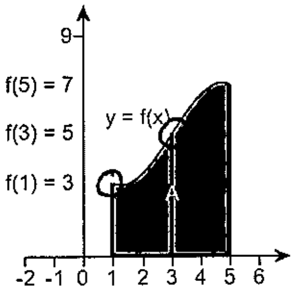
Student: Key
Date:

Instructor: Joe Betters
Course: Pre-Calculus Pre AP (Master Course)

Assignment: 14.5 HW 2020 (Adjusted) NEW

1.
Refer to the figure. The interval [1, 5] is partitioned into two subintervals [1, 3] and [3, 5]. Approximate the area A using the left endpoint of each subinterval.



$\frac{5-1}{2}$ = length 2

$f(1)(2) + f(3)(2)$

$3(2) + 5(2) = \boxed{16}$

The area is approximated as

A ≈ ______ square units
(Type an integer answer.)

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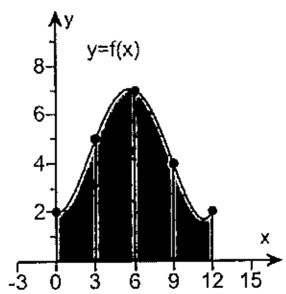
2.
Refer to the figure. The interval [0,12] is partitioned into 4 subintervals [0,3], [3,6], [6,9], and [9,12]. Approximate the area under the graph of $y = f(x)$ from 0 to 12 by using the left endpoint of each subinterval.



$f(0) = 2$, $f(3) = 5$, $f(6) = 7$, $f(9) = 4$, $f(12) = 2$

$\frac{12-0}{4}$ = length 3

$3(f(0) + f(3) + f(6) + f(9))$

$3(2 + 5 + 7 + 4)$

$\boxed{54}$

Type the result below.

Area ≈ ______ square units

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3.

The function $f(x) = -7x + 21$ is defined on the interval [0, 3].

(a) Graph f.

In (b) – (e) approximate the area A under f from 0 to 3 as follows:

(b) By partitioning [0, 3] into three subintervals of equal length and choosing u as the left endpoint of each subinterval.

(c) By partitioning [0, 3] into three subintervals of equal length and choosing u as the right endpoint of each subinterval.

(d) By partitioning [0, 3] into six subintervals of equal length and choosing u as the left endpoint of each subinterval.

(e) By partitioning [0, 3] into six subintervals of equal length and choosing u as the right endpoint of each subinterval.

(f) What is the actual area A?

b) $\frac{3-0}{3}$ = length 1 $[0,1]$ $[1,2]$ $[2,3]$ left

$1(f(0)+f(1)+f(2))$

$1(21+14+7)=42$

c) $\frac{3-0}{3}$ = length 1 Right

$1(f(1)+f(2)+f(3))$

$1(14+7+0)=21$

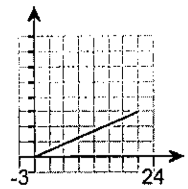
d) $\frac{3-0}{6}$ = length $\frac{1}{2}$ left $[0,\tfrac{1}{2}]$ $[\tfrac{1}{2},1]$ $[1,1\tfrac{1}{2}]$ $[1\tfrac{1}{2},2]$ $[2,2\tfrac{1}{2}]$ $[2\tfrac{1}{2},3]$

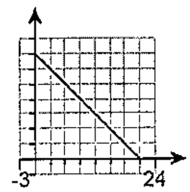
$\frac{1}{2}\left(f(0)+f(\tfrac{1}{2})+f(1)+f(1\tfrac{1}{2})+f(2)+f(2\tfrac{1}{2})\right)$

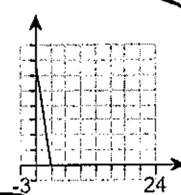
$\frac{1}{2}(21+17.5+14+10.5+7+3.5)$

$=36.75$

Part (a) Choose the graph of f.

○ 

○ 

○ 

$-7x+21$

Part (b) Find the approximate area under f.

☐ 42

(Round to two decimal places.)

Part (c) Find the approximate area under f.

☐ 21

(Round to two decimal places.)

Part (d) Find the approximate area under f.

☐ 36.75

(Round to two decimal places.)

Part (e) Find the approximate area under f.

☐ 26.25

(Round to two decimal places.)

Part (f) The actual area under the graph is

A = ☐ 31.5

(Round to two decimal places.)

e) $\frac{1}{2}\left(f(\tfrac{1}{2})+f(1)+f(1\tfrac{1}{2})+f(2)+f(2\tfrac{1}{2})+f(3)\right)$

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$\frac{1}{2}(17.5+14+10.5+7+3.5+0)=26.25$

video on website

f) $\int_0^3 (-3x+21)\,dx$ use calculator

Google Integral on TI inspire

4)

The function $f(x) = x^3$ is defined on the interval [3, 7].

(a) Graph f, indicating the area A under f from 3 to 7.

(b) Approximate the area A by partitioning [3, 7] into four subintervals of equal length and choosing u as the left endpoint of each subinterval.

(c) Approximate the area A by partitioning [3, 7] into eight subintervals of equal length and choosing u as the left endpoint of each subinterval.

(d) Express the area A as an integral.

(e) Use a graphing utility to approximate the integral.

b) $\frac{7-3}{4}$ = length of 1   [3,4] [4,5] [5,6] [6,7]

$1(f(3)+f(4)+f(5)+f(6)) = \boxed{432}$

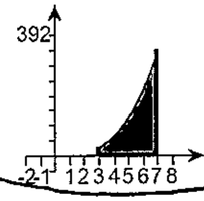
c) $\frac{7-3}{8}$ = length of $\frac{1}{2}$ $[3,3\frac{1}{2}]$, $[3\frac{1}{2},4]$ $[4,4\frac{1}{2}]$ $[4\frac{1}{2},5]$ $[5,5\frac{1}{2}]$ $[5\frac{1}{2},6]$ $[6,6\frac{1}{2}]$ $[6\frac{1}{2},7]$

$\frac{1}{2}(f(3)+f(3\frac{1}{2})+f(4)+f(4\frac{1}{2})+f(5)+f(5\frac{1}{2})+f(6)+f(6\frac{1}{2}))$

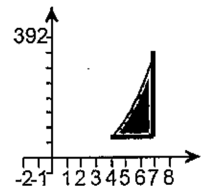
$= \boxed{503.5}$

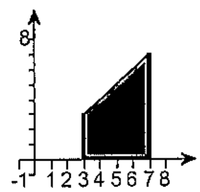
* video for chapter 14 on website *

Part (a) Choose the graph of f.

○ 

x^3

○ 

○ 

Part (b) The approximate area under f is

432 (Round to four decimal places.)

Part (c) The approximate area under f is

503.5 (Round to four decimal places.)

Part (d) Choose the expression of A as an integral.

○ $\sum_{i=3}^{7} (u_i)^3 \Delta x$

○ $\sum_{i=1}^{n} (u_i)^3 \Delta x$

○ $\int_1^n x^3 dx$

○ $\boxed{\int_3^7 x^3 dx}$

Part (d) Use a graphing utility to approximate the integral. (Round to four decimal places.)

○ 580

○ 20

○ 3312.8

○ 316

5)
The function $f(x) = \frac{5}{x}$ is defined on the interval [2, 6].

(a) Graph f, indicating the area A under f from 2 to 6.

(b) Approximate the area A by partitioning [2, 6] into four subintervals of equal length and choosing u as the left endpoint of each subinterval.

(c) Approximate the area A by partitioning [2, 6] into eight subintervals of equal length and choosing u as the left endpoint of each subinterval.

(d) Express the area A as an integral.

(e) Use a graphing utility to approximate the integral.

b) $\frac{6-2}{4} = \text{length } 1$ $[2,3]$ $[3,4]$ $[4,5]$ $[5,6]$

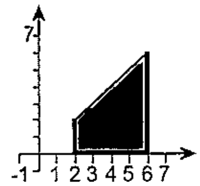
$1(f(2)+f(3)+f(4)+f(5))$
$= 6.417$

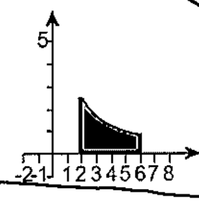
c) $\frac{6-2}{8} = \text{length } \tfrac{1}{2}$ $[2,2\tfrac{1}{2}]$ $[2\tfrac{1}{2},3]$ $[3,3\tfrac{1}{2}]$ $[3\tfrac{1}{2},4]$ $[4,4\tfrac{1}{2}]$ $[4\tfrac{1}{2},5]$ $[5,5\tfrac{1}{2}]$ $[5\tfrac{1}{2},6]$

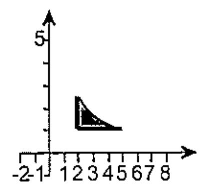
$\frac{1}{2}(f(2)+f(2\tfrac{1}{2})+f(3)+f(3\tfrac{1}{2})$
$+f(4)+f(4\tfrac{1}{2})+f(5)+f(5\tfrac{1}{2}))$
$= 5.933$

* video on website for chp. 14

Part (a) Choose the graph of f.

○ 

○ 

○ 

Part (b) The approximate area under f is $\boxed{6.417}$ (Round to three decimal places.)

Part (c) The approximate area under f is $\boxed{5.933}$ (Round to three decimal places.)

Part (d) Choose the expression of A as an integral.

○ $\int_2^6 \frac{5}{x}\,dx$

○ $\sum_{i=1}^{n} \left(\frac{5}{u_i}\right) \Delta x$

○ $\sum_{i=2}^{6} \left(\frac{5}{u_i}\right) \Delta x$

○ $\int_1^n \frac{5}{x}\,dx$

Part (d) Use a graphing utility to approximate the integral. (Round to three decimal places.)

○ 1.099
○ 8.959
○ 5.493
○ 3.2

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6. The following integral is given.

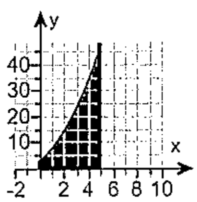
$$\int_{2}^{7} (x^2 - 1)\,dx$$

a) What area does the integral represent?
b) Provide a graph that illustrates this area.
c) Use a graphing utility to approximate this area.

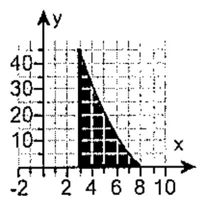
a) The integral represents the area under the graph of f(x) = x^2-1 from 2 to 7.

b) Choose the correct graph that illustrates this area below.

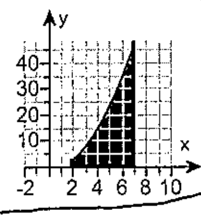
A.



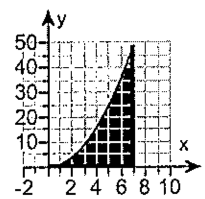
B.



C.



D.



c) Use a graphing utility to approximate this area. Consult your owner's manual for the proper keystrokes.

Area ≈ 106.666667 ~~(Round to six~~ decimal places as needed.)

* video on chp. 14 on website

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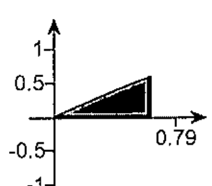
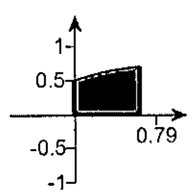
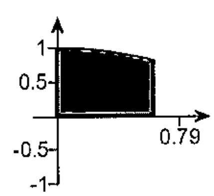
7. Consider the integral $\int_{0}^{\frac{\pi}{5}} \sin x\,dx$.

(a) What area does the integral represent?
(b) Use a graphing utility to approximate the integral.

Part (a) Choose the appropriate graph.







Part (b) Use a graphing utility to approximate $\int_{0}^{\frac{\pi}{5}} \sin x\,dx$.

.191 (Round to three decimal places.)

*use video on chp. 14 on website

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1. 16

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2. 54

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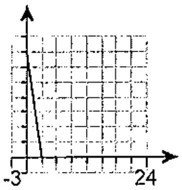
3. 

42

21

36.75

26.25

31.5

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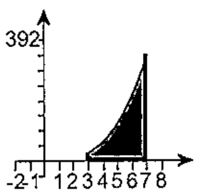
4. 

432

503.5

$$\int_3^7 x^3 dx$$

580

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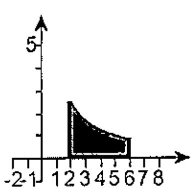
5. 

6.417

5.933

$$\int_2^6 \frac{5}{x} dx$$

5.493

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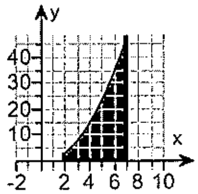
6. $x^2 - 1$

2

7

C. 

106.666667

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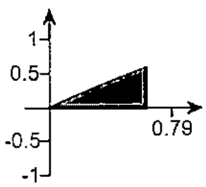
7. 

0.191
