

S212 Homework Assignments

Assignment 1 Due Friday, Sept. 4

Section 2.3: 2,11,22

Hint on 22—look at example 6 on page 103

Section 2.4: 20

Section 2.5: 18

Problems Plus pages 170-171: 3,9

Section 2.8: 23

Section 3.1: 33

Section 3.2: 28,30

Section 3.3: 6,10

Section 3.4: 29,42,70

Section 4.2: 16,24,29,36

Section 4.3: 28,68

Assignment 2 Due Friday, Sept. 11

Section 5.3: 54

Section 3.6: 30

Problems Plus page 413: 6

Section 1.6: 59,60,64,71 Note: Work 59, 60 and 64 without use of a calculator.

Section 3.5: 48,52,54

Section 5.5: 20,28,32,42,66,70

Assignment 3 Due Friday, Sept. 18

Section 7.1: 4, 15, 18, 26, 30, 50

Section 7.2: 8, 16, 30, 68*

* Use identities on page A29 to derive an identity for $\sin A \sin B$.

Section 7.3: 4, 12, 16, 35

Problem A. Suppose $f[0, \pi] \rightarrow \mathbb{R}$ is a given continuous function. Prove that there can be no function $u[0, \pi] \rightarrow \mathbb{R}$ solving the *differential equation*

$$u''(x) + u(x) = f(x) \quad \text{for } 0 \leq x \leq \pi$$

along with the *boundary conditions* $u(0) = 0 = u(\pi)$ if

$$\int_0^\pi f(x) \sin(x) dx \neq 0.$$

Hint: Try a proof by contradiction; that is, assume there IS such a function u and reach a contradiction.

Assignment 4 Due Friday, Sept. 25

Section 7.3: 24, 26

Section 7.4: 8, 12, 18, 20

Section 7.5: 6, 18, 38, 42, 60, 61

Assignment 5 Due Friday, Oct. 2

Section 9.1: 1,9

Section 9.3: 12, 16, 20, 22, 24

Section 9.4: 3, 13

Assignment 6 Due Friday, Oct. 9

Section 7.8: 8, 16, 28, 30, 40, 50, 52, 54, 71, 80

Section 8.1: 10, 14*, 15

* see pages 254 and 256.

Chapter Review page 562: 7

Section 6.1: 10, 20

Assignment 7 Due Friday, Oct. 16

Section 8.2: 9, 12, 16, 26

Section 6.2: 2, 6, 12, 16, 35, 54, 56

Problem A. Consider the solid of revolution obtained by rotating the region bounded by the graphs of $y = 0$ and $y = \frac{1}{x^p}$ for $1 \leq x < \infty$ about the x -axis. Determine for which positive values of p this solid has finite volume (and compute this volume) and for which p -values it has infinite volume.

Problem B. Consider the surface of revolution obtained by rotating the graph of $y = \frac{1}{x^p}$ about the x -axis for $1 \leq x < \infty$. Use the comparison theorem from Section 7.8 to argue that this surface has finite surface area for any $1 < p < \infty$ but infinite surface area for $0 < p < 1$.

Assignment 8 Due Friday, Oct. 23

Section 6.3: 6, 12, 24

Assignment 9 Due Friday, Oct. 30

Read section 4.4 on L'Hospital's Rule.

Section 4.4: 18, 34, 39, 40, 60*

* *Hint: Let $g(x) := \ln((e^x + x)^{1/x})$ and first compute $\lim_{x \rightarrow \infty} g(x)$.*

Section 11.1: 18**, 22, 24**, 30, 32, 36, 40

***Hint: For these two problems, PROVE your answer is true using the ε, N definition.*

Problem A. Prove that the limit

$$\lim_{n \rightarrow \infty} (-1)^n \left(\frac{n}{n+1} \right) \text{ does not exist using the } \varepsilon, N \text{ definition.}$$

In general, for all exercises, cite any theorems/properties you are using to get your answer.

Assignment 10 Due Friday, Nov. 6

Section 11.1: 58, 62, 68, 70, 77

Section 11.2: 12, 20, 22, 30, 36, 42, 52, 60

Assignment 11 Due Friday, Nov. 13

Use the Integral Test (not the Comparison Test) to answer the following problems from 11.3–

Section 11.3: 6, 7, 22, 27, 30

Section 11.4: 4, 12, 16, 20, 39, 40, 43

Assignment 12 Due Friday, Nov. 20

Section 11.5: 5, 7, 8, 23

Section 11.6: 3, 7, 14, 17, 18, 30

Section 11.7: 7, 8, 10, 17, 19, 27, 31, 33*, 34, 37

* *Try Limit Comparison Test with $\sum \frac{1}{n^p}$ for some p .*

Assignment 13 Due Friday, Dec. 4

Section 11.6: 23, 24

Use the Root Test on these to get some practice with it.

Section 11.8: 6, 12, 19, 20, 23, 30, 38

Section 11.9: 3, 6, 8, 13, 14, 34, 38

Assignment 14 – not to be handed in

Section 11.10: 6, 8, 11, 20, 64, 68

Section 11.11: 13, 17, 18