[e^{\arctan x}\right]_0^1 = e^{\pi/4} - 1$

(b) $\displaystyle\frac{d}{dx}\int_0^1 e^{\arctan x}\,dx = 0$ since this is the derivative of a constant.

(c) $\displaystyle\frac{d}{dx}\int_0^x e^{\arctan t}\,dt = e^{\arctan x}$ by the Fundamental Theorem of Calculus.

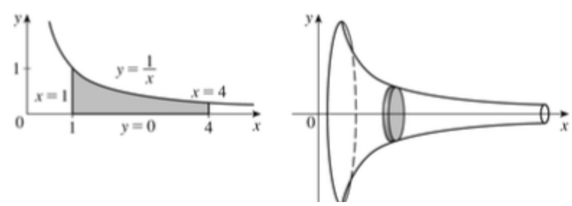
38. $\dfrac{15}{4}$ **48.** $g'(x) = \dfrac{\cos^3 x}{1+\sin^4 x}$

Section 6.1

2. $\dfrac{1}{2}(e-1)$ **24.** $2\sqrt{3} + \dfrac{\pi}{3}$

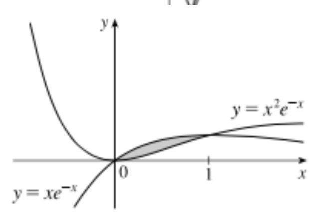
Section 6.2

2. $\displaystyle v = \pi\int_1^4 \frac{1}{x^2}\,dx = \frac{3}{4}\pi$



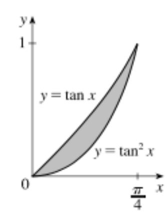
Section 7.1

58. Area$=\displaystyle\int_0^1 (x-x^2)e^{-x}\,dx = \frac{3}{e} - 1$



Section 7.2

4. $\dfrac{8}{15}$ **26.** $\dfrac{316}{693}$ **58.** $\dfrac{\ln 2}{2} - 1 + \dfrac{\pi}{4}$



Section 7.4

64. Area$=\displaystyle\int_1^2 \frac{1}{x^3+x}\,dx = \frac{3}{2}\ln 2 - \frac{1}{2}\ln 5$

Section 11.2

22. Geometric Series converges and Sum$= \dfrac{5}{\pi - 1}$.

Section 11.4

10. Series converges by the Comparison Test.

Section 11.5

14. Series diverges by the Test for Divergence.

18. Series diverges by the Test for Divergence.

Section 11.6

4. Series converges absolutely as $\sum_{n=1}^{\infty} |a_n|$ converges by the Comparison Test.

10. Series converges as it converges absolutely by the Ratio Test.

14. Series diverges by the Ratio Test or by the Test for Divergence.

26. Series converges as it converges absolutely by the Root Test.

30. Series diverges by the Root Test.

32. Series converges as it converges absolutely by the Root Test.

36. Series converges absolutely as $\sum_{n=1}^{\infty} |a_n|$ converges by the Comparison Test.

Section 11.7

6. Series converges as it converges absolutely by the Root Test.

14. Series converges absolutely as series $\sum |a_n|$ converges by the Comparison Test.

18. Series converges by the Alternative Series Test.

Section 11.8

18. $R = 8$ and $I = (-14,\ 2)$ **20.** $R = \dfrac{5}{2}$ and $I = [-2,\ 3)$

30. **(a)** Series converges for $x = 1$, **(b)** Series diverges for $x = 8$,

(c) Series converges for $x = -3$, **(d)** Series diverges for $x = -9$.

Section 11.9

4. $\dfrac{5}{1-4x^2} = 5\sum_{n=0}^{\infty} 4^n x^{2n}, \quad R = \dfrac{1}{2}, \qquad I = \left(-\dfrac{1}{2},\ \dfrac{1}{2}\right)$

8. $\dfrac{x}{2x^2+1} = \sum_{n=0}^{\infty} (-1)^n\, 2^n\, x^{2n+1}, \quad R = \dfrac{1}{\sqrt{2}}, \qquad I = \left(-\dfrac{1}{\sqrt{2}},\ \dfrac{1}{\sqrt{2}}\right)$

16. $x^2 \arctan(x^3) = \sum_{n=0}^{\infty} (-1)^n \dfrac{x^{6n+5}}{2n+1}$ with $R = 1$.

Section 11.10

38. $e^{3x} - e^{2x} = \sum_{n=0}^{\infty} \frac{3^n - 2^n}{n!} x^n, \; R = \infty.$

40. $x^2 \ln(1 + x^3) = \sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^{3n+2}}{n} \quad R = 1.$

54. $\int x^2 \sin(x^2)\, dx = \int \sum_{n=0}^{\infty} (-1)^n \frac{x^{4n+4}}{(2n+1)!}\, dx = C + \sum_{n=0}^{\infty} (-1)^n \frac{x^{4n+5}}{(2n+1)!\,(4n+5)}$ with $R = \infty.$

56. $\arctan(x^2) = \sum_{n=0}^{\infty} (-1)^n \frac{x^{4n+2}}{2n+1} \;\Rightarrow\; \int \arctan(x^2)\, dx = C + \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+3}}{(2n+1)\,(2n+3)}, \; R = 1.$

Section 11.11

4. $T_3(x) = \frac{1}{2} + \frac{\sqrt{3}}{2}\left(x - \frac{\pi}{6}\right) - \frac{1}{4}\left(x - \frac{\pi}{6}\right)^2 - \frac{\sqrt{3}}{12}\left(x - \frac{\pi}{6}\right)^3$

Review Chapter 11

True-False Quiz: 4. True, **6.** True, **12.** True

Exercise:

14. Series converges by the Alt Series Test. **18.** Series converges by the Root Test.

50. $xe^{2x} = \sum_{n=0}^{\infty} \frac{2^n x^{n+1}}{n!}, \; R = \infty.$