

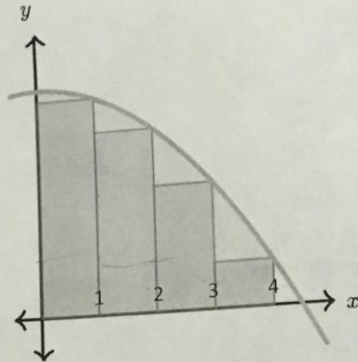
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Academia

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)

$\int_2^4 x dx = 7$ $\int_2^4 x^3 dx = 24$ $\int_2^4 dx = 4$

- a. $\int_2^4 (2x^3 + 5x + 3) dx = \underline{95}$
- b. $\int_2^4 20 dx = \underline{80}$ $4 \times 20 = 80$
- c. $\int_5^5 x^3 dx = \underline{0}$
- d. $\int_4^2 x dx = \underline{-7}$

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 $[-3,0]$ 4 rectangles (20 points)

$\Delta x = .75$

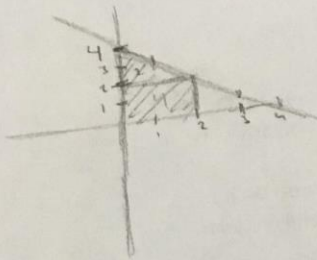
- 0 $(.75)f(-3) = 0$
- 1 $(.75)f(-2.25) = 2.95$
- 2 $(.75)f(-1.5) = 5.06$
- 3 $(.75)f(-.75) = 6.328$
- 4 $(.75)f(0) = 6.75$

Area (Left hand) = $\frac{14.338}{u^2}$
Area (Right hand) = $\frac{21.088}{u^2}$

2) Give the graph (remember to give the axes) of the function $f(x) = 4 - x$ given by the following definite integral. Then use a geometric formula to evaluate the integral (by finding the area) (15 points each)

$$\int_0^2 (4-x) dx = 6 \text{ u}^2$$

Graph



Procedure by geometric formulas

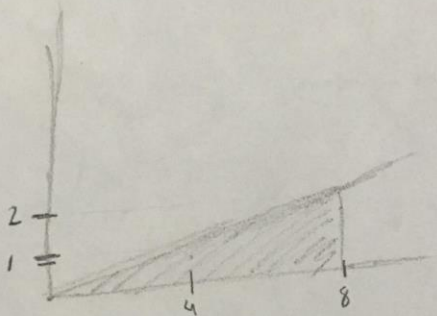
$$b \times h = 2 \times 2 = 4$$

$$\frac{b \times h}{2} = \frac{2 \times 2}{2} = 2$$

$$6 \text{ u}^2 \checkmark$$

$$3) \int_0^8 \frac{x}{4} dx = 8 \text{ u}^2$$

Graph

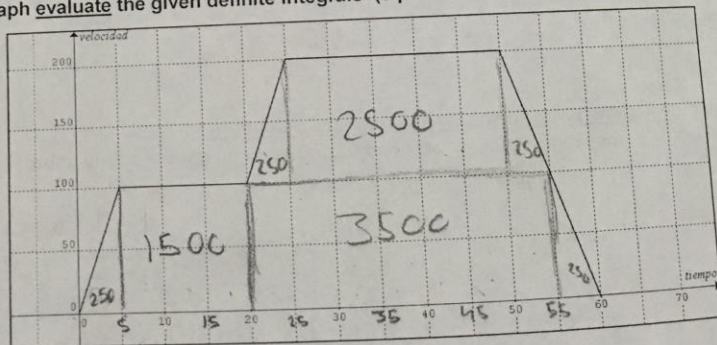


Procedure by geometric formulas

$$\frac{b \times h}{2} = \frac{8 \times 2}{2} = 8$$

$$8 \text{ u}^2 \checkmark$$

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



1. $\int_0^5 f(x) dx$

$$2500 \text{ u}^2$$

3. $\int_5^{50} f(x) dx$

$$7250 \text{ u}^2$$

2. $\int_5^{20} f(x) dx$

$$1500 \text{ u}^2$$

4. $\int_0^{60} f(x) dx$

$$8500 \text{ u}^2$$