

## Answer on Question #45785 - Math - Calculus

$$f(x) = 3x + 5,$$

$$g(x) = 6x^2$$

Find  $(fg)(x)$ .

### Solution

Consider  $F$  to be domain of the function  $f(x)$ ,  $G$  to be domain of the function  $g(x)$ ,  $H$  to be domain of the expression  $(fg)(x)$ .

$(fg)(x) = f(x)g(x)$ . Domain of the whole expression is nothing else but intersection of the function's domains:  $H = F \cap G$ .

Particular case of the task:

$$f(x) = 3x + 5. \text{ It's domain: } F = \mathbb{R}.$$

$$g(x) = 6x^2. \text{ It's domain: } G = \mathbb{R}.$$

Thus,

$$(fg)(x) = f(x)g(x) = (3x + 5)(6x^2) = 3x \times 6x^2 + 5 \times 6x^2 = 18x^3 + 30x^2,$$

$$H = F \cap G = \mathbb{R} \cap \mathbb{R} = \mathbb{R}.$$

**Answer:**  $(fg)(x) = 18x^3 + 30x^2$ .