Key

Math 4

Name_____

1-2 Practice

Date_____

In numbers 1-8, let $f(x)=3x^2$, $g(x)=2x-5$, $h(x)=x^2+2x-3$, $k(x)=3x+6$, $p(x)=\frac{1}{3}x-2$
Evaluate the following:

1. $g(k(-3))$

$= g(3(-3)+6)$

$= g(-3) = 2(-3)-5 = \boxed{-11}$

2. $h(f(5))$

$= h(3(5)^2)$

$= h(75) = 75^2+2(75)-3$

$= \boxed{5772}$

3. $g(k(f(1)))$

$= g(k(3(1)^2))$

$= g(k(3))$

$= g(3(3)+6)$

$= g(15) = 2(15)-5 = \boxed{25}$

4. $g(k(-x))$

$= g(3(-x)+6)$

$= g(-3x+6)$

$= 2(-3x+6)-5 = -6x+12-5$

$= \boxed{-6x+7}$

5. $(k \circ p)(t)$

$= k\left(\frac{1}{3}t-2\right)$

$= 3\left(\frac{1}{3}t-2\right)+6$

$= t-6+6$

$= \boxed{t}$

6. $(f \circ g)(s)$

$= f(2s-5)$

$= 3(2s-5)^2$ → $(2s-5)(2s-5)$

$= 4s^2-10s-10s+25$

$= 3(4s^2-20s+25)$

$= \boxed{12s^2-60s+75}$

7. $(p \circ k)(t)$

$= p(3t+6)$

$= \frac{1}{3}(3t+6)-2$

$= t+2-2 = \boxed{t}$

8. $(g \circ f)(s)$

$= g(3s^2)$

$= 2(3s^2)-5$

$= \boxed{6s^2-5}$

9. Based on your work from problems 1-8, which functions are inverses of each other? How do you know?

k + p are inverses since $k(p(x)) = p(k(x))$

10. Give rules for two functions so that their composition becomes the following:

Answers vary!

a. $g(h(x)) = 3x + 5$

$h(x) = 3x$

$g(x) = x + 5$

$g(h(x)) = g(3x) =$ ✓

b. $v(w(x)) = (x-9)^2$

$w(x) = x - 9$

$v(x) = x^2$

$v(w(x)) = v(x-9) =$ ✓

11. Consider the functions $f(x) = 4x + 3$ and $g(x) = \frac{8}{x+2}$. Evaluate the following combinations of those functions.

a. $[f+g](3) =$

$= f(3) + g(3)$

$= 4(3) + 3 + \frac{8}{3+2}$

$= 12 + 3 + \frac{8}{5} = \boxed{16\frac{3}{5}} = 16,6$

b. $[f-g](3) =$

$= 4(3) + 3 - \left(\frac{8}{3+2}\right)$

$= 15 - \frac{8}{5}$

$= \boxed{13\frac{2}{5} = 13.4}$

c. $[f \cdot g](3) =$

$= 4(3) + 3 \cdot \left(\frac{8}{3+2}\right)$

$= \frac{15}{1} \cdot \frac{8}{5}$

$= \boxed{24}$

d. $[f \div g](3) =$

$= \frac{f(3)}{g(3)}$

$= \frac{4(3)+3}{\frac{8}{3+2}}$

$= \frac{15}{\frac{8}{5}}$

$= \frac{15}{1} \cdot \frac{5}{8}$

$= \boxed{\frac{75}{8}} = 9.375$