Question

Find the derivative of f(x) = negative 7 divided by x at x = -3.

Solution

$$f(x) = -\frac{7}{x}$$

$$f'(x) = \left(-\frac{7}{x}\right)' = -7\left(\frac{1}{x}\right)' = -7(x^{-1})' = -7(-x^{-2}) = -7 \cdot \left(-\frac{1}{x^2}\right) = \frac{7}{x^2} \qquad (1)$$

Property of derivative

$$(af(x))' = a(f(x))'$$

and well-known formula from the table of derivatives

$$(x^n)' = nx^{n-1} \qquad (2)$$

were applied in (1).

In this problem we put $n = -1$ in (2).

Thus, it follows from (1) that

$$f'(-3) = \left(\frac{7}{x^2}\right)\Big|_{x=-3} = \frac{7}{(-3)^2} = \frac{7}{9}$$

Answer: $f'(-3) = \frac{7}{9}$.