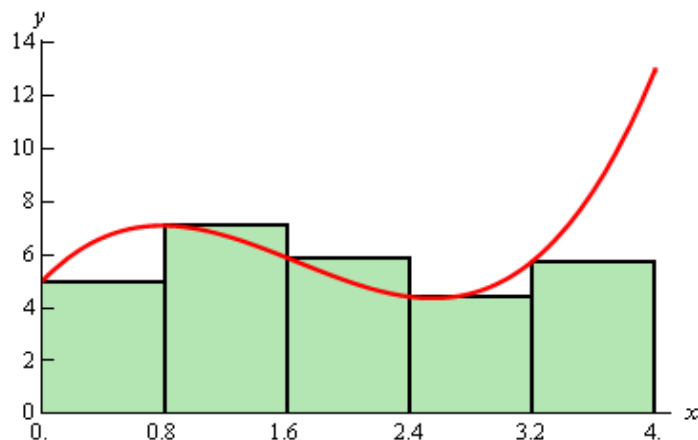


Application of Antiderivatives Study Guide

5.1 -- Riemanns Sums Graphs -- Megan Ridle



Use this function to answer the following questions.

1. Estimate the area enclosed by the function and the x-axis using the right Riemann sum.
2. Estimate the area enclosed by the function and the x-axis using the left Riemann sum.
3. Take the average of both sums to estimate the area and state which side is the upper estimate and which side is the lower estimate.

5.1 -- Riemanns Sums Tables Jackson Goddard

1. A car comes to a stop six seconds after the driver applies the brakes. While the brakes are on, the following velocities are recorded:

Time since brakes applied (sec)	0	2	4	6
Velocity (ft/sec)	86	40	10	0

Give lower and upper estimates for the distance the car traveled after the brakes were applied.

2. The velocity $V(t)$ in the table is increasing, $0 \leq t \leq 12$. Find a lower estimate for the total distance traveled using $n=4$.

t	0	3	6	9	12
$v(t)$	23	27	30	33	37

3. A village wishes to measure the quantity of water that is piped to a factory during a typical morning. A gauge on the water line gives the flow rate (in cubic meters per hour) at any instant. The flow rate is about 110 m^3/hr at 6 am and increases steadily to about 340 m^3/hr at 9

am. Using only this information, give your best estimate of the total volume of water used by the factory between 6 am and 9 am.

5.2 -- Thomas Wayne

1. Estimate the definite integral from 0 to 8 of the equation 2^x using the left hand sum $n=2$.
2. Estimate the definite integral between 0 to 12 of the equation $1/x+2$ using right hand sum $n=5$
3. Use a calculator to find the integral from 0 to 11 for the equation (x^2+5) then determine whether using the left hand sum of $n=3$ is an underestimate or overestimate.

5.4 -- Katie Wolfe

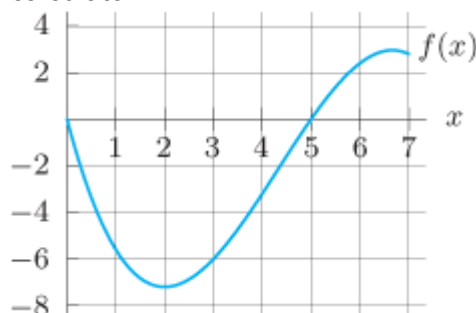
1. Suppose there is a country with an initial population of 700,000. Let's say that T days later the population is growing by of $f(T) = 300t$ people per day.
 - a. Give a definite integral that represents the total change in the population during the time $T=0$ and $T=10$
 - b. Find the population at time $T=10$
2. The acceleration of a tractor trailer is given by $f(t) = 45t$ miles/hour. What is the distance traveled by the tractor trailer between $t=0$ and $t=8$
3. Let $f(t)$ represent what it costs per day to park in Columbia in dollars per hour where t is

$$\int_0^8 f(t) dt$$

time measured in hours and $t=0$ corresponds to midnight. Interpret

6.1 Graphs -- Lee Houck

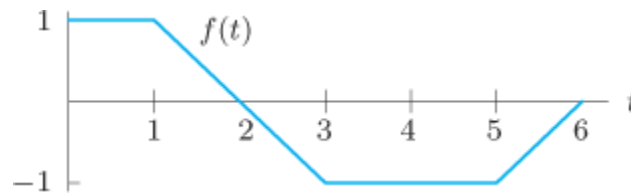
1. Find the average value of a lamp over a period from 1980-2015 where the original value in 1980 was \$230, and increased at a rate of 10% per year by using a graphing calculator.



2. Estimate the area between the function $f(x)$ and the x-axis between $x=0$ to 7.
3. From the function $F(x)=10(.92)^x$, find the average value between $F(10)$ and $F(25)$ using a graphing calculator.

6.1 Numerically -- Jordan Scott

1. Suppose $F'(x) = 2x^2 + 5$ and $F(0) = 3$. Find the value of $F(b)$ for $b = 0, 0.1, 0.2, 0.5$, and 1.0 .
2. The figure below shows f . If $F' = f$ and $F(0) = 0$, find $F(b)$ for $b = 1, 2, 3, 4, 5, 6$.



3. Suppose $f'(t) = (0.82)^t$ and $f(2) = 9$. Find the value of $f(b)$ for $b = 2, 4, 6, 10$ and 20 .

6.3 Using The Fundamental Theorem- Caroline Johnston

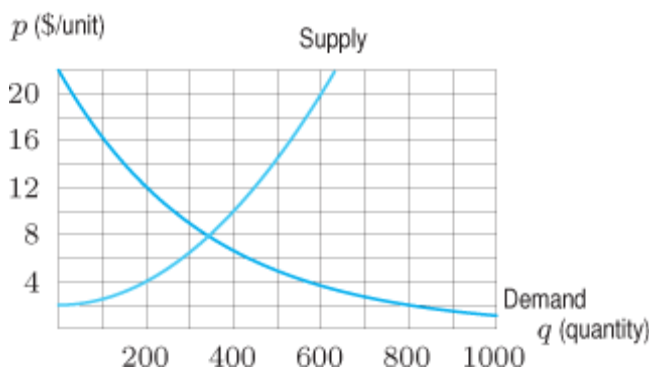
1. Use the Fundamental Theorem to compute the following definite integral: $\int_1^2 (8x + 5) \, dx$
2. Write a definite integral to represent the area under the graph of $f(t) = e^{0.5t}$ between $t = 0$ and $t = 4$. Use the Fundamental Theorem to calculate the area.
3. Interpret and estimate the value of:

$$\int_1^{\infty} \frac{1}{x^2} \, dx.$$

5.3 Area -- Meagen Sigmon

1. Find the Area under $P = 95(0.6)^t$ between $t = 0$ and $t = 9$
2. (a) Find the Area under $y = x^2 + 2$ between $x = 0$ and $x = 2$
(b) Sketch the area under $y = x^2 + 2$ between $x = 0$ and $x = 2$
3. Find the Total Area between $y = 16 - x^2$ and the x axis for $0 \leq x \leq 6.5$. Round Answer to 3 decimals

P function of Q 6.4 -- Chelsey Bazzle



1. Find the consumer surplus for the demand $p=100-3q^2$ curve as $q=5$ units are sold at the equilibrium price.
2. Given the demand curve $p=35-q^2$ and the supply curve $p=3+q^2$, find the producer surplus when the market is in equilibrium.
3. For a product, the demand curve is $p=110e^{-0.08q}$ and the supply curve is $p = 4\sqrt{q} + 10$ for $0 \leq q \leq 500$, where q is quantity and p is price in dollars per unit.
 - (a) At a price of \$60, what quantity are consumers willing to buy and what quantity are producers willing to supply? Will the market push prices up or down?

Q function of P 6.2 -- Makenzie Logue

1. The demand curve for a product is given by $q=100-2p$ and the supply curve is given by $q=3p-50$.
 - a. Find the equilibrium price & quantity
 - b. Find consumer surplus at the equilibrium
 - c. Find the producer surplus at the equilibrium
2. The demand curve for a packaged salad is given by $q=700-8p$ and the supply curve for that salad is given by $q=10p-40$, where q is quantity of salad and p is price in dollars per salad.
 - a. Find the equilibrium price & quantity
 - b. Find consumer surplus at the equilibrium
 - c. Find the producer surplus at the equilibrium.

5.5 -- Shelby Keith

1. The marginal cost function for a company is given by $C'(q) = q^3 - 14q + 80$ dollars/unit where q is quantity produced. If $C(0) = 700$, what is the total cost of producing 30 units?
2. A cup of espresso is 105 degrees fahrenheit when $t=0$. It cools at a rate of $r = -8(.73^t)$ degrees fahrenheit per minute with t in minutes. What is the espresso's estimated temperature after 12 minutes?
3. The marginal revenue function on sales of q units of a product is $R'(q) = 200 - 12q^{1/3}$ dollars per unit. Estimate the total revenue if sales are 150 units. What is the marginal revenue at 150 units?