Questions From Homework

Composite Functions
Combining Functions in a Different Way!

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

A new function *h(x)* is created when the domain of *g(x)* is restricted by the range of *f(x)*

$$h(x) = f(g(x))$$

$$= f(2x+1)$$

$$= (2x+1)^2 + 3(2x+1)$$

$$= 4x^2 + 4x + 1 + 6x + 3$$

$$= 4x^2 + 10x + 4$$

The notation "$f \circ g$" means the composition of *f with g* and is read "*f* composed with g."

Composite Functions

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

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

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

$f(x) = x^2 + 5x + 6$ $\qquad$ $g(x) = 3x - 2$

Find

$(f \circ g)x$

$f(g(x))$

$f(3x-2) = (3x-2)^2 + 5(3x-2) + 6$

$= 9x^2 - 12x + 4 + 15x - 10 + 6$

$= 9x^2 + 3x$

$(g \circ g)x$

$g(g(x))$

$g(3x-2) = 3(3x-2) - 2$

$= 9x - 6 - 2$

$= 9x - 8$

$f(x) = x^2 + 5x + 6$

$g(x) = 3x - 2$

$f(g(3))$

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

$= 9 - 2$

$= 7$

$F(7) = (7)^2 + 5(7) + 6$

$= 49 + 35 + 6$

$= 90$

$f(g(-2))$

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

$= -6 - 2$

$= -8$

$F(-8) = (-8)^2 + 5(-8) + 6$

$= 64 - 40 + 6$

$= 30$

$f(x) = x^2 + 5x + 6$

$g(x) = 3x - 2$

$g(f(-1))$

$f(-1) = (-1)^2 + 5(-1) + 6$

$= 1 - 5 + 6$

$= 2$

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

$= 6 - 2$

$= 4$

$g(g(4))$

$g(4) = 3(4) - 2$

$= 12 - 2$

$= 10$

$g(10) = 3(10) - 2$

$= 30 - 2$

$= 28$

Homework

③ $f(x) = 3x - 5$ $\quad g(x) = 2 - 5x - x^2$

d) $g(f(x))$

$g(3x-5) = 2 - 5(3x-5) - (3x-5)^2$

$= 2 - 15x + 25 - (9x^2 - 30x + 25)$

$= 2 - 15x + 25 - 9x^2 + 30x - 25$

$= -9x^2 + 15x + 2$