$f(x) = 3x - 6 \quad [1, 4] \quad$ 6 rect. Approx area under curve.

$$\Delta x = \frac{1}{2} = .5$$

LRAM =

$$\frac{1}{2}f(1) + \frac{1}{2}f(1.5) + \frac{1}{2}f(2) + \frac{1}{2}f(2.5) + \frac{1}{2}f(3) + \frac{1}{2}f(3.5) = \underline{2.25}$$

RRAM =

$$\frac{1}{2}f(1.5) + \frac{1}{2}f(2) + \frac{1}{2}f(2.5) + \frac{1}{2}f(3) + \frac{1}{2}f(3.5) + \frac{1}{2}f(4) = \underline{6.75}$$

MRAM =

$$\frac{1}{2}f(1.25) + \frac{1}{2}f(1.75) + \frac{1}{2}f(2.25) + \frac{1}{2}f(2.75) + \frac{1}{2}f(3.25) + \frac{1}{2}f(3.75) = \underline{4.5}$$

$$\text{MRAM} \neq \frac{\text{LRAM} + \text{RRAM}}{2} \;!!$$

$$\lim_{n\to\infty} \underbrace{\sum_{i=1}^{n} f(x_i)\Delta x_i}_{\text{Riemann Sum}} = \text{actual "signed" area between } f(x) \text{ and } x\text{-axis on } [a,b]$$

$n \to \infty$ ↓ $\Delta x \to 0$

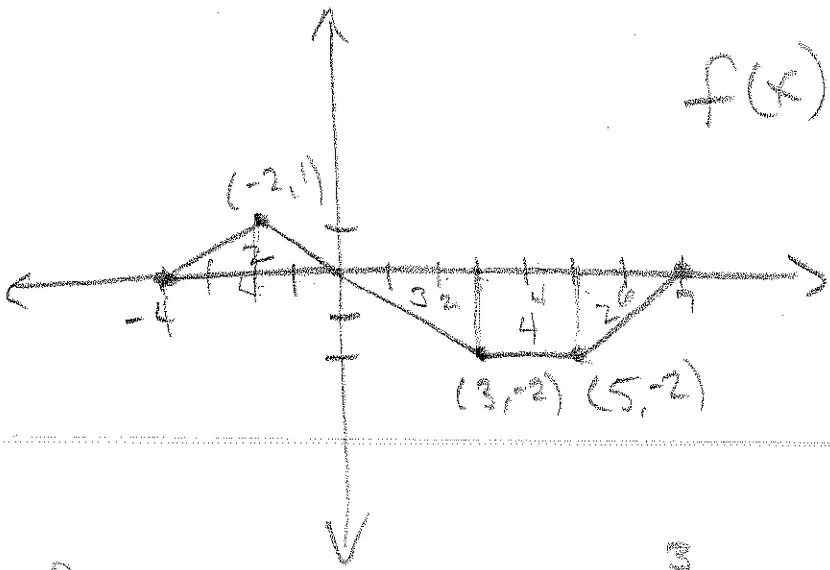
$$= \int_a^b f(x)\,dx$$

b ← upper limit of integration

a ← lower limit of integration

definite integral

If $f(x) \le 0$ on $[a,b]$, $\int_a^b f(x)\,dx \le 0$



5. $\int_0^{-4} f(x)\,dx = \underline{-2}$

6. $\int_3^5 4f(x)\,dx = \underline{-16}$

1. $\int_{-4}^{0} f(x)\,dx = \underline{\quad 2 \quad}$ 2. $\int_0^3 f(x)\,dx = \underline{\quad -3 \quad}$

3. $\int_0^7 f(x)\,dx = \underline{\quad -9 \quad}$ 4. $\int_{-4}^{7} f(x)\,dx = \underline{\quad -7 \quad}$

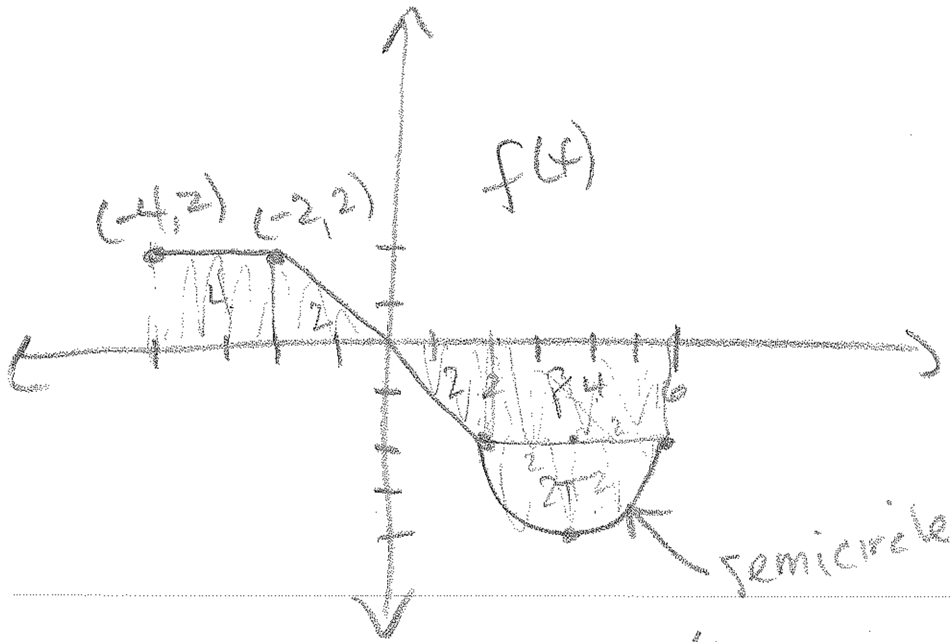
If c is between a and b, $\int_a^b f(x)\,dx = \int_a^c f(x)\,dx + \int_c^b f(x)\,dx$

$$\int_a^b f(x)\,dx = -\int_b^a f(x)\,dx$$

$$\int_a^b k f(x)\,dx = k \int_a^b f(x)\,dx$$

$$\int_a^b f(x)+g(x)\,dx = \int_a^b f(x)\,dx + \int_a^b g(x)\,dx$$

$$\int_a^a f(x)\,dx = 0$$



$$\int_{-4}^{0} f(x)\,dx = \underline{\;6\;}$$

$$\int_{2}^{6} f(x)\,dx = \underline{-8-2\pi}$$

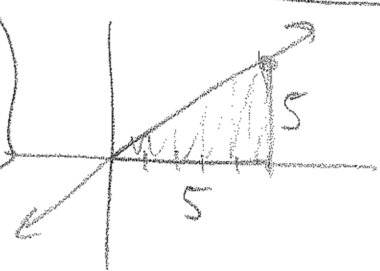
$$\int_{-4}^{6} f(x)\,dx = \underline{-4-2\pi}$$

$$\int_{6}^{-4} f(x)\,dx = \underline{4+2\pi}$$

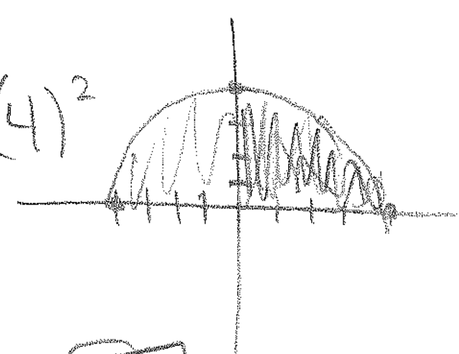
$$\int_{0}^{2} 4f(x)\,dx = \underline{-8}$$

$$\int_{-4}^{6} |f(x)|\,dx = \underline{16+2\pi}$$

$$\int_{0}^{5} x\,dx = \boxed{\frac{25}{2}}$$

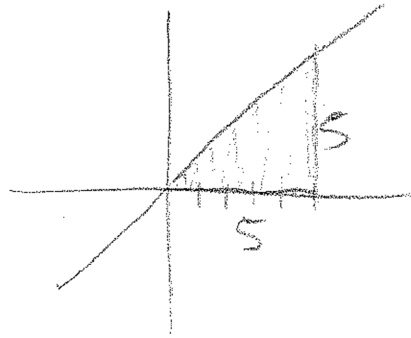


$$\int_{-4}^{4} \sqrt{16-x^2}\,dx = \frac{1}{2}\pi(4)^2 = \boxed{8\pi}$$

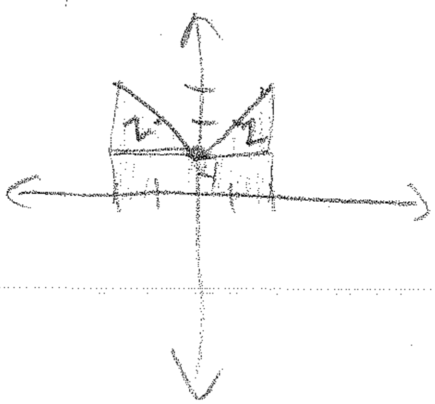


$$\int_{0}^{4} \sqrt{16-x^2}\,dx = \frac{1}{4}\pi(4)^2 = \boxed{4\pi}$$

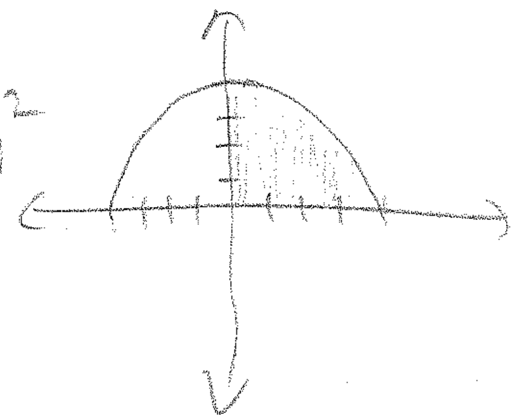
$\int_0^5 x\,dx = 12.5$



$\int_{-2}^{2} (|x|+1)\,dx = 8$



$\int_0^4 \sqrt{16-x^2}\,dx = \frac{1}{4}\pi(4)^2$
$= \boxed{4\pi}$



$\int_3^6 5\,dx = \boxed{15}$

$\int_2^6 f(x)\,dx = 12 \qquad \int_2^4 f(x)\,dx = 8$

a) $\int_4^6 f(x)\,dx = \underline{\ 4\ }$ b) $\int_2^6 3f(x)\,dx = \underline{\ 36\ }$

c) $\int_4^2 f(x)\,dx = \underline{\ -8\ }$ d) $\int_2^4 (f(x)+5)\,dx = \underline{\ 18\ }$