

3-19-10

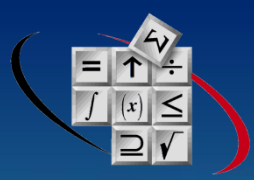
Daily Check

Simplify (2 pts each):

1) $(4x^6y^3)^4$

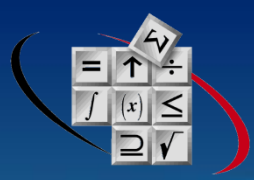
2) $\frac{6x^3y^6z^4}{24x^4yz^7}$

4.2 Composition of Functions



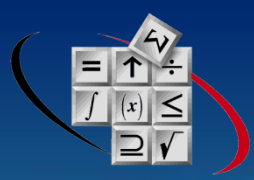
Objective

☒ To form and evaluate composite functions.

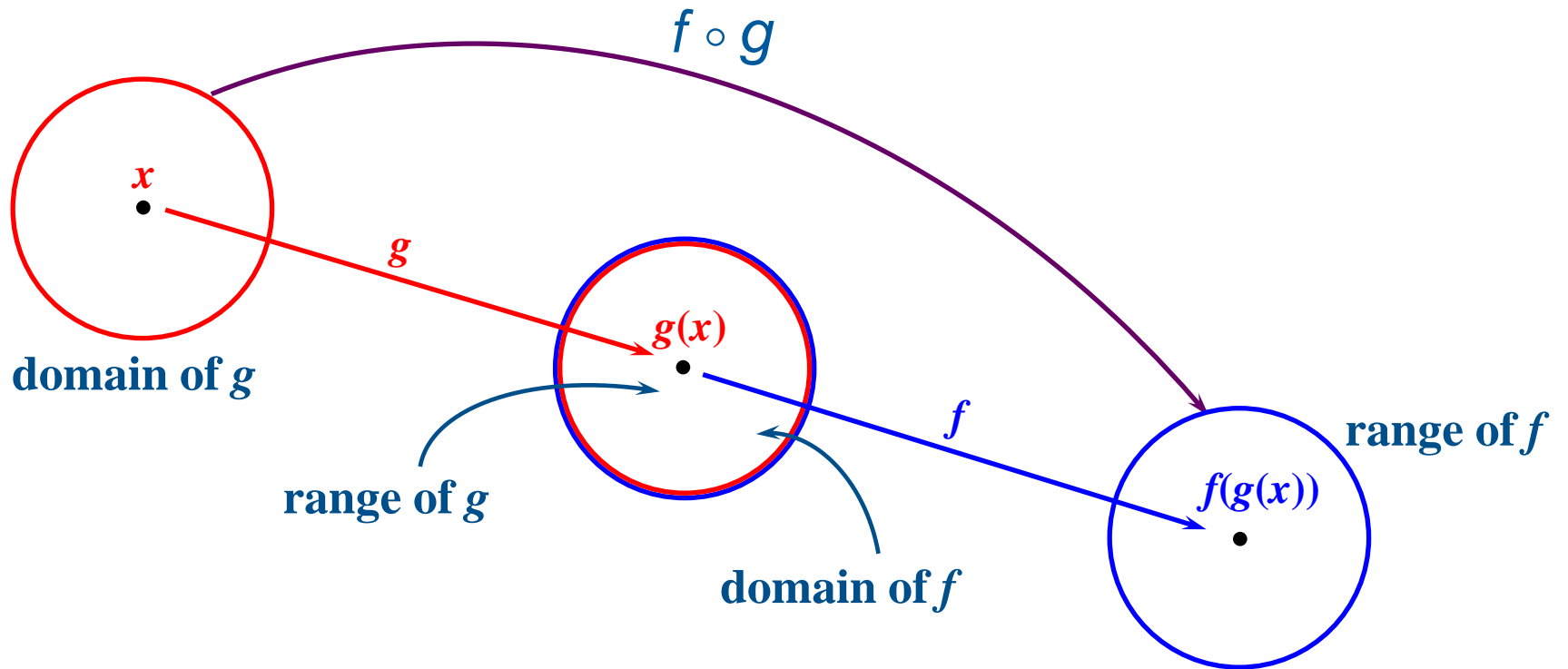


Composition of functions

- ⊗ Composition of functions is the successive application of the functions in a specific order.
- ⊗ Given two functions f and g , the **composite function** $f \circ g$ is defined by $(f \circ g)(x) = f(g(x))$ and is read “ f of g of x .”

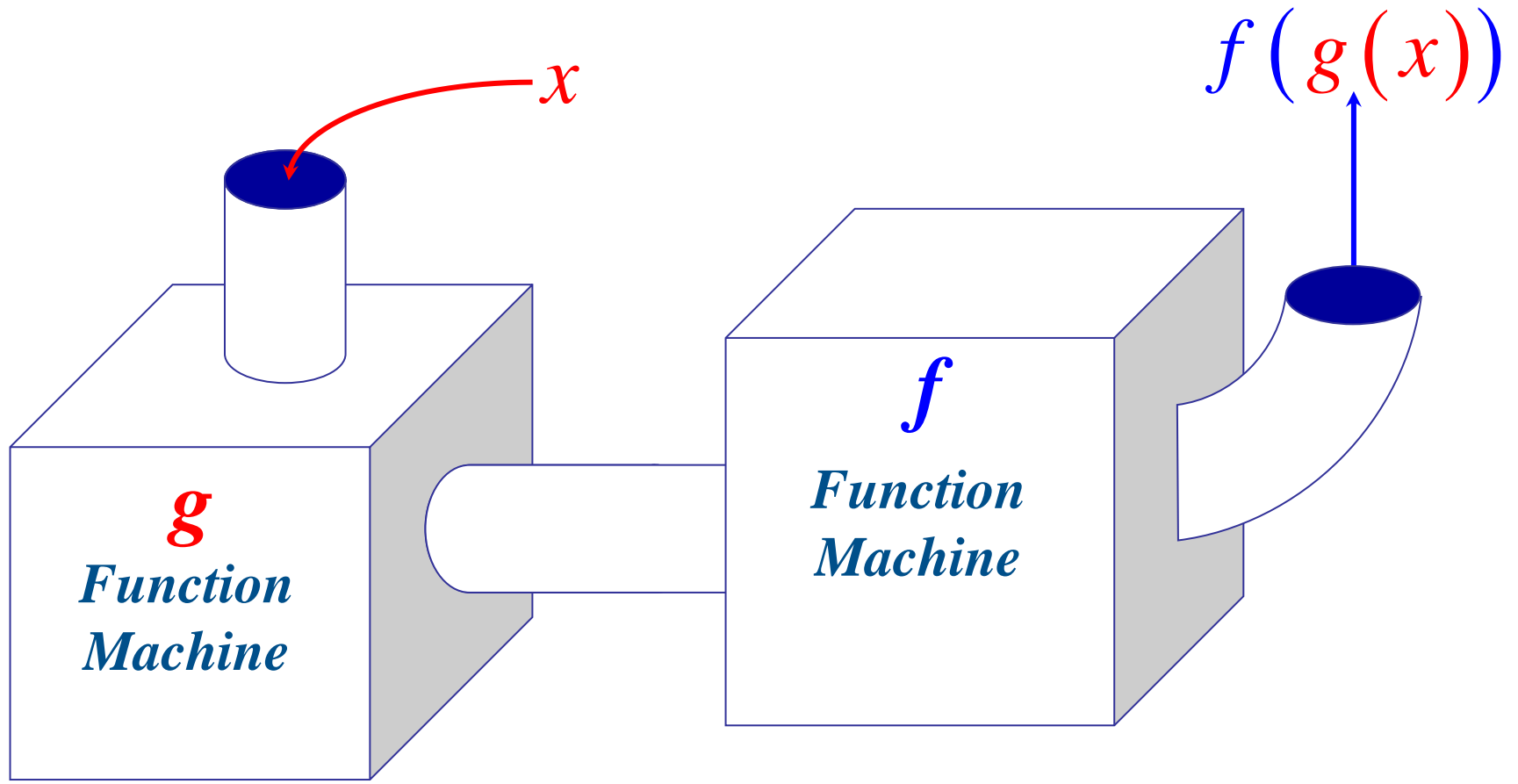


A composite function





A different way to look at it...





Example 1

⊗ Evaluate $(f \circ g)(x)$ and $(g \circ f)(x)$:

$$\triangleright f(x) = x - 3 \qquad g(f(x)) = 2(x - 3)^2 - 1$$

$$\begin{aligned} \triangleright g(x) &= 2x^2 - 1 &&= 2(x^2 - 6x + 9) - 1 \\ &&&= 2x^2 - 12x + 18 - 1 \end{aligned}$$

$$(f \circ g)(x) = 2x^2 - 4$$

$$(g \circ f)(x) = 2x^2 - 12x + 17$$

You can see that function composition is not commutative!



Example 2

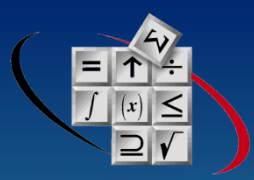
⊗ Evaluate $(f \circ g)(x)$ and $(g \circ f)(x)$:

➤ $f(x) = 2x^3$ $g(f(x)) = (2x^3)^{-1}$

➤ $g(x) = x^{-1}$ $= \frac{1}{2x^3}$

$$(f \circ g)(x) = \frac{2}{x^3}$$

$$(g \circ f)(x) = \frac{1}{2x^3}$$

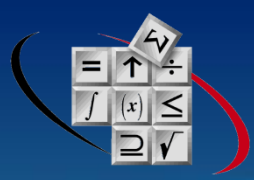


Your turn

☒ Evaluate $(f \circ g)(x)$ and $(g \circ f)(x)$:

➤ $f(x) = 3x^2$

➤ $g(x) = x + 5$



Summary...

⊗ Function composition

- Perform function in innermost parentheses first