3 Найти производную функции:

$$y(x) = \frac{2x}{1-x^2}$$

Решение:

$$y'(x) = \left(\frac{2x}{1-x^2}\right)' = \frac{(2x)'(1-x^2) - 2x(1-x^2)'}{(1-x^2)^2} = (1)$$

$$(2x)' = 2$$

$$(1-x^2)' = (-x^2)' = (-1)(x^2)' = (-1)\,2x = -2x$$

$$(1) = \frac{2(1-x^2) - 2x(-2x)}{(1-x^2)^2} = \frac{2(1-x^2) + (2x)^2}{(1-x^2)^2} =$$

$$= \frac{2(1-x^2) + 4x^2}{(1-x^2)^2} = \frac{2 - 2x^2 + 4x^2}{(1-x^2)^2} = \frac{2+2x^2}{(1-x^2)^2} =$$

$$= 2\,\frac{1+x^2}{(1-x^2)^2}$$

Ответ:

$$y'(x) = 2\,\frac{1+x^2}{(1-x^2)^2}$$