

Name: _____

Date: _____

Math 10 Enriched: Section 0.1 Introduction to Function Notations

1. Given the functions, $f(x) = 3x^2 - 2x$ and $g(x) = -\frac{3x}{2} + 3$, find the indicated values:

i) $f(3) \times g(4)$

ii) $2f(-2) - 3g(2)$

iii) $4f(2) \times g(-3)$

2. Given the functions, $f(x) = \sqrt{x} + 3$ and $g(x) = 2x^2 - 1$, find the indicated values:

i) $f(g(x))$

ii) $g(f(x))$

iii) $g(f(g(x)))$

iv) $f(g(3))$

v) $g(f(18))$

vi) $g(f(g(5)))$

vii) $f(f(x))$

viii) $g(g(f(25)))$

ix) $f(g(f(50)))$

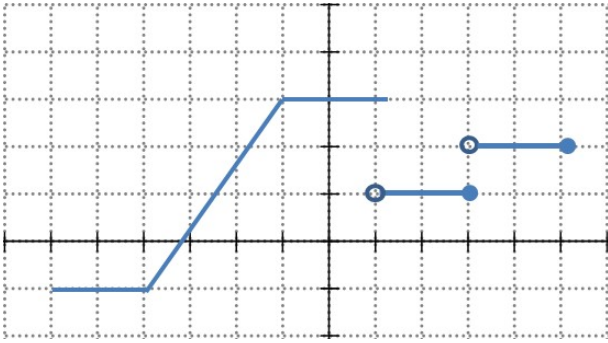
3. If $f(x) = x^2 + 3x - 10$, find the value of "x" that will make the expression true:

i) $f(x) = 0$

v) $f(x) = 8$

vi) $f(x) = -6$

4. Given the graph of $f(x)$, find the indicated values:



i) $f(2) =$

ii) $f(1) =$

iii) $f(4) =$

v) $f(?) = 3$

vi) $f(-4) \times f(3)$

5. If $f(x) = x^2 - x + 2$, $g(x) = ax + b$, and $f(g(x)) = 9x^2 - 3x + 2$, determine all possible ordered pairs (a,b) which satisfy this relationship.

6. If $f(x) = 2x - 1$, determine all real values of "x" such that $(f(x))^2 - 3f(x) + 2 = 0$

7. A function $f(x)$ has the following three properties:

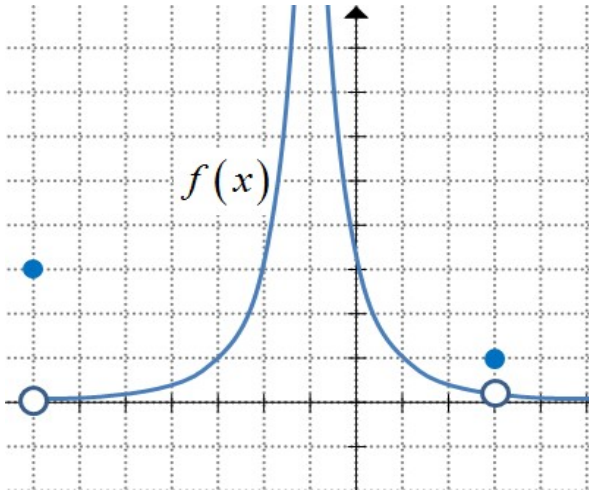
i) $f(1) = 1$, ii) $f(2x) = 4f(x) + 6$, iii) $f(x+2) = f(x) + 12x + 12$

Calculate the value of $f(6)$.

8. Give an example of a function $g(x)$ such that the identity below is true for all values of "x" and "y"

$$g(x+y) = g(x) + g(y)$$

9. Given the graph of $f(x)$, find the value of the following values:



i) $f(f(3)) =$

ii) $f(f(0)) =$

iii) $f(-1)$

v) $f(-7) \times f(0)$

vi) $f(f(x)) = x \quad x = ?$

vii) $f(f(f(-2)))$

10. Let $f(x) = 2^{kx} + 9$, where "k" is a real number. If $f(3) : f(6) = 1 : 3$, determine the value of $f(9) - f(3)$.

11. The function $f(x)$ has the property that $f(2x+3) = 2f(x)+3$ for all values of "x". If $f(0) = 6$, what is the value of $f(9)$?

12. Given the piece-wise function, what is the value of $f(f(f(3)))$?

$$f(n) = \begin{cases} n^2 & \text{if } n \text{ is even} \\ n+1 & \text{if } n \text{ is odd} \end{cases}$$

13. The function "f" is defined for integer values only and satisfies the following:

$$f(n) = \begin{cases} n+2 & \text{if } n < 10 \\ f(n-2) & \text{if } n \geq 10 \end{cases}$$

14. Let $\phi(x)$ denote the sum of the digits of the positive integer "x". For example, $\phi(8) = 8$ and $\phi(123) = 1 + 2 + 3$. For how many two digit value of "x" is $\phi(\phi(x)) = 3$?
- a) 3 b) 4 c) 6 d) 9 e) 10

15. For any three real numbers "a", "b", and "c", with $b \neq c$, the operation ϖ is defined by:

$$\varpi(a, b, c) = \frac{a}{b - c}. \text{ What is the value of } \varpi(\varpi(1, 2, 3), \varpi(2, 3, 1), \varpi(3, 1, 2))?$$

16. COMC: Let $f(x) = x^2$ and $g(x) = 3x - 8$,

a. Determine all values of "x" such that $f(g(x)) = g(f(x))$

b. Let $h(x) = 3x - r$, determine all values of "r" such that $f(h(2)) = h(f(2))$

17. Challenge: Let $f(t) = \frac{7^t}{7^t + \sqrt{7}}$. Find the value of the following:

$$f\left(\frac{1}{2014}\right) + f\left(\frac{2}{2014}\right) + f\left(\frac{3}{2014}\right) + \dots + f\left(\frac{2013}{2014}\right)$$