Josh Rementeria

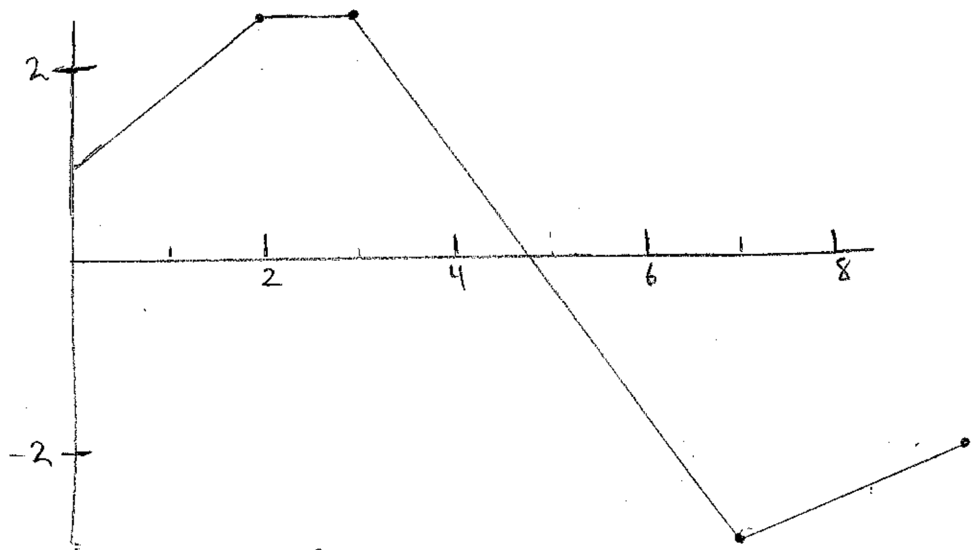
Section 5.2: The Definite Integral (pgs. 343 – 355)

18) Express the limit as a definite integral on the given interval.

$$\lim_{n\to\infty} \sum_{i=1}^{n} \frac{\cos x_i}{x_i} \Delta x, \; [\pi, 2\pi]$$

31) The graph of f is shown. Evaluate each integral by interpreting it in terms of areas.

(see 354 for better graph)



(a) $\int_0^2 f(x)\,dx$ (b) $\int_0^5 f(x)\,dx$

(c) $\int_5^7 f(x)\,dx$ (d) $\int_0^9 f(x)\,dx$

35) Evaluate the integral by interpreting it in terms of area.

$$\int_{-3}^{0} \left(1 + \sqrt{9 - x^2}\right) dx$$

Simon Truong

5.3 Evaluating Definite Integrals

(29) Evaluate the integral.

$\int_{-1}^{2} (x-2|x|)\,dx$

(59) The velocity function, $v(t)$, is given. Find a) the displacement and b) the distance traveled by the particle during the given time interval.

$v(t) = 3t-5,\ 0 \le t \le 3$

(67) The marginal cost of manufacturing x yards of a certain fabric is $C'(x) = 3 - 0.01x + 0.000006x^2$ (in dollars per yard). Find the increase in cost if the production level is raised from 2000 yards to 4000 yards.

Julia Norman

Section 5.4: Fundamental Theorem of Calculus

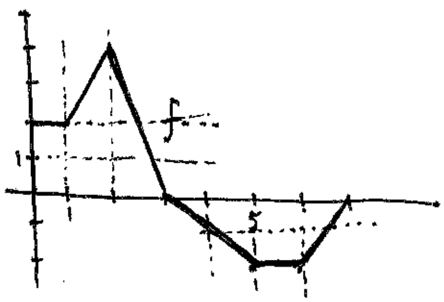
1) Let $g(x) = \int_0^x f(t)\,dt$ where f is the function whose graph is shown.

a.) Evaluate $g(0)$, $g(1)$, $g(2)$, $g(3)$, and $g(6)$

b.) On what interval is g increasing?

c.) Where does g have a maximum value?

d) Sketch a rough graph of g.



2) $\int_1^x \frac{1}{t^3+1}\,dt$

3) $\int_x^{\pi} \sqrt{1+\sec t}\,dt$

Use part 1 of the Fundamental Theorem of Calculus to find the derivative of the function

Michael Sloan

Chapter 5.5 The Substitution Rule
(Problem #1)

U Substitution

1. Evaluate $\int x^3 \cos(x^4 + 2)\, dx$

Michael Sloan

Chapter 5.5 The Substitution Rule
(Problem # 2)

Integrating Definite Integrals

2.

Calculate $\int_0^{\pi} \csc(\pi t)\cot(\pi t)\,dt$

Michael Sloan

Chapter 5.5 The Substitution Rule

(Problem #3)

Integrating Even and Odd Functions

a $\int_{-1}^{1} \frac{\tan(x)}{1+x^2+x^4}\,dx$

b $\int_{-2}^{2} (x^6+1)\,dx$

Questions

Rakan Alhajeri

5.6

11. $\int \arctan 4t \, dt$

23. $\int_1^2 (\ln x)^2 \, dx$

25. $\int \cos \sqrt{x} \, dx$

Sarina Haghighat 5.7 (trig integral)

1) $\int_0^{\pi/3} \frac{\sin x + \sin x \tan^2 x}{\sec^2 x}$

2) $\int \sin^3 x \cos^2 x \, dx$

3) $\int_0^{\pi/6} \tan^2 x \sec^4 x \, dx$

5.7 (Trig Subs)

Austin Hirsh

8) Use the subsitution $u = \sec x$ to evaluate the integral

$$\int \tan^5 x \sec^3 x \, dx$$

16) Evaluate: $\displaystyle\int_0^{2\sqrt{3}} \frac{x^3}{\sqrt{16-x^2}} \, dx$

18) Evaluate:

$$\int \frac{x^3}{\sqrt{x^2+1}} \, dx$$

Joe Taylor

Section 5.7 (Partial Fractions)

Find

$$\int \frac{x^2 - 29x + 5}{(x-4)^2\,(x^2+3)}\,dx$$

Joe Taylor

Section 5.7 (Partial Fractions)

Find

$$\int \frac{5x - 4}{2x^2 + x - 1}\, dx$$

Joe Taylor

Section 5.7 (Partial Fractions)

Find

$$\int \frac{2x^2 - x + 4}{x^3 + 4x}\, dx$$

5 Use the midpoint rule (a) and Simpsons Rule (b) to approximate the given integral. Calculate the error in each approximation (c).

$$\int_0^2 \frac{x}{1+x^2}\,dx \quad n=10$$

7. Use the Trapezoidal Rule (a), the Midpoint Rule (b), and Simpsons Rule (c) to approximate the given integral.

$$\int_0^2 \sqrt[4]{1+x^2}\,dx$$

19. Find the approximations T_{10}, M_{10} and S_{10} for $\int_0^{\pi} e^{1/x}\,dx$ (a). Estimate the errors in your approximations in part a (b).

Determine whether each integral is convergent or divergent.
Evaluate those that are convergent.

① $\int_{-\infty}^{-1} \frac{1}{\sqrt{2-w}}\, dw$

② $\int_{0}^{1} \frac{\ln x}{\sqrt{x}}\, dx$

Use the Comparison Theorem to determine whether the integral is convergent or divergent.

③ $\int_{1}^{\infty} \frac{x+1}{\sqrt{x^4-x}}\, dx$

Maureen Cobile Sec 5.10 Questions

Erin Kendrick

5. Sketch the region enclosed by the given curves. Decide
(6.1) whether to integrate with respect to x or y. Draw a typical approximating rectangle and label its height & width. Then find the area of the region.

$$y = e^x; \ y = x^2 - 1, \ x = 1, \ x = -1$$

17. Sketch the region enclosed by the given curves and find
(6.1) it's area.

$$y = 1/x, \ y = x, \ y = 1/4 x, \ x > 0$$

Erin Kendrick

19. Use a graph to find approximate x-coordinates of the points of intersection of the given curves. Then find (approximately) the area of the region bounded by the curves.
(6.1)

$$y = x\sin(x^2), \quad y = x^4$$

1: Find Volume of the solid obtained by rotating the region bounded by the given curves about the specified line.

$y = 2 - \frac{1}{2}x$, $y = 0$, $x = 1$, $x = 2$; about x-axis

7. Find volume of the solid obtained by rotating the region bounded by the given curves about the specified line.

$y^2 = x$, $x = 2y$; about y-axis

17. The region enclosed by the given curves is rotated about the specified line. Find the volume of the resulting solid.

$y = x^3$, $y = \sqrt{x}$; about $x = 1$

6.2

Elliot Kadota

6.4-6.5 Problems

Peter Twomey

1) Find the exact length of the curve (Hint: Use Table 21)

$x = y^{3/2}$, $0 \leq y \leq 1$

2) Set up an integral that represents the length of the curve.

$x = t + \cos t$ $y = t - \sin t$, $0 \leq t \leq 2\pi$

3) Find the average value of the function on the given interval

$f(x) = 4x - x^2$, $[0, 4]$

Section 6.6 Springs & Cables

16. A 10-ft chain weighs 25 lb and hangs from a ceiling. How much work is done to lift the lower end to be level with the ceiling?

2.5 lbs/ft So $(2.5\Delta x)\cdot x_i$

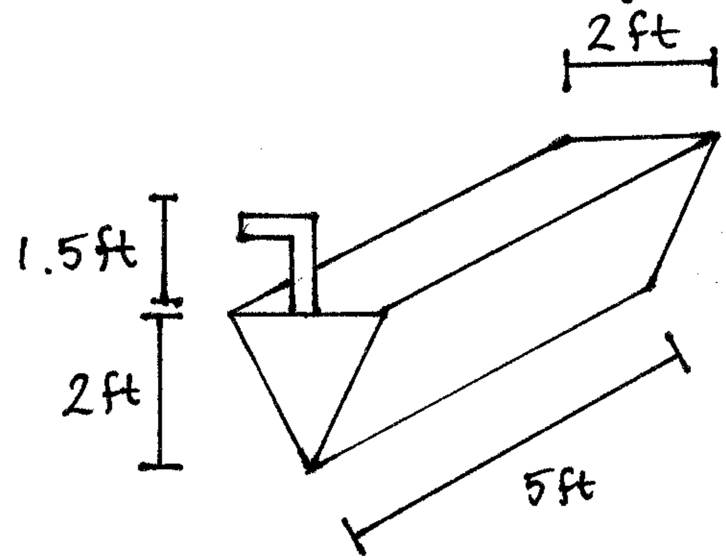
$$W = \int_0^{10} 2.5x\,dx = 1.25x^2\Big|_0^{10}$$

$$= 1.25\left((10)^2 - (0)^2\right) = \boxed{125 \text{ ft-lb}}$$

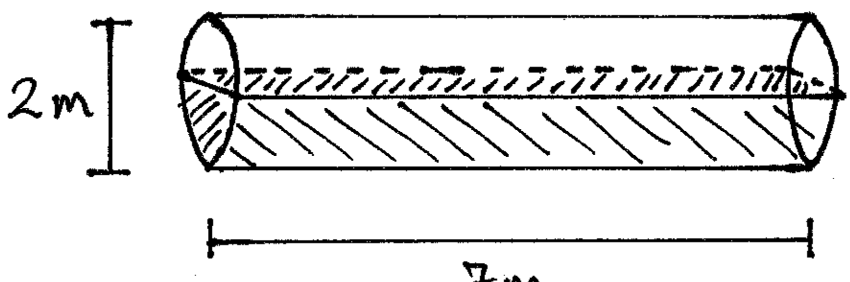
6.6

Christian Yee-Yamashita

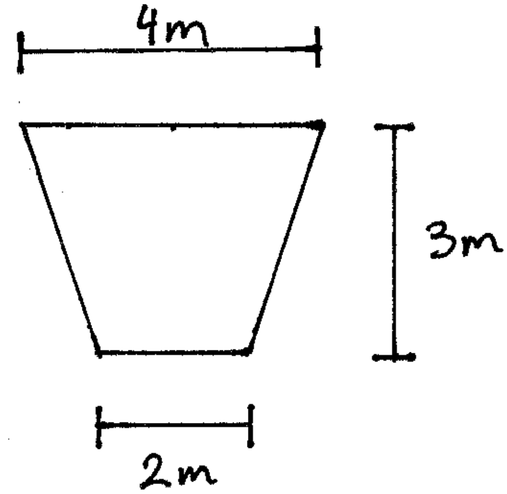
1) A rectangular pyramidal tank is upside-down and filled to the brim with water. The water weighs 62.4 lbs/ft³. Write an integral that gives the amount of work that is done in pumping water out of the tank through a 1.5ft tube/pipe.



2) A cylindrical tank laying on its side filled halfway with water. Write an integral that gives the amount of work that is done in pumping water out of the top of the tank.



3) Write an integral that gives the amount of work that is done emptying water out of the following tank if it is originally full.



* frustum of a cone - a section of a cone. cross-sections are circles just like conical tanks.

$\boxed{6.7}$ 2

Shane

\$150 = 500 people   \$45 = 560 people

a) What price should be charged?

b) What is consumer surplus?

Shane Voss

7) IF a supply curve is modeled by the equation $P = 200 + .2x^{3/2}$, find the Producer surplus when the Selling price is \$400.

6.7

$\boxed{67}$ ① Shane Voss

Demand for a Product is

$$P = 1200 - 0.2x - 0.001x^2$$

Find surplus when sales level is 500

6.8: Probability
Math 151-01
Kerry Nowacki

① Let $f(x) = .006x(10-x)$ for $0 \le x \le 10$
and $f(x) = 0$ for all other values of x.

a) Verify that f is a probability density function

b) find $P(2 \le x \le 7)$

② Let $f(x) = \frac{c}{(4+x^2)}$

for what values of c is f a probability density function?

③ The manager at Aromas determines that the average wait time is 2.5 minutes.

a) find the probability that a customer must wait more than 4 minutes

b) Find the probability a customer is served within the first 2 minutes.

c) If the manager wants to give away a free coffee to anyone who waits more than a certain amount of time, but doesn't want to give away to more than 2% of customers How long would the customer have to wait?

Evie Blackburn

Section 7.1

1. Show that $y = \frac{2}{3}e^{x} + e^{-2x}$ is a solution of the differential equation $y' + 2y = 2e^{x}$.

5. Which of the following functions are solutions of the differential equation: $y'' + y = \sin(x)$

a. $y = \sin(x)$ b. $y = \cos(x)$ c. $y = \frac{1}{2}x\sin(x)$ d. $y = \frac{1}{2}x\cos(x)$

9. A population is modeled by the differential equation:

$$\frac{dP}{dt} = 1.2P\left(1 - \frac{P}{4200}\right)$$

a. For what values of P is the population increasing?
b. For what values of P is the population decreasing?
c. What are the equilibrium solutions?

Elizabeth Petty 8.1

Determine whether the sequence converges or diverges. If it converges, find the limit. (Questions 1+2)

1. $a_n = \frac{3^{n+2}}{5^n}$

2. $a_n = \frac{\sin 2n}{1+\sqrt{n}}$

3. If \$1000 is invested at 6% interest, compounded annually, then after n years the investment is worth $a_n = 1000(1.06)^n$ dollars.

(a) Find the first five terms of the sequence $\{a_n\}$.

(b) Is the sequence convergent or divergent? Explain

Katelin Maatz

8.2: Series

1. Determine whether the geometric series is convergent or divergent. If it is convergent, find its sum.

$$\sum_{n=0}^{\infty} \frac{\pi^n}{3^{n+1}}$$

Determine whether the series is convergent or divergent. If it is convergent, find its sum.

2. $$\sum_{n=1}^{\infty} \frac{1+2^n}{3^n}$$

3. $1.53\overline{42}$

8.3 The Integral and Comparison Tests; Estimating Sums

Maddy Horn

Questions:

1) It is important to distinguish between

$$\sum_{n=1}^{\infty} n^b \quad \text{and} \quad \sum_{n=1}^{\infty} b^n$$

what name is given to the first series? the second? For what values of b does the first series converge? the second?

2) Determine whether the series is convergent or divergent. $\sum_{n=1}^{\infty} \frac{\cos^2 n}{n^2+1}$

3) Determine whether the series is convergent or divergent. $\sum_{n=1}^{\infty} \frac{2+(-1)^n}{n\sqrt{n}}$

8.4 Kelly Wilson

1.) Approximate the sum to 4 decimals

$$\sum_{n=1}^{\infty} \frac{(-1)^n n}{8^n}$$

2.) Determine whether the series is absolutely convergent

$$\sum_{n=0}^{\infty} \frac{(-10)^n}{n!}$$

3.) Determine if the series converges, converges absolutely, or diverges

$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\sqrt{n}}$$

8.5 Power Series #1 Brooke Zalud

Zalud

$$\sum_{n=0}^{\infty} \frac{(-1)^n x^n}{n+1}$$

8.5 Power Series #3

Brooke Zallud

$$\sum_{n=1}^{\infty} n!(2x-1)^n$$

Math 191 Review Problems ~ Section 8.6 (Ryann Garcia) Questions

#1) Find a power series representation for the function and determine the interval of convergence. (#7 in the book)

$$f(x) = \frac{x}{9+x^2}$$

#2) Find a power series representation for f, and graph f and several partial sums $S_n(x)$ on the same screen. What happens as n increases? (#22 in the book)

$$f(x) = \tan^{-1}(2x)$$

#3) Use a power series to approximate the definite integral to six decimal places. (#27 in the book, but with different x)

$$\int_0^{0.2} \frac{1}{1-x^3}\,dx$$

JACK ORR

SECTION 8.7

TAYLOR AND MACLAURIN SERIES

1) FIND THE TAYLOR SERIES FOR $f(x) = \cos x$ CENTERED AT $a = \pi$. WHAT IS THE RADIUS OF CONVERGENCE?

2) USE SERIES TO EVALUATE $\lim_{x \to 0} \dfrac{\sin x - x + \frac{1}{6}x^3}{x^5}$.

3) USE SERIES TO APPROXIMATE $\int_0^{0.3} \tan^{-1}(x^3)\,dx$ TO 5 DECIMAL PLACES.

Matteo Salom 8.7

1.) Find the Maclaurin Series for $f(x) = x^2 \left(\ln(1+x^3) \right)$

2.) Use the Maclaurin Series for e^x to calculate $e^{-0.2}$ to the nearest 5 decimal places.

3.) Find the sum of the series : $1 - \ln(2) + \frac{\ln(2)^2}{2!} - \frac{\ln\left(\frac{2}{3}\right)^3}{3!} + \ldots$