Jan 13, 2020

Today in class we:

1. Went over HW
2. Did Pg. 299 #20-36 EVEN
3. Did 2 multiple choice problems #30 + #49 (work attached)
4. HW due tomorrow attached
5. There are also some book problems that are optional for additional practice for anyone interested:

   Pg 310 #27-37 odd

   Pg 298 #2, 4, 5, 6

6. 2 day Quiz Tues + Wed.

   One part NO calc

   2nd part with calc

CALCULUS AB

SECTION II, Part B

Time—45 minutes

Number of problems—3

No calculator is allowed for these problems.

HW - not optional

t (seconds)	0	10	20	30	40	50	60	70	80
$v(t)$ (feet per second)	5	14	22	29	35	40	44	47	49

4. Rocket A has positive velocity $v(t)$ after being launched upward from an initial height of 0 feet at time $t = 0$ seconds. The velocity of the rocket is recorded for selected values of t over the interval $0 \le t \le 80$ seconds, as shown in the table above.

   (a) Find the average acceleration of rocket A over the time interval $0 \le t \le 80$ seconds. Indicate units of measure.

   (b) Using correct units, explain the meaning of $\int_{10}^{70} v(t)\,dt$ in terms of the rocket's flight. Use a midpoint Riemann sum with 3 subintervals of equal length to approximate $\int_{10}^{70} v(t)\,dt$.

   (c) Rocket B is launched upward with an acceleration of $a(t) = \dfrac{3}{\sqrt{t+1}}$ feet per second per second. At time $t = 0$ seconds, the initial height of the rocket is 0 feet, and the initial velocity is 2 feet per second. Which of the two rockets is traveling faster at time $t = 80$ seconds? Explain your answer.

Skip

Calculator allowed

Distance x (mm)	0	60	120	180	240	300	360
Diameter $B(x)$ (mm)	24	30	28	30	26	24	26

HW Not optional

3. A blood vessel is 360 millimeters (mm) long with circular cross sections of varying diameter. The table above gives the measurements of the diameter of the blood vessel at selected points along the length of the blood vessel, where x represents the distance from one end of the blood vessel and $B(x)$ is a twice-differentiable function that represents the diameter at that point.

   (a) Write an integral expression in terms of $B(x)$ that represents the average radius, in mm, of the blood vessel between $x = 0$ and $x = 360$.

   (b) Approximate the value of your answer from part (a) using the data from the table and a midpoint Riemann sum with three subintervals of equal length. Show the computations that lead to your answer.

   Skip (c) Using correct units, explain the meaning of $\pi \int_{125}^{275} \left(\frac{B(x)}{2} \right)^2 dx$ in terms of the blood vessel.

   (d) Explain why there must be at least one value x, for $0 < x < 360$, such that $B''(x) = 0$.

HW - not optional

Given: $\int_1^{12} f(x)\,dx = -5$ $\int_7^{12} f(x)\,dx = 20$

Find ① $\int_1^7 f(x)\,dx$ ② $\int_7^7 f(x)\,dx$ ③ $\int_{12}^1 3f(x)\,dx$

④ Given: $\int_a^b f(x)\,dx = a + 2b$

Find $\int_a^b [f(x) + 3]\,dx$

⑤ $\int_0^1 \frac{e^x}{e^x + 2}\,dx$

⑥ The following is a Right endpoint Riemann Sum Approx. for what? Integral

$$\frac{1}{20}\left(\sqrt{\frac{1}{20}} + \sqrt{\frac{2}{20}} + \sqrt{\frac{3}{20}} + \cdots + \sqrt{\frac{19}{20}} + \sqrt{\frac{20}{20}}\right)$$

HW - not optional

① evaluate NO calculator: $\int_{\frac{\pi}{4}}^{\pi/3} \sec x \tan x =$

② evaluate with Calculator:

a) $\int_{\frac{\pi}{4}}^{\pi/3} \frac{\sin x}{\cos^2 x}\,dx$

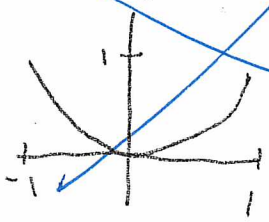
b) $\int_{-4}^{2.5} \left| \frac{9-x^2}{x-3} \right| dx =$

③ NC $\int_{-1}^{2} \frac{5}{x+7}\,dx$

④ NC $\int_{-1}^{2} \frac{5}{2x+7}\,dx$

⑤ ~~Pg 291~~ ~~#16~~

$f(t) = 1 - \sqrt{1-t^2}$ $[-1, 1]$



⑥ Total Shaded region WS

#18) use calc but show correct set-up!!

⑦ Pg 291 #32-36

⑧ Review Sheet.

⑨

t min	0	5	8	10	15
v(t) ft/min	20	30	40	50	0

$[0, 15]$

LRAm =

RRAm =

Trap =

this is optional extra practice → { Pg 310 # 27–37 odd; Pg 298 # 2, 4, 5, 6

Did these 2 examples together in class

49. Multiple Choice If the interval $[0, \pi]$ is divided into n subintervals of length π/n and c_k is chosen from the kth subinterval, which of the following is a Riemann sum?

(A) $\sum_{k=1}^{n} \sin(c_k)$ (B) $\sum_{k=1}^{\infty} \sin(c_k)$ (C) $\sum_{k=1}^{n} \sin(c_k)\left(\frac{\pi}{n}\right)$ height base

(D) $\sum_{k=1}^{n} \sin\left(\frac{\pi}{n}\right)(c_k)$ (E) $\sum_{k=1}^{n} \sin(c_k)\left(\frac{\pi}{k}\right)$

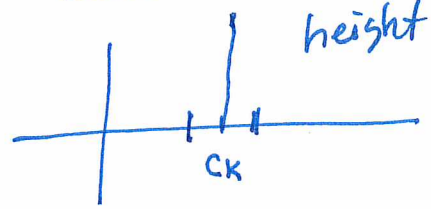
base · height

$\frac{\pi}{n}$ base

$\frac{b-a}{n}$ $\frac{\pi-0}{n}$

height $f(c_k)$

$\int f(x)\,dx$



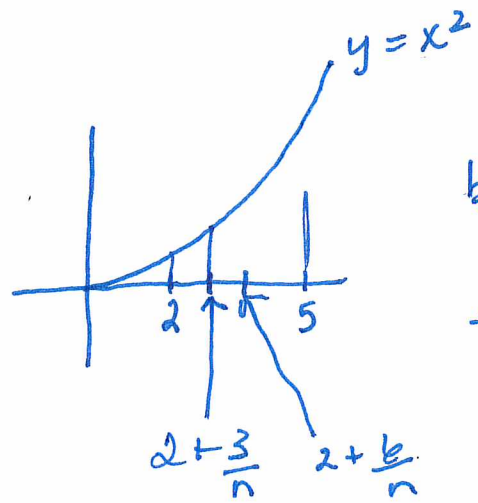
30. Which of the following limits is equal to $\int_2^5 x^2\,dx$?

(A) $\lim_{n\to\infty} \sum_{k=1}^{n} \left(2 + \frac{k}{n}\right)^2 \frac{1}{n}$

(B) $\lim_{n\to\infty} \sum_{k=1}^{n} \left(2 + \frac{k}{n}\right)^2 \frac{3}{n}$

(C) $\lim_{n\to\infty} \sum_{k=1}^{n} \left(2 + \frac{3k}{n}\right)^2 \frac{1}{n}$

(D) $\lim_{n\to\infty} \sum_{k=1}^{n} \left(2 + \frac{3k}{n}\right)^2 \frac{3}{n}$



$\frac{b-a}{n} = h$

$\frac{5-2}{n} = \frac{3}{n}$ base