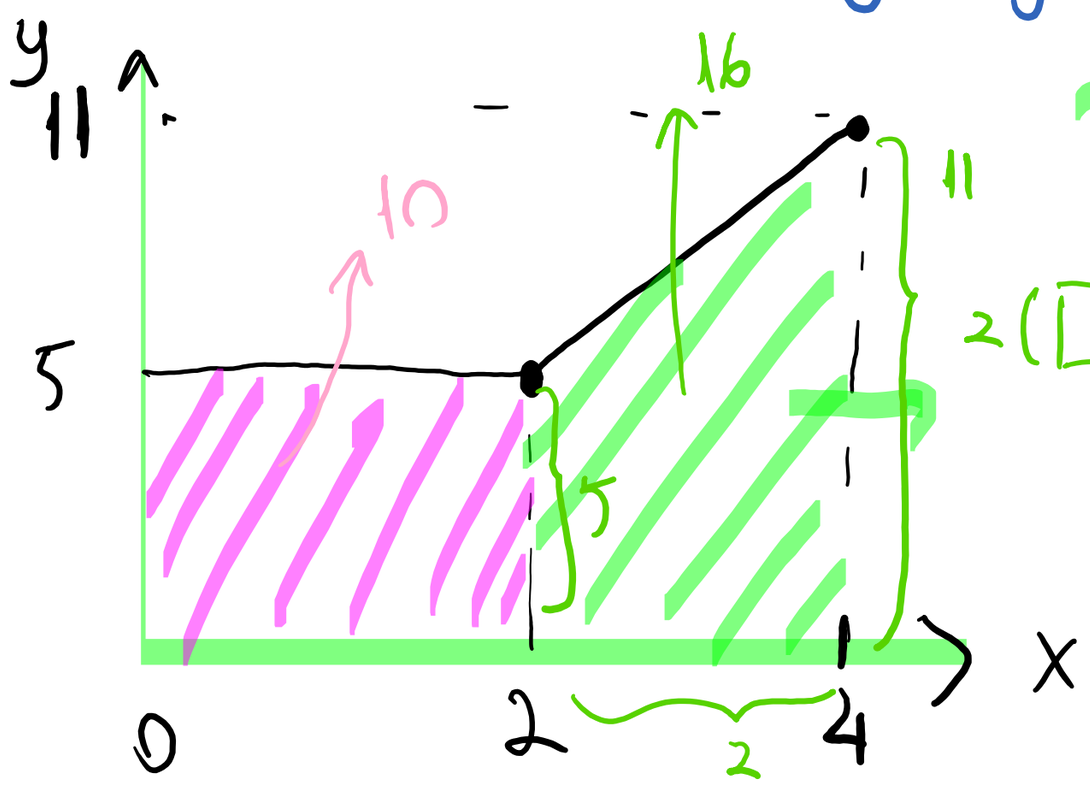
Supplementary Q1 - 5.2 Geometry to eval def integral

Use geometry to evaluate the definite integral:

$$\int_0^4 f(x)\,dx, \quad \text{where} \quad f(x) = \begin{cases} 5, & \text{if } x \leq 2 \quad (1) \\ 3x-1, & \text{if } x > 2 \quad (2) \end{cases}$$

Hint: Break down the area by using the piece-wise f. intervals



(2) $y = 3x-1$

$x=2 \Rightarrow y = 3\cdot 2 - 1 = 5$

$x=4 \Rightarrow y = 3\cdot 4 - 1 = 11$

$(4, 11)$

$A_R = 5 \cdot 2 = 10$

$A_{Trapezoid} = \frac{(b_1+b_2)\cdot h}{2} = \frac{(5+11)\cdot 2}{2} = 16$

(formula sheet)

$$\int_0^4 f(x)\,dx = A_R + A_T = 10 + 16 = 26$$