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M.C method for Integral.

$\therefore$ $\frac{\text{Total R.N}}{\text{Boundary RN}} = \frac{\text{Area of reel}}{\text{Area of curve}}$

$$\frac{N}{n} = \frac{A}{A_c}$$

- Find the value of Integration.

  - Random Number
  - function
  - limit
  - Use M.C method.

Now $\int_a^b f(x) \cdot dx$

Let $y = f(x)$

when $x = a$, $y = f(a)$

$x = b$, $y = f(b)$

Area of Reclangle $(A) = (b-a) \times (f(b) - f(a))$

Boundry $a < x < b$

$f(a) \leq y \leq f(b)$

$\therefore$ $y - f(x) \leq 0$ — IN

— or OUT

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S.N	Rand(x)	Rand(y)	$y-f(x) \le 0$	Queue
N	$a < x < b$	$f(a) < y \le f(b)$		
⋮				

$N' = \_\_$ $n = \_\_$

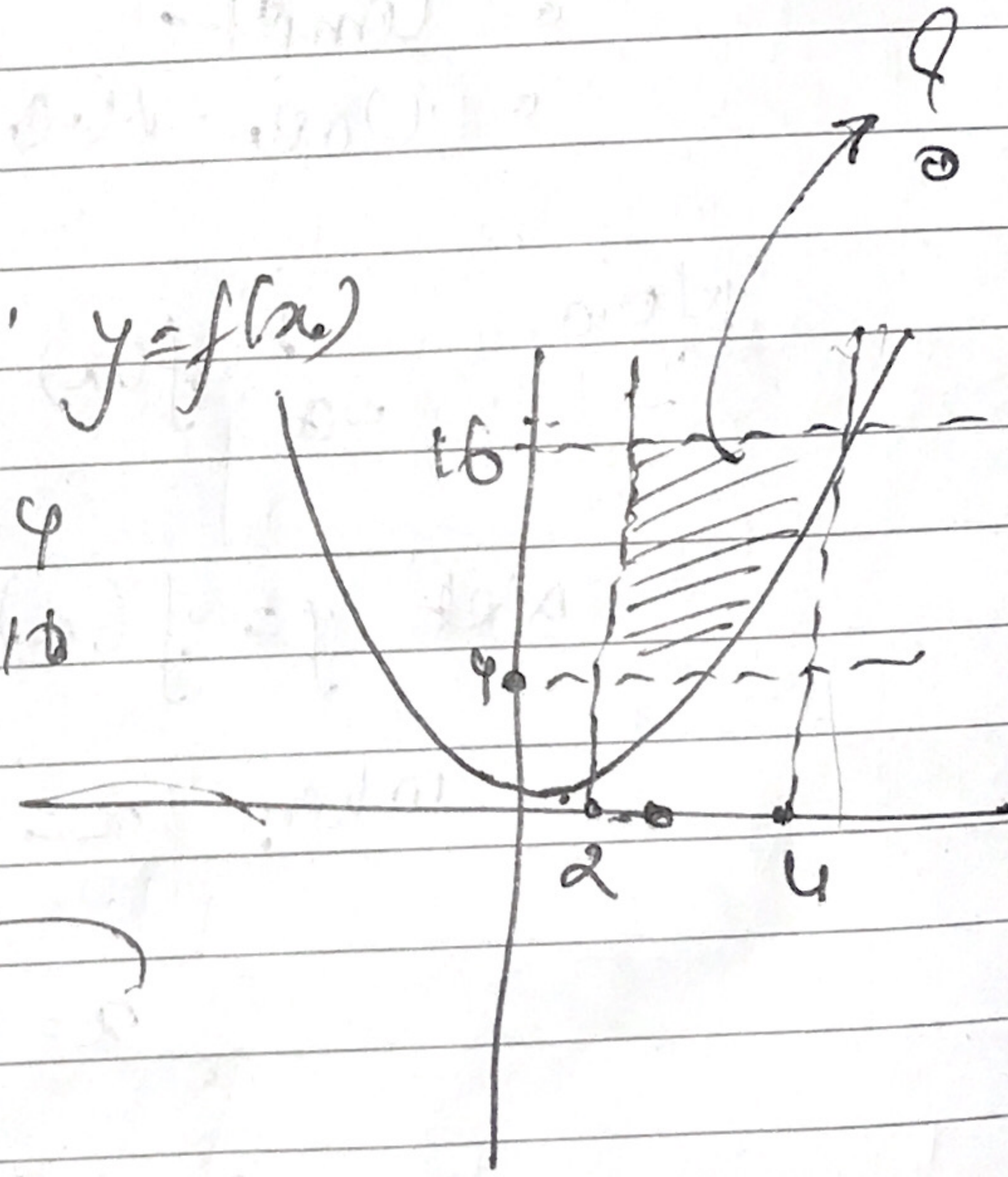
$$\text{Area of Integral} = \text{Area of Rectangle} \times \frac{n}{N}$$

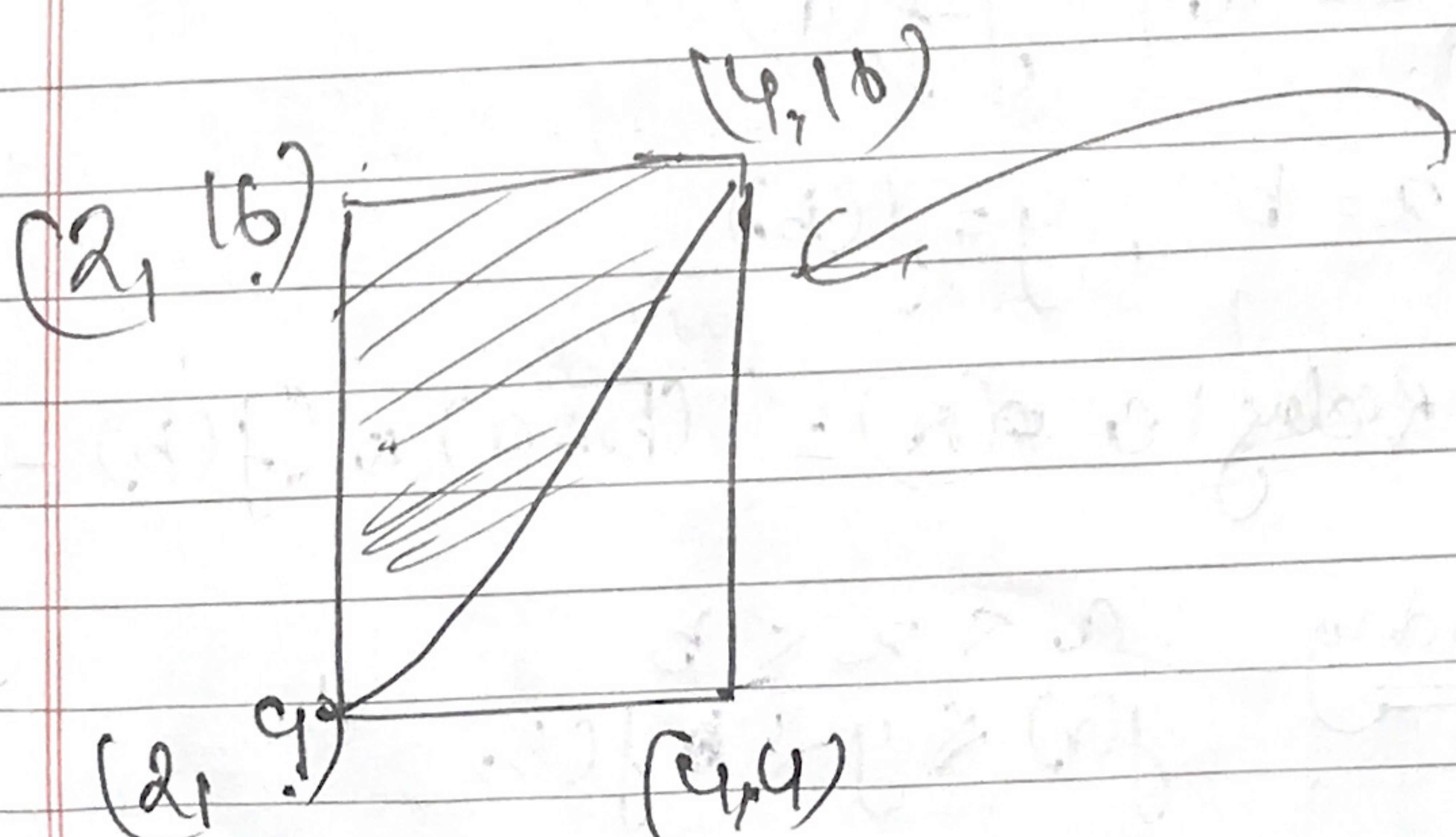
Que

$$I = \int_2^4 x^2 \, dx$$

Let up $y = x^2$ $\because y = f(x)$

When $x = 2$ then $y = 4$
$x = 4$ $y = 16$





$A = y - x^2$ $\therefore x = \text{Ran} \# (2) + 2$ $\therefore y = \text{Ran} \# (12) + 2$

$\boxed{\text{CALC}} \rightarrow \boxed{=}$

$\because a < x < b$ $\quad f(a) < y < f(b)$

$2 < x < 4$ $\quad 4 < y < 16$

$\because$ Area of Rectangle $= (b-a) \times (f(b) - f(a))$

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

$= 24$ sq unit

and, $y = x^2$

$y - x^2 < 0$ if true then IN

false then OUT

(2,4) (4,16)

SN	X	Y	$Y - X^2$	Remark
1	0	0	0	IN
2	2.32	10.06	-1.7	IN
3	2.34	13.24	1.43	OUT
4	2.73	4.08	-7.7	IN
5	3.32	15.61	3.8	OUT
6	3.75	10.9	-0.8	IN
7	3.6	4.6	-7.2	IN
8	2.3	11.8	0.077	OUT
9	3.9	4.88	-6.6	IN
10	2.05	7.84	1.1	OUT
11	3.4	4.72	-7.6	IN
12	3.~~04~~	8.2	-1.1	IN
13	2.85	8.9	1.85	OUT

14	2.176	14.22	10.08	OUT
15	2.76	4.07	-3.5	IN
16	3.61	6.22	-6.8	IN
17	3.96	10.91	-4.81	IN

$\therefore$ $N = 17$ $\quad\quad n = 11$

Area of Integral = Area of rect $\times \frac{n}{N}$

$= 24 \times \frac{11}{17}$

$= 15.52$

$I_A = \int_2^4 x^2 \, dx = \left.\frac{x^3}{3}\right|_3^4 = \frac{4^3 - 3^3}{3}$

$= 18.66$

$E = 18.66 - 15.52 = 3.14$

$\% E = \frac{3.14}{18.66} \times 100 = 16.82\%$