**Section 5.3**

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

**Section 5.4**

**32.** $1 - \ln 4$

**Section 5.5**

**44.** $\dfrac{1}{2}\arctan(x^2) + C$

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

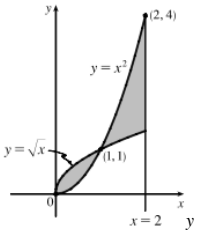
(c) $\dfrac{d}{dx}\displaystyle\int_0^x e^{\arctan t}\,dt = e^{\arctan x}$ by the Fundamental Theorem of Calculus.

**34.** $\dfrac{1}{2}\arcsin(x^2) + C$

**Review Chapter 6**

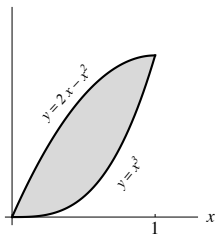
**6.** Area$= \displaystyle\int_0^1 (\sqrt{x} - x^2)\,dx + \int_1^2 (x^2 - \sqrt{x})\,dx$

$= \dfrac{10 - 4\sqrt{2}}{3}$




**16.** **(a)** Area$== \displaystyle\int_0^1 (2x - x^2 - x^3)\,dx = \frac{5}{12}$

**(b)** Volume$= \displaystyle\int_0^1 [(2x - x^2)^2 - (x^3)^2]\,dx = \frac{41}{105}\pi.$




**Section 7.2**

**4.** $\dfrac{8}{15}$ **22.** $\dfrac{\tan^3\theta}{3} + \dfrac{\tan^5\theta}{5} + C$

**Section 7.4**

**28.** $= \ln|x| + \dfrac{1}{3x} + \dfrac{1}{3\sqrt{6}}\tan^{-1}\left(\dfrac{x}{\sqrt{6}}\right) + C$ **64.** Area$= \displaystyle\int_1^2 \frac{1}{x^3 + x}\,dx = \frac{3}{2}\ln 2 - \frac{1}{2}\ln 5$

**66a.** Volume$= \pi\displaystyle\int_0^1 \left(\frac{1}{x^2 + 3x + 2}\right)^2 dx = \pi\int_0^1 \frac{1}{(x+1)^2(x+2)^2}\,dx = \pi\left(\frac{2}{3} + \ln\frac{9}{16}\right)$

**Review Chapter 7**

**10.** $\dfrac{1}{12}\pi^{3/2}$ **30.** $-\arcsin(e^{-x}) + C$

## 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.

**A11: 5.** (a) Diverges by the Comparison Test. (b) Converges by the Comparison Test,

(d) Converges by Comparison or Limit Comparison Test, (e) Converges by the Root Test

## Section 11.8

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

**6.** $\dfrac{4}{3+2x} = \dfrac{4}{3}\left(\dfrac{1}{1+\dfrac{2x}{3}}\right) = \sum_{n=0}^{\infty} (-1)^n \dfrac{2^{n+2}}{3^{n+1}} x^n, \quad R = \dfrac{3}{2}, \qquad I = \left(-\dfrac{3}{2},\ \dfrac{3}{2}\right)$

**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

**4.** $f(x) = \sum_{n=0}^{\infty} \dfrac{(-1)^n}{3^n(n+1)}(x-4)^n$ and $R = 3$. **38.** $e^{3x} - e^{2x} = \sum_{n=0}^{\infty} \dfrac{3^n - 2^n}{n!}\, x^n,\ R = \infty.$

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

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

## Review Chapter 11

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

## Exercise:

**14.** Series converges by the Alt Series Test. **16.** Series diverges by the Test for Divergence.

**18.** Series converges by the Root Test. **24.** Series converges absolutely as $\sum |a_n|$ is convergent P-series.

**26.** Series diverges by the Test for Divergence. **50.** $xe^{2x} = \sum_{n=0}^{\infty} \dfrac{2^n x^{n+1}}{n!},\ R = \infty.$