Lesson 5 Practice

Part I: $f(x) = 2x - 1$ $g(x) = 3x$ $h(x) = x^2 + 1$

1. $f(x) + g(x)$

$2x - 1 + 3x$

$5x - 1$

2. $\dfrac{f(x)}{g(x)} = \dfrac{2x-1}{3x}$

3. $f(g(h(2)))$

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

$f(g(5))$

$g(5) = 3(5) = 15$

$f(15) = 2(15) - 1 = \boxed{29}$

4. $g(f(0))$

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

$g(-1) = 3(-1) = -3$

5. $(g \cdot f)(x)$

$g(x) \cdot f(x)$

$3x(2x - 1)$

$6x^2 - 3x$

6. $g(f(h(-2)))$

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

$g(f(5))$

$f(5) = 2(5) - 1 = 9$

$g(9) = 3(9)$

27

PART II: $f(x) = 9 - x$ $g(x) = x^2 + x$ $h(x) = x - 2$

7. $(g \circ f)(3)$

$g(f(3))$

$f(3) = 9 - 3 = 6$

$g(6) = 6^2 + 6 = 42$

8. $f(h(x))$

$f(x - 2) = 9 - (x - 2)$

$= 9 - x + 2$

$= -x + 11$

9. $(f(g(h(-8)))$

$h(-8) = -8 - 2 = -10$

$f(g(-10))$

$g(-10) = (-10)^2 + (-10) = 90$

$f(90) = 9 - 90 = -81$

10. $(h \circ g)(11)$

$h(g(11))$

$g(11) = 11^2 + 11 = 132$

$h(132) = 132 - 2 = 130$

11. $f(g(x))$

$f(x^2 + x)$

$9 - (x^2 + x)$

$9 - x^2 - x$

$-x^2 - x + 9$

12. $h(f(-6))$

$f(-6) = 9 - (-6) = 15$

$h(15) = 15 - 2 = 13$

PART III: $f(x) = 3x + 2$ $g(x) = -4x$ $h(x) = x^2 - 4$

13. $g(x) - f(x)$
$-4x - (3x + 2)$
$-4x - 3x - 2$
$-7x - 2$

14. $g(x) f(x)$
$-4x (3x + 2)$
$-12x - 8x$

15. $f(g(h(x)))$
$f(g(x^2 - 4))$
$g(x^2 - 4) = -4(x^2 - 4) = -4x^2 + 16$
$f(-4x^2 + 16) = 3(-4x^2 + 16) + 2$
$= -12x^2 + 50$

16. $(h \circ g)(0)$
$h(g(0))$
$g(0) = -4(0) = 0$
$h(0) = 0^2 - 4 = -4$

17. $f(11) - g(-5)$
$f(11) = 3(11) + 2 = 33 + 2 = 35$
$g(-5) = -4(-5) = 20$
$35 - 20 = 15$

18. $(h \circ g)(x)$
$h(g(x))$
$h(-4x)$
$(-4x)^2 - 4$
$16x^2 - 4$

PART IV:
Scenario 1:
40 hr/wk, $220/wk salary + 3% commission on > $5k

$220 \div 40 = 5.5/hr$

$f(x) = 200 + 0.03(x)$ $g(x) = x - 5000$

$f(g(x)) = 200 + 0.03(x - 5000)$

Scenario 2:
purchase x
sales tax 7.5%.
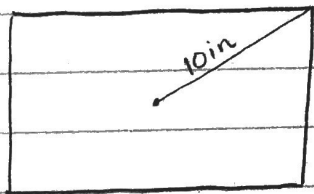fee: $20

$t(x) = x + 0.075(x)$
$f(x) = x + 20$

$f(t(x)) = x + 0.075(x) + 20$

Scenario 3:

10 inches / 4 seconds
2.5 inches / 1 second

$t \rightarrow$ time (in seconds) $r \rightarrow$ radius (in inches)
$d(s) = 2.5(t)$ $A = \pi r^2$
↳ distance to the corner is the radius
so
$A(r) = \pi r^2$

$A(d(t)) = \pi (2.5(t))^2$