1 Given $f(x) = x^2 - 3x + 1$ and $g(x) = 4x + 5$, find each function.

$(f+g)(x) = f(x) + g(x) = (x^2 - 3x + 1) + (4x + 5)$

$= x^2 - 3x + 1 + 4x + 5$

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

$(f-g)(x) = f(x) - g(x) = (x^2 - 3x + 1) - (4x + 5)$

$= x^2 - 3x + 1 - 4x - 5$

$(f-g)(x) = x^2 - 7x - 4$

$(f \cdot g)(x) = f(x) \cdot g(x) = (x^2 - 3x + 1)(4x + 5)$

$= 4x^3 + 5x^2 - 12x^2 - 15x + 4x + 5$

$(f \cdot g)(x) = 4x^3 - 7x^2 - 11x + 5$

$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}, \; g(x) \neq 0 = \frac{x^2 - 3x + 1}{4x + 5}, \; x \neq -\frac{5}{4} = \left(\frac{f}{g}\right)(x)$

$4x + 5 = 0$

$4x = -5$

$x = -\frac{5}{4}$

Composition of functions

$[f \circ g](x) = f[g(x)]. = f(g(x))$

$f(x) = x + 4$

$f(8) = 8 + 4 = 12$

$f(y) = y + 4$

$f(m+7) = (m+7) + 4 = m + 11$

$f(x) = x - 9$ $\quad$ $g(x) = 2x + 5$

$[f \circ g](x)$

$f[g(x)] = f(2x+5) = (2x+5) - 9$

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

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

$g[f(x)] = g(x-9)$

$= 2(x-9) + 5$

$= 2x - 18 + 5$

$(g \circ f)(x) = 2x - 13$

$f(x) = 3x - 1$ $\quad$ $g(x) = x + 4$

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

$= f(x+4) = 3(x+4) - 1$

$= 3x + 12 - 1$

$[f \circ g](x) = 3x + 11$

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

$= g(3x-1) = (3x-1) + 4$

$[g \circ f](x) = 3x + 3$

p. 389-390			
15-16, 28-31, 33-42, 46-47, 56-57			