Function Operations

$f(x) = 7y^3 - 3y^2$ $g(x) = 5y^3 - 9y$

$(f + g)(x) = f(x) + g(x)$

$7y^3 - 3y^2 + 5y^3 - 9y$

$= \boxed{12y^3 - 3y^2 - 9y}$

$(f \bullet g)(x) = f(x)\,g(x)$

$(7y^3 - 3y^2)(5y^3 - 9y^1)$

$= \boxed{35y^6 - 63y^4 - 15y^5 + 27y^3}$

OR $\boxed{= 35y^6 - 15y^5 - 63y^4 + 27y^3}$

$(f - g)(x) = f(x) - g(x)$

$(7y^3 - 3y^2) - 1(5y^3 - 9y)$

↑ distribute

$7y^3 - 3y^2 - 5y^3 + 9y$

$= \boxed{2y^3 - 3y^2 + 9y}$

* multiply like bases ⇒ Add exponents

Evaluating Functions Review

$f(x) = 2x - 7$ $g(x) = x^2 - x + 5$

$f(5) = 2(5) - 7$
$= 10 - 7$
$= \boxed{3}$

$g(-2) = (-2)^2 - (-2) + 5$
$= \boxed{11}$

Compositions of Functions

Notation: $(f \circ g)(x)$ "f of g of x"

$= f(g(x))$ Evaluate $f(x)$ at $g(x)$
→ substitute $g(x)$ into $f(x)$

Given $f(x) = x^2 + x$ $g(x) = 4 - x$

Find: 1) $(g \circ f)(x) = g(f(x))$

$(g \circ f)(x) = 4 - (x^2 + x)$
$= \boxed{4 - x^2 - x}$

2) $(f \circ g)(x) = f(g(x))$

$f(g(x)) = [g(x)]^2 + [g(x)]$
$= [4-x]^2 + [4-x]$
$= (4-x)(4-x) + 4-x$
$= 16 - 4x - 4x + x^2 + 4 - x$
$= \boxed{x^2 - 9x + 20}$

Given $f(x) = x + 5$
$g(x) = x^2 - 2$

Find $f(\boxed{g(3)})$

$g(3) = (3)^2 - 2$
$= 7$

* Work from the inside out!

$f(g(3)) = 7 + 5 = \boxed{12}$

$f(g(3)) = (3)^2 - 2 + 5 = \boxed{13}$