

## Product and Quotient of Functions

If  $f$  and  $g$  are functions,  
the product function  $(fg)(x)$  is defined by: \_\_\_\_\_

the quotient function  $\left(\frac{f}{g}\right)(x)$  is defined by: \_\_\_\_\_

The domain of  $fg$  is the set of all real numbers that are in the domain of **both**  $f$  and  $g$ .

The domain of  $\frac{f}{g}$  is the set of all real numbers that are in the domain of **both**  $f$  and  $g$ ,  
such that  $g(x) \neq 0$ .

1. Given  $f(x) = \sqrt{3x}$  and  $g(x) = \sqrt{x^2 - 1}$ .

a) State the domain of  $f$ .

b) State the domain of  $g$ .

c) Find  $(fg)(x)$  and state the domain.

d) Find  $\left(\frac{f}{g}\right)(x)$  and state the domain.

2. Given  $f(x) = 2^{-x}$  and  $g(x) = 3(2)^{5x-1}$ .

a) State the domain of  $f$ .

b) State the domain of  $g$ .

c) Find  $(fg)(x)$  and state the domain.

d) Find  $\left(\frac{g}{f}\right)(x)$  and state the domain.

3. Given  $f(x) = \log_2(x-1)$  and  $g(x) = \log_2(16-x^2)$ .

a) State the domain of  $f$ .

b) State the domain of  $g$ .

c) Find  $(fg)(x)$  and state the domain.

d) Find  $\left(\frac{g}{f}\right)(x)$  and state the domain.

4. Given  $f(x) = \tan x$  and  $g(x) = \csc x$ .

a) State the domain of  $f$ .

b) State the domain of  $g$ .

c) Determine  $(fg)(x)$  and state the domain.

d) Determine  $\left(\frac{g}{f}\right)(x)$  and state the domain.