p389 5.6, 22, 24, 26-35, 41-45, 60 Key

⑤ $f(x) = -3x$

$g(x) = 5x-6$

$(f \circ g)(x) = -3(5x-6)$

$= \boxed{-15x+18}$

$(g \circ f)(x) = 5(-3x)-6$

$= \boxed{-15x-6}$

⑥ $f(x) = x+4$

$g(x) = x^2+3x-10$

$(f \circ g)(x) = (x^2+3x-10)+4$

$= \boxed{x^2+3x-6}$

$(g \circ f)(x) = (x+4)^2+3(x+4)-10$

$= x^2+8x+16+3x+12-10$

$= \boxed{x^2+11x+18}$

(22) $f = \{(-1,11), (2,-2), (5,-7), (4,-4)\}$

$g = \{(5,-4), (4,-3), (-1,2), (2,3)\}$

$f \circ g = \{(-1,-2)\}$ $D = \{-1\}$ $R = \{-2\}$

$g \circ f =$ undefined

(24) $f = \{(1,-1), (2,-2), (3,-3), (4,-4)\}$

$g = \{(1,-4), (2,-3), (3,-2), (4,-1)\}$

$f \circ g =$ undefined

$g \circ f =$ undefined

(26) $f = \{(12,-3), (9,-2), (8,-1), (6,3)\}$

$g = \{(-1,5), (-2,6), (-3,-1), (-4,8)\}$

$f \circ g = \{(-2,3), (-4,-1)\}$ $D = \{-4,-2\}$ $R = \{-1,3\}$

$g \circ f = \{(12,-1), (9,6), (8,5)\}$ $D = \{8,9,12\}$ $R = \{-1,5,6\}$

(27) $f(x) = 2x$

$g(x) = x+5$

$(f \circ g)(x) = 2(x+5)$

$= \boxed{2x+10}$

$(g \circ f)(x) = (2x)+5$

$= \boxed{2x+5}$

(28) $f(x) = -3x$

$g(x) = -x+8$

$(f \circ g)(x) = -3(-x+8)$

$= \boxed{3x-24}$

$(g \circ f)(x) = -(-3x)+8$

$= \boxed{3x+8}$

(29) $f(x) = x+5$

$g(x) = 3x-7$

$(f \circ g)(x) = 3x-7+5$

$= \boxed{3x-2}$

$(g \circ f)(x) = 3(x+5)-7$

$= 3x+15-7$

$= \boxed{3x+8}$

(30) $f(x) = x-4$

$g(x) = x^2-10$

$(f \circ g)(x) = x^2-10-4$

$= \boxed{x^2-14}$

$(g \circ f)(x) = (x-4)^2-10$

$= x^2-8x+16-10$

$= \boxed{x^2-8x+6}$

(31) $f(x) = x^2+6x-2$

$g(x) = x-6$

$(f \circ g)(x) = (x-6)^2+6(x-6)-2$

$= x^2-12x+36+6x-36-2$

$= \boxed{x^2-6x-2}$

$(g \circ f)(x) = x^2+6x-2-6$

$= \boxed{x^2+6x-8}$

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

$g(x) = 4x+3$

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

$= 2(16x^2+24x+9)-4x-3+1$

$= 32x^2+48x+18-4x-3+1$

$= \boxed{32x^2+44x+16}$

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

$= 8x^2-4x+4+3$

$= \boxed{8x^2-4x+7}$

(33) $f(x) = 4x - 1$

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

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

$= 4x^3 + 8 - 1$

$= \boxed{4x^3 + 7}$

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

$= (4x-1)(4x-1)(4x-1) + 2$

$= (16x^2 - 8x + 1)(4x-1) + 2$

$= 64x^3 - 16x^2 - 32x^2 + 8x + 4x - 1 + 2$

$= \boxed{64x^3 - 48x^2 + 12x + 1}$

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

$g(x) = x^2$

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

$= \boxed{x^4 + 3x^2 + 1}$

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

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

$= x^4 + 3x^3 + x^2 + 3x^3 + 9x^2 + 3x$

$+ x^2 + 3x + 1$

$= \boxed{x^4 + 6x^3 + 11x^2 + 6x + 1}$

(35) $f(x) = 2x^2$

$g(x) = 8x^2 + 3x$

$(f \circ g)(x) = 2(8x^2 + 3x)^2$

$= 2(8x^2 + 3x)(8x^2 + 3x)$

$= 2(64x^4 + 48x^3 + 9x^2)$

$= \boxed{128x^4 + 96x^3 + 18x^2}$

$(g \circ f)(x) = 8(2x^2)^2 + 3(2x^2)$

$= 8(4x^4) + 6x^2$

$= \boxed{32x^4 + 6x^2}$

(41) $f[g(-2)]$

$g(-2) = -2(-2) + 1$

$= 4 + 1 = 5$

$f(5) = 5(5) = \boxed{25}$

(42) $g[h(3)]$

$h(3) = (3)^2 + 6(3) + 8$

$= 9 + 18 + 8 = 35$

$g(35) = -2(35) + 1$

$= -70 + 1 = \boxed{-69}$

(43) $h[f(-5)]$

$f(-5) = 5(-5) = -25$

$h(-25) = (-25)^2 + 6(-25) + 8$

$= 625 - 150 + 8 = \boxed{483}$

(44) $h[g(2)]$

$g(2) = -2(2) + 1$

$= -4 + 1 = -3$

$h(-3) = (-3)^2 + 6(-3) + 8$

$= 9 - 18 + 8 = \boxed{-1}$

(45) $f[h(-3)]$

$h(-3) = (-3)^2 + 6(-3) + 8$

$= 9 - 18 + 8 = -1$

$f(-1) = 5(-1) = \boxed{-5}$

(60) Tobias. Chris didn't sub for the 2nd x