2.4 Operations w/ Fncs.

Obj: 1. Perform operations w/ fncs to write new fncs.

2. Find the composition of 2 fncs.

For all fncs $f(x)$ & $g(x)$

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

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

Product: $(fg)(x) = f(x) \cdot g(x)$

Quotient: $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$, $g(x) \neq 0$

Oct 19-11:02 AM

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

$g(x) = 4x^2 + 7x - 5$

Find $(f+g)(x)$ and $(f-g)(x)$

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

$= 5x^2 - 2x + 3 + 4x^2 + 7x - 5$

$= 9x^2 + 5x - 2$

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

$= 5x^2 - 2x + 3 - (4x^2 + 7x - 5)$

$= 5x^2 - 2x + 3 - 4x^2 - 7x + 5$

$= x^2 - 9x + 8$

Oct 19-11:20 AM

$f(x) = -7x^2 + 12x + 2.5$

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

Find $(f+g)(x)$ and $(f-g)(x)$

$(f+g)(x) = -7x^2 + 12x + 2.5 + 7x^2 - 5$

$= 12x - 2.5$

$(f-g)(x) = -7x^2 + 12x + 2.5 - (7x^2 - 5)$

$= -7x^2 + 12x + 2.5 - 7x^2 + 5$

$= -14x^2 + 12x + 7.5$

Oct 19-11:23 AM

$f(x) = 5x^2 \quad g(x) = 3x - 1$

Find $(fg)(x)$ and $\left(\frac{f}{g}\right)(x)$

$(fg)(x) = f(x) \cdot g(x) = 5x^2(3x - 1)$

$= 15x^3 - 5x^2$

$\left(\frac{f}{g}\right)(x) = \frac{5x^2}{3x-1}$, $3x - 1 \neq 0$

$+1 \quad +1$

$\frac{3x}{3} \neq \frac{1}{3}$

$x \neq \frac{1}{3}$

Domain Restriction

Oct 19-11:29 AM

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

$g(x)=5x-2$

Find $(fg)(x)$ and $\left(\frac{f}{g}\right)(x)$

$(fg)(x)=(3x^2+1)(5x+2)$

$=15x^3+6x^2+5x+2$

$\left(\frac{f}{g}\right)(x)=\frac{3x^2+1}{5x-2}$ $5x-2\neq 0$, $+2$, $\frac{+2}{5}$ $x\neq\frac{2}{5}$

Oct 19-11:32 AM

$f(x)=9x^2$

$g(x)=4x+3$

Find $(fg)(x)$ and $\left(\frac{f}{g}\right)(x)$

$(fg)(x)=9x^2(4x+3)$

$=36x^3+27x^2$

$\left(\frac{f}{g}\right)(x)=\frac{9x^2}{4x+3}$, $4x+3\neq 0$, -3, $\frac{-3}{4}$ $x\neq-\frac{3}{4}$

Oct 19-11:36 AM

Compositions

$f(x) = x^2 - 1$

$f(1) = 1^2 - 1 = 0$

$f(-2) = (-2)^2 - 1 = 3$

$f(a) = a^2 - 1$

$f(2a) = (2a)^2 - 1 = 4a^2 - 1$

$f(2a+1) = (2a+1)^2 - 1$

Oct 19-11:41 AM

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

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

$= 9x^2 - 1$

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

Compositions:

$f(g(x))$ $\qquad$ $g(f(x))$

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

Oct 19-11:43 AM

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

Find $(f \circ g)(x)$ and $(g \circ f)(x)$

$f(g(x))$ $g(f(x))$

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

$g(f(x)) = 2(x^2 + 4)$
$= 2x^2 + 8$

Oct 19-11:46 AM

$f(x) = 2x^2 + 3$ $g(x) = 3x$

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

$f(g(x)) = 2(3x)^2 + 3$
$= 2(9x^2) + 3$
$= 18x^2 + 3$

$g(f(x)) = 3(2x^2 + 3)$
$= 6x^2 + 9$

Oct 19-11:49 AM