

Question #31154

Find the area bounded by $y = 5 + 4x - x^2$, the x-axis and the ordinates $x = 1$ and $x = 4$.

- a. 24 unit²
- b. 19 unit²
- c. 2 unit²
- d. 32 unit²

Solution. The area bounded by the function $y = 5 + 4x - x^2$, x-axis and $x=1$ and $x=4$ is equal to integral

$$\begin{aligned} S &= \int_1^4 (5 + 4x - x^2) dx = \left(5x + 2x^2 - \frac{x^3}{3} \right) \Big|_1^4 = 5 \cdot 4 + 2 \cdot 4^2 - \frac{4^3}{3} - 5 \cdot 1 - 2 \cdot 1^3 + \frac{1}{3} \\ &= 20 + 32 - \frac{64}{3} - 7 + \frac{1}{3} = 45 - \frac{63}{3} = \frac{72}{3} = 24. \end{aligned}$$

Answer. The area is $S = 24\text{unit}^2$.