

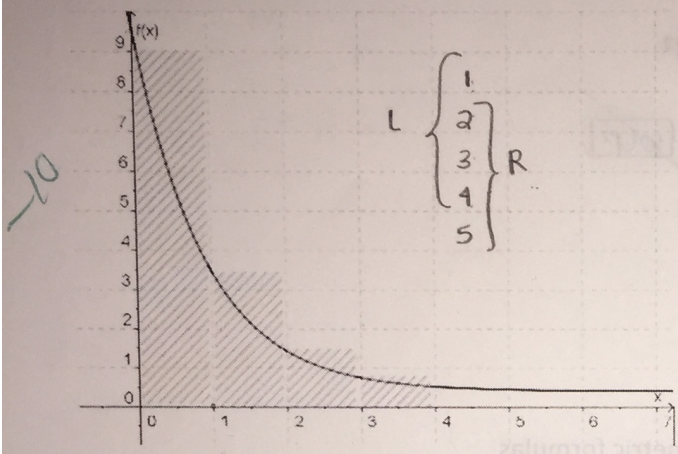
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+5

I. Multiple choice. Choose the letter of the right answer (10 points).

1. Choose the sentence that best describes the approximate area below the graph of $f(x)$:



- a) Approximation of the area on the interval $[0, 4]$ using 4 partitions with left-hand calculations.
- b) Approximation of the area on the interval $[1, 5]$ using 4 partitions with right-hand calculations.
- c) Approximation of the area on the interval $[0, 4]$ using 4 partitions with right-hand calculations.
- d) Approximation of the area on the interval $[1, 5]$ using 4 partitions with left-hand calculations.

II. Evaluate the integral using the following values. SHOW THE STEPS OF YOUR PROCEDURE. (5 points each)

$\int_2^4 x dx = 9$ $\int_2^4 x^3 dx = 54$ $\int_2^4 dx = 7$

- a. $\int_2^4 (5x^3 + 4x + 6) dx = \frac{5}{4} \int_2^4 x^3 dx + 4 \int_2^4 x dx + 6 \int_2^4 dx = 5(54) + 4(9) + 6(7) = 270 + 36 + 42 = \boxed{348}$
- b. $\int_2^4 23 dx = 23 \int_2^4 dx = 23(7) = \boxed{161}$
- c. $\int_5^5 x^3 dx = \boxed{0}$
- d. $\int_4^2 x dx = \boxed{-9}$

IV. Procedure. Solve the following problem showing your entire procedure.

1) Approximate the area of a plane regions using left hand, right hand and middle points approximations.

$f(x) = 9 - x^2$ on $[3, 5]$ 4 rectangles (20 points)

$\Delta = \frac{5-3}{4} = \frac{2}{4} = 0.5$

$\frac{b-a}{n} = \Delta x$

Area (Left hand) = $\frac{-10.75}{4} u^2$
Area (Right hand) = $\frac{-18.75}{4} u^2$

X	f(x)	Δx	Area of function
3	0	.5	0
3.5	-3.25	.5	-1.625
4	-7	.5	-3.5
4.5	-11.25	.5	-5.625
5	-16	.5	-8

Middle:

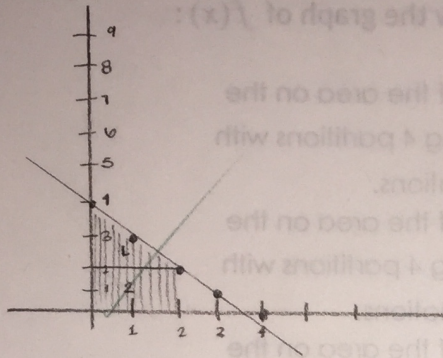
X	f(x)	Δx	Area of function
3.25	-1.563	.5	-0.781
3.75	-5.063	.5	-2.531
4.25	-9.063	.5	-4.531
4.75	-13.563	.5	-6.781

Middle = $\frac{-14.625}{4} u^2$

2) Give the graph (remember to shade the corresponding area) whose area is given by the following definite integral. Then use a geometric formula to evaluate the integral (by finding the area) **(15 points each)**

$$\int_0^2 (4-x) dx$$

Graph



Procedure by geometric formulas

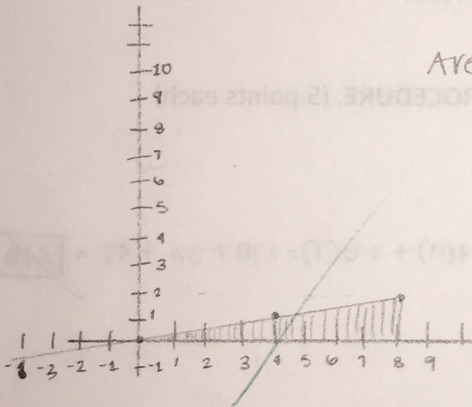
$$\textcircled{1} \frac{bh}{2} = \frac{2(2)}{2} = 2u^2$$

$$\textcircled{2} bh = 2(2) = 4u^2$$

$$\text{Area} = 4 + 2 = \boxed{6u^2}$$

3) $\int_0^8 \frac{x}{4} dx$

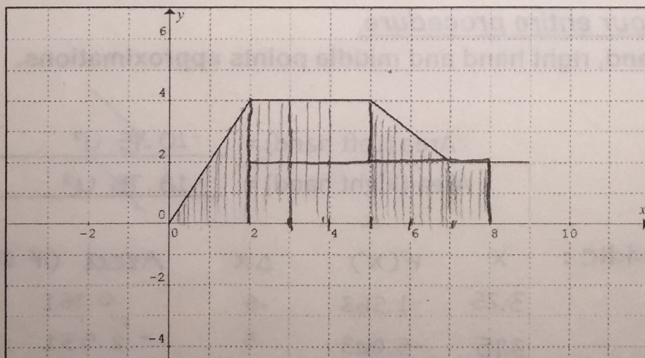
Graph



Procedure by geometric formulas

$$\text{Area} = \frac{bh}{2} = \frac{8(2)}{2} = \frac{16}{2} = \boxed{8u^2}$$

3) Based on the following graph evaluate the given definite integrals (5 points each):



1. $\int_0^3 f(x) dx$

$$\frac{bh}{2} + bh = \frac{2(4)}{2} + 1(4) = 4 + 4$$

$$= \boxed{8u^2}$$

3. $\int_0^7 f(x) dx$

$$\frac{bh}{2} + bh = \frac{2(2)}{2} + 2(2) = 2 + 4$$

$$= \boxed{6u^2}$$

2. $\int_4^8 f(x) dx$

$$bh = 2(4)$$

$$= \boxed{-8u^2}$$

4. $\int_0^8 f(x) dx$

$$bh + \frac{bh}{2} + bh + \frac{bh}{2} = 6(2) + \frac{2(4)}{2} +$$

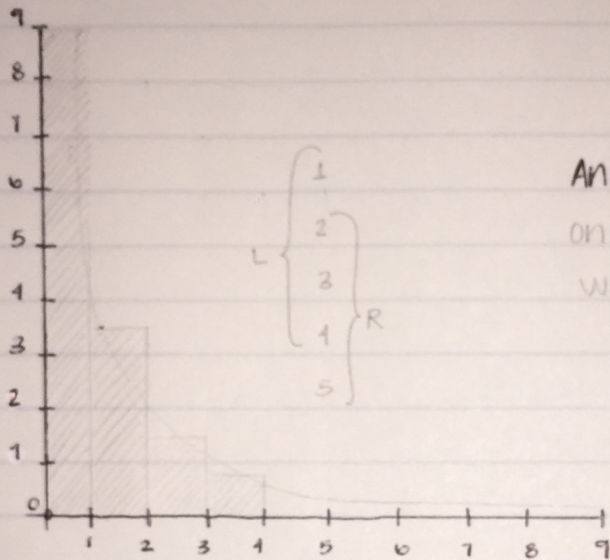
$$\boxed{24u^2}$$

$$3(2) + \frac{2(2)}{2}$$

$$6(2) + 4 + 3(2) + 12$$

QUIZ 2: SECOND PARTIAL CORRECTIONS.

1. CHOOSE THE SENTENCE THAT BEST DESCRIBES THE APPROXIMATE AREA BELOW THE GRAPH OF $f(x)$



Answer: approximation of the area on the interval $[0, 4]$ using 4 partitions with left-hand calculations.