

Name: _____

Date: _____

SOLUTIONS HW Pre Calculus 12: Section 1.1 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) $4f(2) \times g(-3)$

$f(3) = 3(9) - 6 = 21$

$f(-2) = 3(4) + 4 = 16$

$f(2) = 3(4) - 4 = 8$

$g(4) = -6 + 3 = -3$

$g(2) = 0$

$g(-3) = -1.5(-3) + 3 = 7.5$

$f(3) \times g(4) = -63$

$2f(-2) - 3g(2) = 32$

$4f(2) \times g(-3) = 4 \times 8 \times (7.5) = 240$

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

i) $f(x) + 2g(x)$

ii) $4g(x+1)$

iii) $f(x^2) - 3g(x+1)$

$= \sqrt{x} + 3 + 2(2x^2 - 1)$

$= 4x^2 + \sqrt{x} + 1$

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

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

$= 2x^2 + 4x + 2 - 1$

$= 2x^2 + 4x + 1$

$4g(x+1) = 8x^2 + 16x + 4$

$f(x^2) = \sqrt{x^2} + 3$

$= |x| + 3$

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

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

$= 2x^2 + 4x + 1$

$f(x^2) - 3g(x+1) = |x| + 3 - 3(2x^2 + 4x + 1)$

$= |x| - 6x^2 - 12x$

iv) $f \circ g(x) = f(g(x)) =$

$f(g(x)) = \sqrt{g(x)} + 3$

$= \sqrt{2x^2 - 1} + 3$

v) $g \circ f(x) = g(f(x)) =$

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

$= 2(\sqrt{x} + 3)^2 - 1$

3. Given the functions, $f(x) = \frac{x^2 - 2x + 4}{x - 5}$, find the indicated values:

i) $f(4)$

ii) $f(5)$

iii) $f(2x-1)$

$$f(4) = \frac{16 - 8 + 4}{-1} = -12$$

$$f(5) = \frac{\dots}{0} = \text{undefined}$$

$$f(2x-1) = \frac{(2x-1)^2 - 2x + 4}{(2x-1) - 5}$$

$$= \frac{4x^2 - 4x + 1 - 2x + 4}{2x - 6}$$

$$= \frac{4x^2 - 6x + 5}{2x - 6}$$

4. 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) $f(x) = -6$

$$x^2 + 3x - 10 = 8$$

$$x^2 + 3x - 10 = -6$$

$$f(x) = (x+5)(x-2) = 0$$

$$x^2 + 3x - 18 = 0$$

$$x^2 + 3x - 4 = 0$$

$$(x+6)(x-3) = 0$$

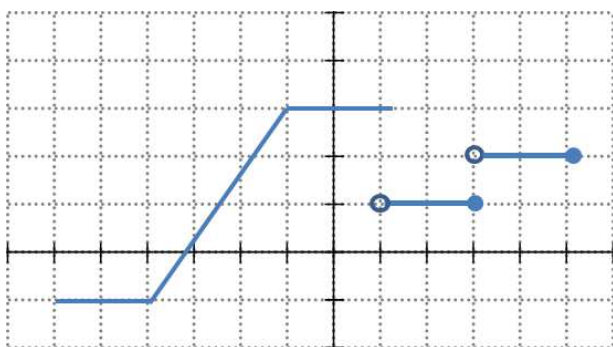
$$(x+4)(x-1) = 0$$

$$x = -6 \text{ or } x = 3$$

$$x = -4 \text{ or } x = 1$$

$$x = -5 \text{ or } x = 2$$

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



i) $f(2) = 1$

ii) $f(1) = 3$

iii) $f(4) = 2$

v) $f(?) = 3$
 $-1 \leq ? \leq 1$

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

$$f(-4) = -1$$

$$f(3) = 1$$

$$f(-4) \times f(3) = -1$$

6. If $f(x) = \frac{x^2 - x + 2}{4x^2 - 9}$, for what values of "x" will the function $f(x)$ be undefined? Show all your work and steps.

To find the value(s) of "x" such that the function is undefined, find your NPV's!!! Look into the denominator!!

$$4x^2 - 9 = 0$$

$$(2x + 3)(2x - 3) = 0$$

$$x = \frac{3}{2} \text{ or } \frac{-3}{2}$$

7. If $f(x) = 2x^4 - 3x^3 + \sqrt{8}x^2 + 10x - 9$, determine the value of

$$i) f(-2)$$

$$ii) f(2)$$

$$iii) f(-3) + f(3)$$

$$f(-2) = 2(-2)^4 - 3(-2)^3 + \sqrt{8}(-2)^2 + 10(-2) - 9 \quad f(2) = 2(16) - 3(8) + \sqrt{8}(4) + 20 - 9$$

$$= 32 + 24 + 8\sqrt{2} - 20 - 9$$

$$= 32 - 24 + 8\sqrt{2} + 20 - 9$$

$$= 27 + 8\sqrt{2}$$

$$= 8\sqrt{2} + 19$$

$$f(-3) = 2(-3)^4 - 3(-3)^3 + \sqrt{8}(-3)^2 + 10(-3) - 9$$

$$f(3) = 2(3)^4 - 3(3)^3 + \sqrt{8}(3)^2 + 10(3) - 9$$

$$f(-3) + f(3) = 2(-3)^4 + 2(3)^4 + \sqrt{8}(-3)^2 + \sqrt{8}(3)^2 - 18$$

$$= 324 + 36\sqrt{2} - 18$$

$$= 306 + 36\sqrt{2}$$

$$iv) f(f(x)) = ?$$

$$vi) g(g(x)) = ?$$

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

OMIT These three..... I'll fix them later

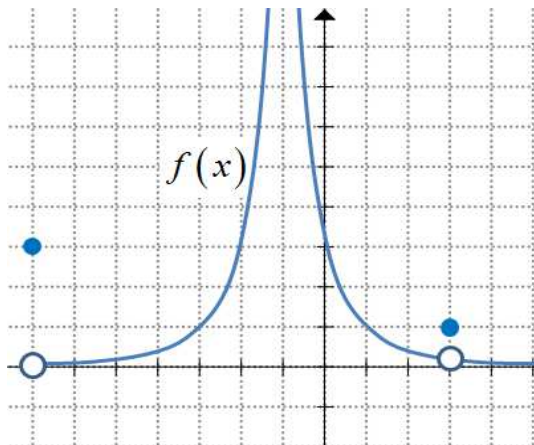
8. Let $f(x) = 6x^2 - 11x + 4$ and $g(x) = 2x + 1$, find the following:

$$i) f(g(x))$$

$$ii) g(f(x))$$

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

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



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

$$f(3) = 1$$

$$f(f(3)) = f(1) = 1$$

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

$$f(0) = 3$$

$$f(f(0)) = f(3) = 1$$

$$iii) f(-1)$$

$f(-1)$ is undefined

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

$$f(-7) = 3 \quad f(0) = 3$$

$$f(-7) \times f(0) = 9$$

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

$$vi) f(f(f(-2)))$$

For question vi) remember that $f(x)$ is equal to "y". If you replace that in to the equation, you get $f(y)=x$. Look for any point on the graph where the "x" and "y" coordinates are the same. So (1,1) is the only point. Therefore $x = 1$.

$$f(-2) = 3$$

$$vi) f(3) = 1$$

$$f(1) = 1$$

10. 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 $f(9)$?

We should go over these in class..

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

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

12. The function " f " is defined for integer values only and satisfies the following, what is the value of $f(20)$?

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