

Determine the area bounded by the curve  $y = 3x^2 + 6x + 8$ , the x-axis and the ordinates  $x = 1$  and  $x = 3$ .

- a. 6 unit<sup>2</sup>
- b. 6 unit<sup>2</sup>
- c. 66 unit<sup>2</sup>
- d. 65 unit<sup>2</sup>

**Solution:**

For the area under the curve we have formula:

$$A = \int_a^b y \, dx$$

In our case we have:

$$\begin{aligned} A &= \int_1^3 (3x^2 + 6x + 8) \, dx = \left( 3 \frac{x^3}{3} + 6 \frac{x^2}{2} + 8x \right) \Big|_1^3 = (x^3 + 3x^2 + 8x) \Big|_1^3 \\ &= 3^3 + 3 * 3^2 + 8 * 3 - 1^3 - 3 * 1^2 - 8 * 1 = 27 + 27 + 24 - 1 - 3 - 8 = 66 \end{aligned}$$

**Answer: c. 66 unit<sup>2</sup>**