MATH 1042 RECOMMENDED HOMEWORK PROBLEMS Fall 2025

Text: James Stewart, *Calculus, Early Transcendentals*, **9**th Edition, Cengage Learning.

Chapter 5: Integrals

5.2: 35, 36, 42, 45, 57, 59, 61, 63

5.3: 3, 7, 10, 13, 26, 27, 29, 33, 34, 35, 37, 41, 43, 47, 50, 52, 55, 57, 72, 74, 83a,b,c

5.4: 10, 14, 15, 16, 20, 22, 32, 35, 36, 39, 40, 41, 45, 57, 58, 74

5.5: 2, 4, 9, 14, 15, 21, 22, 25, 27, 32, 35, 45, 48, 50, 51, 52, 54, 59, 61, 63, 65, 77

Chapter 6: Applications of Integration

6.1: 2, 4, 11, 14, 17, 19, 20, 22, 24, 28, 29, 37, 41

6.2: 11, 12, 15, 18, 19, 21, 23, 25, 27, 29-39 (in Problems 29-39, do only the odd numbers and only set up the integrals, do not evaluate them)

6.4: 1, 3, 5, 7, 8, 10, 13, 15

Chapter 7: Techniques of Integration

7.1: 1, 2, 3, 11, 13, 15, 16, 25, 27, 28, 33, 39, 43, 47, 71

7.2: 1, 3, 4, 6, 7, 9, 11, 13, 18, 21, 22, 23, 25, 27, 29, 40, 52, 65, 66, 69, 71;

7.3: 6, 7, 8, 9, 10, 11, 12, 15, 18, 19, 28, 35, 43

7.4: 2, 6, 9, 12, 15, 17, 19, 21, 23, 26, 30, 68, 69

7.8: 1, 6, 9, 12, 16, 19, 22, 27, 29, 30, 35, 37, 40, 45, 50, 51, 53 (in Problems 50, 51, and 53, make a **rough sketch, do not use a graphing calculator)**, 58, 59, 60

Chapter 11: Infinite Sequences and Series

11.1: 29, 33, 36, 38, 41, 42, 43, 47, 48, 53, 54, 57, 61, 79, 81

11.2: 1, 3, 4, 15, 17, 20, 21, 28, 29, 32, 37, 39, 41, 42, 45, 47, 60, 61, 62, 65

11.3: 7, 8, 9, 11, 17, 19, 21, 23, 29

11.4: 1, 2, 3, 7, 9, 12, 13, 14, 15, 17, 23, 27, 29, 33, 37

11.5: 6, 7, 9, 10, 13, 18, 23, 27, 28, 30

11.6: 1, 5, 7, 8, 9, 10, 11, 14, 15, 16, 21, 22, 24, 25, 26, 27, 29, 30, 33

11.8: 4, 12, 13, 15, 17, 19, 22, 23, 25, 37, 38

11.9: 3, 6, 8, 10, 15, 16, 17, 22, 28, 30

11.10: 3, 4, 6, 8, 9, 22, 25, 27, 28, 30 (in Problems 24, 25, 27, 28, and 30, only find the **first four terms of the Taylor Series)**, 39, 41, 43, 44, 60, 61

11.11: 3, 4, 5, 6, 7(in Problems 3-7, do not graph f and T_3)

Some problems using the same techniques as the assigned homework for additional practice if needed

For problems such as "**A7: 1**", see *Additional Homework Problems* on next pages

5.2: 43, 46, 58

5.3: 9, 25, 30, 36, 42, 45, 49, 73

5.4: 13, 44

5.5: 20, 31, 40, 47, 53, 62

6.1: 13, 21

6.2: 13, 14, 17, 22, 30-40even (only set up, but do not evaluate the integrals in 30-40)

7.1: 5, 14, 21, 32

7.2: 5, 12, 14, 17, 28, 30, Also **A7: 1, 2, 3**

7.3: 5, 14, 16, 20

7.4: 5, 16, 37

7.5: Most of the exercises are good for practice. And the text of 7.5 itself is very helpful for review.

7.8: 2, 10, 13, 25, 28, 31, 57, 62; Also **A7: 4, 5**

11.1: 31, 34, 39, 46, 51, 55, 56, 62

11.2: 18, 30, 31, 40, 44, 46, 59 Also **A11: 1**

11.4: 11, 19, 28, 34; Also **A11: 2**

11.5: 5, 11, 14, 16, 25

11.6: 12, 23, 28, 31

11.8: 5, 6, 14, 21, 24

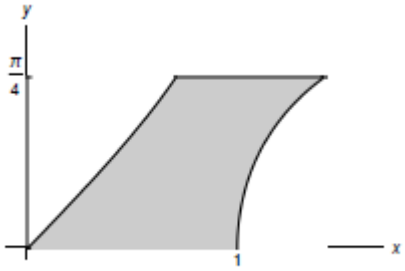
11.9: 7, 21, 27; Also **A11: 3, 4**

11.10: 7, 24, 42, 62

Additional Homework Problems

A7

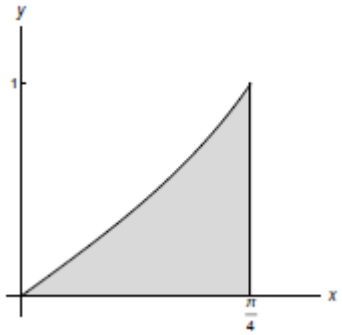
1. The region D in the xy-plane is bounded by the curves $y = \arcsin x$, $y = \operatorname{arcsec} x$, and the lines $y = 0$ and $y = \frac{\pi}{4}$ (see the illustration). Find the volume of the solid formed by rotating region D about the y-axis.



2. The region D in the xy-plane is bounded by the curve $y = \tan x$ and the lines $y = 0$ and $x = \frac{\pi}{4}$ (see the illustration).

(a) Find the volume of the solid obtained by rotating region D about the x-axis.

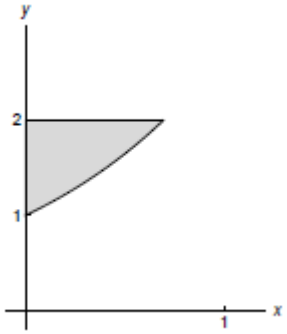
(b) Find the volume of the solid obtained by rotating region D about the line $y = 1$.



3. The region R in the xy-plane is bounded by the curve $y = e^x$ and the lines $y = 2$ and $x = 0$ (see the illustration).

(a) Set up an integral to find the volume of the solid obtained by rotating region D about the y-axis. You do not need to evaluate this integral.

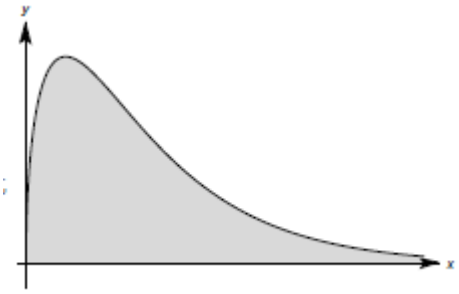
(b) Set up an integral to find the volume of the solid obtained by rotating region D about the line $x = 1$. You do not need to evaluate this integral.



4. Consider the region $D = \{(x, y)|x \geq 0, 0 \leq y \leq \sqrt{x}e^{-x}\}$ as shown in the picture. A solid, S is generated by rotating region D about the x-axis.

(a) Express the volume of solid S first as an improper integral, and then as a limit of proper integrals.

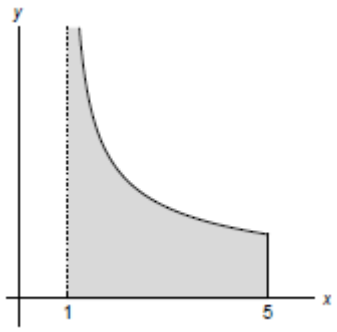
(b) Find the volume of solid S, or show that this volume is infinite.



5. Consider the region $D = \{(x, y)|1 < x \leq 5, 0 \leq y \leq \frac{1}{\sqrt{x-1}}\}$ as shown in the picture. A solid, S is generated by rotating region D about the x-axis.

(a) Express the volume of solid S first as an improper integral, and then as a limit of proper integrals.

(b) Find the volume of solid S, or show that this volume is infinite.



A11

1. Suppose that the N-th *partial sum* of the series $\sum_{n=1}^{\infty} a_n$ is $S_N = \dfrac{3N-1}{5N+1}$.

(a) Does the *series* $\sum_{n=1}^{\infty} a_n$ converge? If so, find its sum.

(b) Does the *sequence* $\{a_n\}_{n=1}^{\infty}$ converge? If so, find its limit.

2. Determine whether each series coverges or diverges.

(a) $\displaystyle\sum_{n=1}^{\infty} \frac{3+\sin n}{\sqrt{n}}$

(b) $\displaystyle\sum_{n=1}^{\infty} \frac{3+\sin n}{n\sqrt{n}}$

(c) $\displaystyle\sum_{n=1}^{\infty} \frac{4^n}{3^n+5^n}$

(d) $\displaystyle\sum_{n=1}^{\infty} \frac{5^n}{3^n+4^n}$

3. Let $f(x) = \displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n x^{2n}}{4^n(2n)!}$.

(a) Evaluate $f'(x)$. Simplify and give your answer in summation notation.

(b) Evaluate $\int f(x)dx$. Simplify and give your answer in summation notation.

4. Let $f(x) = \displaystyle\sum_{n=0}^{\infty} \frac{5^n(x-4)^{n+1}}{(n+3)(n+1)!}$.

(a) Evaluate $f'(x)$. Simplify and give your answer in summation notation.

(b) Evaluate $\int f(x)dx$. Simplify and give your answer in summation notation.