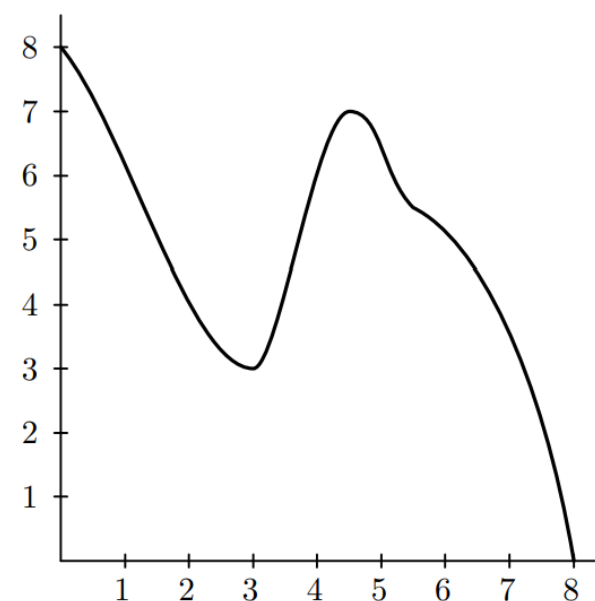


1049. Let f be the function graphed at the right. Which of the following is the best estimate of $\int_1^6 f(x) dx$? Justify your answer.

- A) -24
- B) 9
- C) 26
- D) 38



Solution:

To solve this problem we need to break the integral into three parts:

$$\int_1^6 f(x) dx = \underbrace{\int_1^3 f(x) dx}_{A_1} + \underbrace{\int_3^4 f(x) dx}_{A_2} + \underbrace{\int_4^6 f(x) dx}_{A_3}$$

Area under the graph $f(x)$:
 $x \in [1, 3]$
 A_1

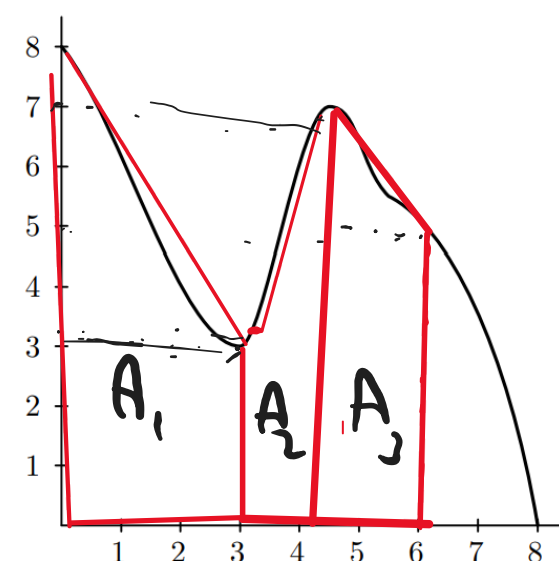
Area under the graph $f(x)$:
 $x \in [3, 4]$
 A_2

Area under the graph $f(x)$:
 $x \in [4, 6]$
 A_3

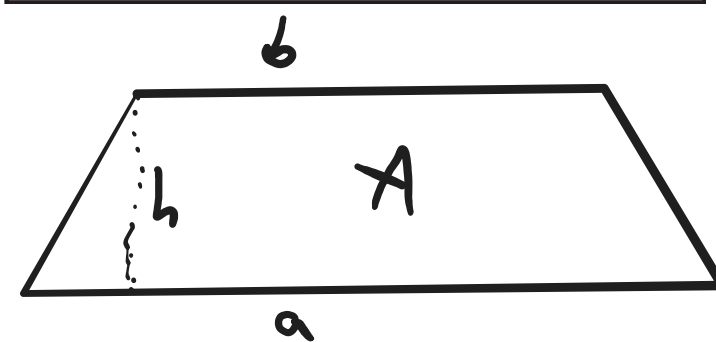
! We need to estimate each Area by drawing a symmetric shape that has an easy area calculation (i.e., trapezoid)

1049. Let f be the function graphed at the right. Which of the following is the best estimate of $\int_1^6 f(x) dx$? Justify your answer.

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REMEMBER



$$A = \text{Area of Trapezoid} = \frac{h}{2} [a + b]$$

$$A_1 \approx \frac{3}{2} (3 + 8) = \frac{33}{2}$$

$$A_2 = \frac{1}{2} (3 + 7) = 5$$

$$A_3 = \frac{2}{2} (7 + 0) = 7$$

$$A_1 + A_2 + A_3 = 33.5$$

The integral $\int_1^6 f(x) dx \leq A_1 + A_2 + A_3 = 33.5$

Therefore the answer is 26 (< 33.5)