

Area under  $y=f(x)$   
 $[0, 12]$   $\hookrightarrow$  up to  $y=0$

LRAM

Left end

Rect

APPROX Method

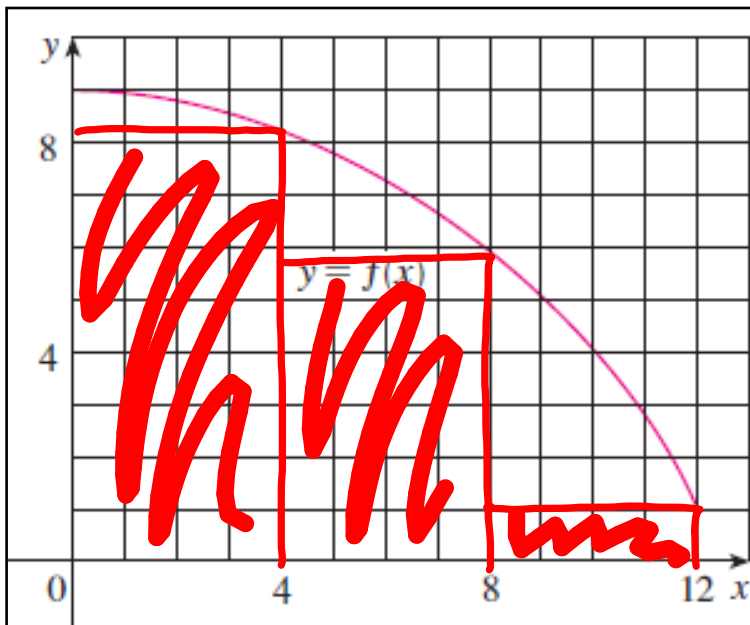
$n=3$  : # of rect.

$$\text{Area under } y=f(x) \approx 4(9) + 4(8.25) + 4(5.75)$$

$$[0, 12]$$

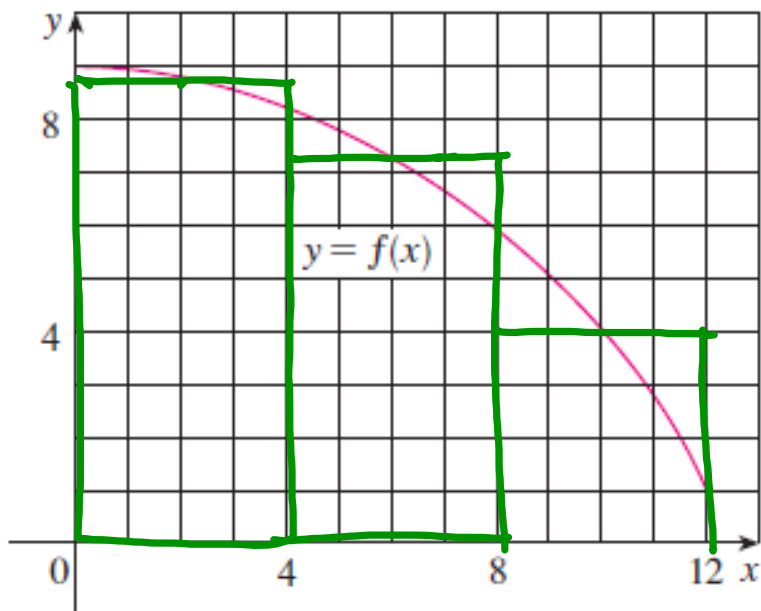
$$= 4(9 + 8.25 + 5.75)$$

$$= 92$$



R R A M

$$\begin{aligned} \text{Area: } & 4(8.25) + 4(5.75) \\ & + 4(1) \\ & = 4(8.25 + 5.75 + 1) \\ & = 4(15) = \underline{\underline{60}} \end{aligned}$$



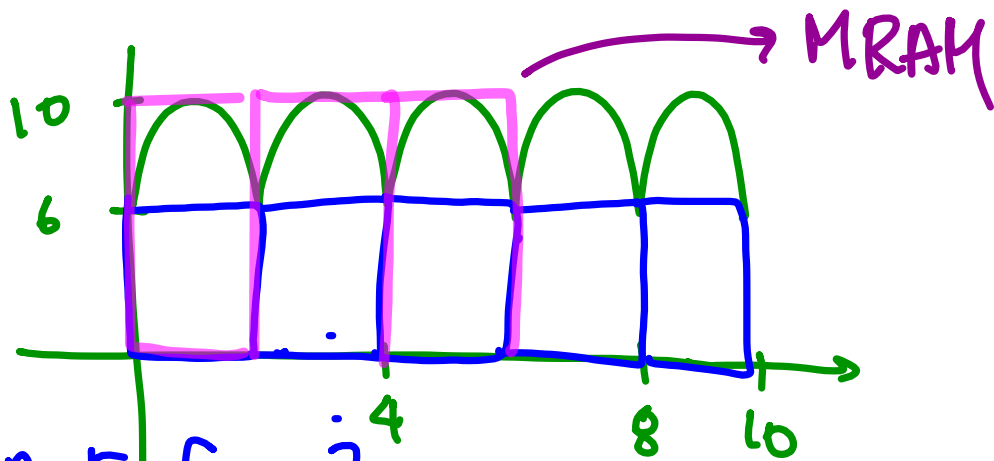
M R A H

$$\text{AREA} = 4(8.75) + 4(7.25)$$

$$+ 4(4)$$

$$= 4(8.75 + 7.25 + 4)$$

$$= 80$$



$n=5$   $[0, 10]$   
LRAM, RRAM

$$y = -x^2 + 16$$

Area under  $y = -x^2 + 16$   
for  $[0, 4]$ ,  $n = 4$



① LRAM :  $w = 1$

$$1(16) + 1(15) + 1(12) + 1(7)$$

$$\begin{array}{cccc} \downarrow & \downarrow & \downarrow & \downarrow \\ f(0) & f(1) & f(2) & f(3) \end{array}$$

$$\approx \underline{\underline{50}}$$