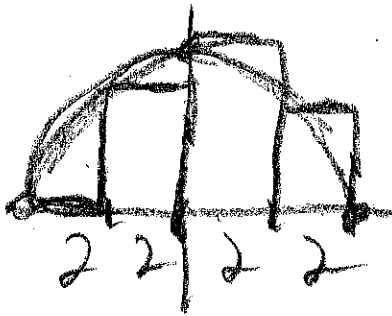


My Key

1) Estimate the area under the curve $f(x) = 16 - x^2$ between $x = -4$ and $x = 4$ using the "LRAM, RRAM and MRAM with 4 rectangles of equal width.



LRAM

$$2(0) + 2(12) + 2(16) + 2(12)$$

$$0 + 24 + 32 + 24$$

$$\frac{48}{4}$$

$$80$$

$$f(-4) = 0$$

$$f(-2) = 16 - 4 = 12$$

$$f(0) = 16$$

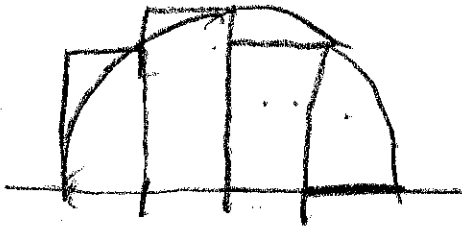
$$f(2) = 12$$

$$f(4) = 0$$

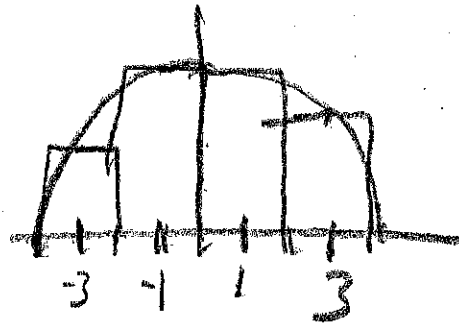
RRAM

$$2(12) + 2(16) + 2(12) + 2(0)$$

$$80$$



MRAM



$$2(7) + 2(15) + 2(15) + 2(7)$$

$$14 \quad 30 \quad 30 \quad 14$$

$$\frac{60}{4}$$

$$80$$

$$f(-3) = 16 - 9 = 7$$

$$f(-1) = 16 - 1 = 15$$

$$f(1) = 16 - 1 = 15$$

$$f(3) = 16 - 9 = 7$$

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MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Express the limit as a definite integral.

2) $\lim_{\|P\| \rightarrow 0} \sum_{k=1}^n (3c_k^2 - 10c_k + 2) \Delta x_k$, where P is a partition of $[-10, 3]$ 2) _____

A) $\int_3^{-10} (3x^2 - 10x + 2) dx$

B) $\int_1^n (6x - 10) dx$

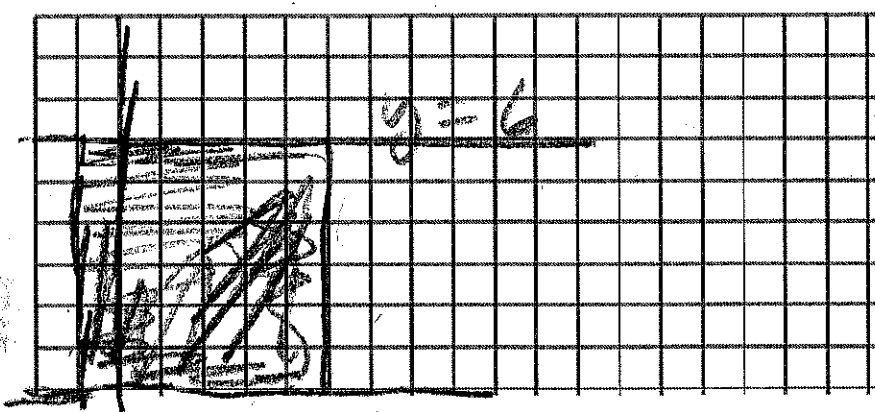
C) $\int_{-10}^3 (3x - 10) dx$

D) $\int_{-10}^3 (3x^2 - 10x + 2) dx$

AB

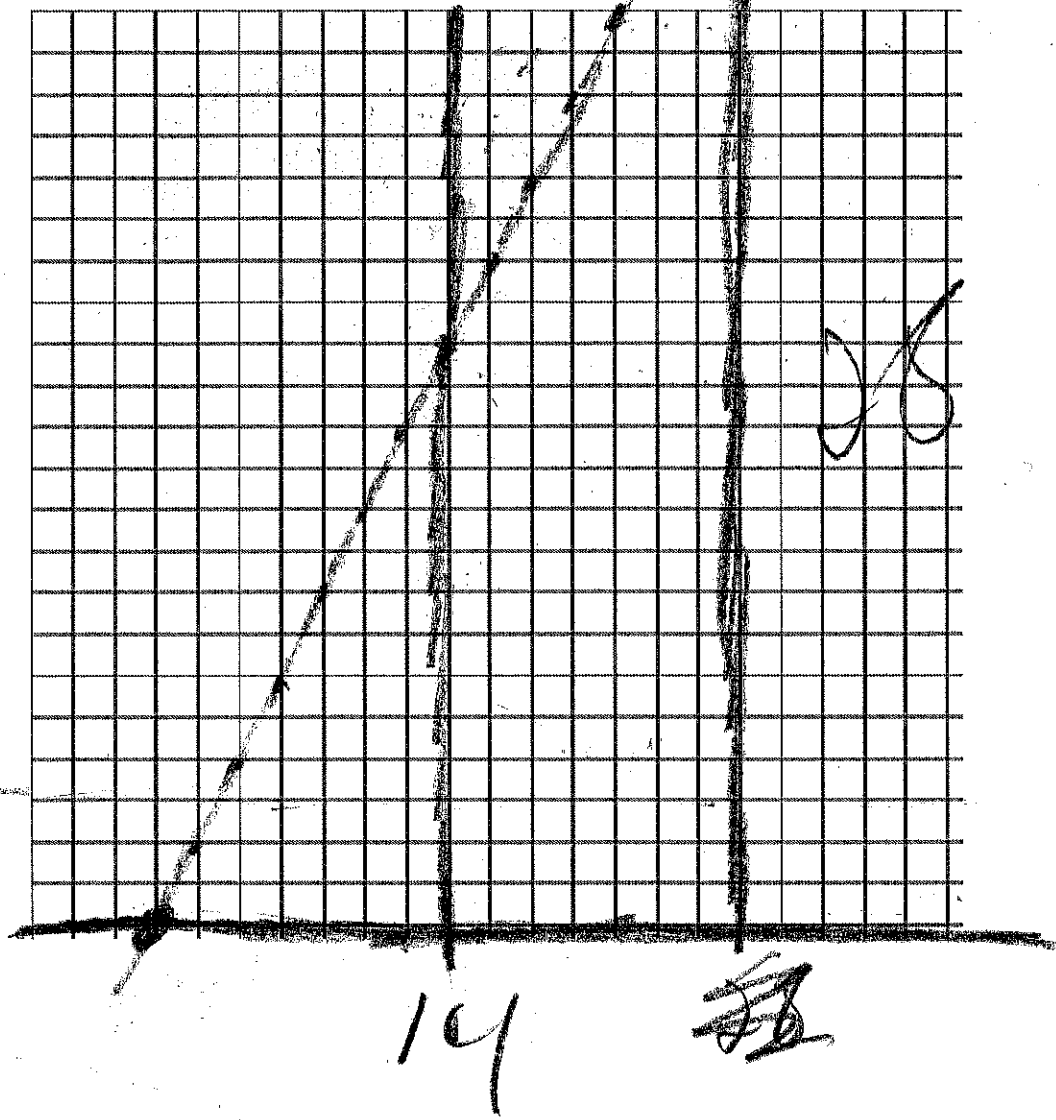
Graph the integrand and use areas to evaluate the integral.

3) $\int_{-1}^5 6 dx$



$6(6) = 36$

4) $\int_{-7}^7 (2x + 14) dx$



$$\frac{1}{2} (14)(28) = 14^2$$

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Alaska

5)

A tanker damaged in the Gulf of Alaska is leaking oil. Due to rough seas, constant monitoring is impossible. The following rates of the leakage into the sea are measured at the following times

Time(h since damage)	3	5	10	18	24
Leakage(gal/hr)	135	100	80	75	70

Use the data in the table and Rectangle Area Approximations to make a worse case estimate of the amount of oil that has escaped into the sea and a best case estimate. Show your analysis.

decreasing \rightarrow Concave down (sort of)
 so LRAM worst,

$$2(135) + 5(100) + 8(80) + 6(75)$$

270 500 640 450

6(70=5) 420

1140

450

270

1660 gallons

Best Case

$$2(100) + 5(80) + 8(75) + 6(70)$$

200 8(70=5) 420

400 560=40

600

420

1620 gallons