Name:_____   Date:_____

Math 10/11 Enriched: Section 5a Function Notations and Composite Functions

1. Given each function, $f(x) = 2x+1$ and $g(x) = 3x+1$, determine each value:

a) $f(3)$	b) $g(4) \times f(3)$	c) $f(2) - g(5)$
d) $2f(3) + 4g(-1)$	e) $g(f(3)) =$	f) $f(g(3)) =$
g) $f(f(x))$	h) $g(g(x))$	i) $f(g(?)) = 21$
j) $f(f(?)) = 23$	k) $g(g(?)) = 40$	l) $f(f(f(x)))$

2. Given that $f(x) = 3x^2 - 1$, determine the the equation for $f(f(x))$

3. Given that $f(x) = \sqrt{x}$ and $g(x) = 4 + 2x$, which value is the largest?

    $f(f(16))$, $g(g(16))$, $f(g(16))$, or $g(f(16))$?

4. If $g(x) = 2x - 1$ and $g(g(x)) = Ax^2 + Bx + C$, where "A", "B", and "C" are integers, what is the value of $A + B + C$?

5. Evaluate the following: $n(p) = ap^3 - cp + 8$ and $n(-13) = 5$, determine the value of $n(13) =$

6. If $f(x) = \dfrac{\sqrt{x+2}}{x+2}$ and $g(x) = \dfrac{1}{x} - 2$, then $f\big[g(x)\big] =$

a) $\dfrac{\sqrt{\frac{1}{x}-2}}{\frac{1}{x}-2}$

b) $\sqrt{\dfrac{1-2x}{x}}$

c) $\dfrac{\sqrt{\frac{1}{x-2}+2}}{\frac{1}{x-2}+2}$

d) $\sqrt{x}$

e) $\dfrac{\sqrt{x}}{x}$

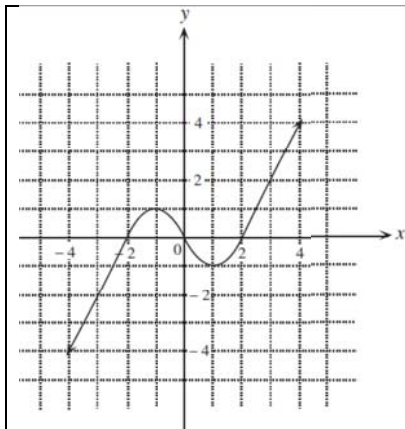7. If $g(x) = 1 - 3x$ and $f\big(g(x)\big) = 9x^2 - 6x + 5$, then $f(1) =$

a) -2 b) 0 c) 5 d) 8 e) 53

8. Given the graph of $y = g(x)$ below, find the value of each of the expressions:

a) $g(4) + g(-3)$	b) $g(0) + g(2)$
c) $g(-4) \times g(3)$	d) $g(-2) - g(1)$
e) $g\big(g(4)\big)$	f) $g\big(g(3)\big)$
g) $g\big(g\big(g(-1)\big)\big)$	f) $g\big(g\big(g(x)\big)\big) = 0 \quad x = ?$

9. If exactly two different linear functions, f and g, satisfy $f\big(f(x)\big) = g\big(g(x)\big) = 4x + 3$, what is the product of $f(1)\ and\ g(1)$?

10. For all real numbers x, the function f is periodic, with f(x+6) = f(x+10) = f(x). If f(22) =22, what is the value of f(44)?

11. Given that $f(x)$ and $g(x)$ are both linear functions where $g(f(3))=6$ and $g(f(4))=9$. If $f(g(0))=4$ then what is the value of $g(f(13))$?

12. Given that $g(x)$ is a quadratic function where $g(5)=96$, $g(2)=21$, and $g(-3)=56$. Find the equation $g(x)$.

13. Given that $f(x)$ is a quadratic function with $f(0)=6$ and $g(x)$ is a polynomial function that satisfies the following: $g(1)=6$, $g(2)=4$, and $g(3)=2$. What is the value of $f(g(4))$?

14. Given the functions: $f(x)=\sqrt{x+3}$ and $g(x)=2x+4$. What is the domain and range of $g(f(x))$?

15. The function $p(n)$ outputs the number of distinct prime factors "n" has, while the function $d(n)$ outputs the number of digits "n" has. For example, $p(16)=1$ and $d(16)=2$. For how many positive integers of $n\le 50$ does $p(n)=d(n)$?