PC Sec 3-7 p. 197 (3-16, 23)

③ $f(x) = 2x^2 + 3x$ $\quad g(x) = x - 7$

$f(g(0)) = f(0-7) = f(-7) = 2(-7)^2 + 3(-7)$

$= 98 - 21 = \boxed{77}$

$g(f(0)) = g(2(0)^2 + 3(0)) = g(0) = 0 - 7 = \boxed{-7}$

$\boxed{77 \neq -7 \quad \therefore \quad f(g(0)) \neq g(f(0))}$

④ a) $f(g(6)) = g(f(6))$ FALSE

$f(g(6)) = 2(6-7)^2 + 3(6-7)$

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

$= 2 - 3 = -1$

$g(f(6)) = 2(6)^2 + 3(6) - 7$

$= 72 + 18 - 7$

$= 83$

$\boxed{-1 \neq 83}$

b) $f(g(3)) = g(f(3))$ TRUE

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

$= 2(-4)^2 + 3(-4)$

$= 32 - 12 = 20$

$g(f(3)) = 2x^2 + 3x - 7$

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

$= 18 + 9 - 7$

$= 20$

$\boxed{20 = 20}$

⑤ $M(t) = 2t - 1$ $\quad N(t) = \dfrac{3}{t+1}$

a) $(M \circ N)(t) = 2\left(\dfrac{3}{t+1}\right) - 1 = \boxed{\dfrac{6}{t+1} - 1}$

b) $t + 1 \neq 0$

$-1 \quad -1$

$t \neq -1$

$\boxed{D: \{t \mid t \neq -1\}}$

⑥ FALSE - order matters

⑦ $f(g(-5)) = (x - 2 + 1)^2$

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

$= (-6)^2 = \boxed{36}$

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

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

$= (-4)^2 - 2$

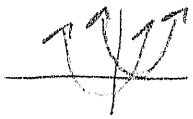
$= 16 - 2 = \boxed{14}$

SEC 3-7 Cont.

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

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

★ On calc, Diff. graph



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

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

$= 2(-27) - 1 = \boxed{-55}$

(10) a) $(f \circ g)(x) = f(g(x)) = 2(3x)^3 - 1 = 2(27x^3) - 1 = \boxed{54x^3 - 1}$

b) Domain of $g(x) = 3x$ D: $\{x \mid x \in \mathbb{R}^3\}$

$f(g(x)) = 54x^3 - 1$ $\boxed{D: \{x \mid x \in \mathbb{R}^3\}}$

c) $g(f(x)) = 3(2x^3 - 1) = 6x^3 - 3$

$6x^3 - 3 = 54x^3 - 1$

$-6x^3 + 1 \quad -6x^3 + 1$

$\frac{-2}{48} = \frac{48x^3}{48}$

$\sqrt[3]{x^3} = \sqrt[3]{\frac{-1}{24}}$

$\boxed{x = \sqrt[3]{\frac{-1}{24}} \approx -0.3467}$

(11) a) $T(x,y) \to (x+3, y+1)$

$S(x,y) \to \left(x, \frac{y}{4}\right)$

b) $T \circ S \to T(S(x,y)) \to \boxed{\left(x+3, \frac{y}{4}+1\right)}$

$S \circ T \to S(T(x,y)) \to \boxed{\left(x+3, \frac{y+1}{4}\right)}$

(12) a) $g(f(3)) = \boxed{2}$

b) $\sqrt{5}$

c) $g(f(x)) = \sqrt{x+1}$

d) $x + 1 \geq 0$ $\quad x \geq -1$ $\quad \boxed{\{x \mid x \geq -1\}}$

$-1 \quad -1$

(13) $S(S(x,y)) \quad (x,y) \to (-y,x) \to \boxed{(-x,-y)}$

(14) $T \circ T(x,y) = (x+12, 4y)$

$T(x,y) = (x+6, 2y)$

(15) D → 90% of price

R → $100 off

(16) a) $D(R(1200)) = 1200 - 100 = 1100$

$= .9(1100) = \boxed{\$990}$

b) $R(D(1200)) = 1200(.9) = 1080$

$= 1080 - 100 = \boxed{\$980}$

(23) $f(x) = (4x)^2 = \boxed{16x^2}$