Function Notation

Equations can be written in a form called function notation.
We use this as a quick way to evaluate functions for a given input.

Example: $\boxed{y = 2x - 8}$ ➡ $\boxed{f(x) = 2x - 8}$

This is read as "f of x"

Evaluating Functions

To evaluate a function for a specific value, substitute the value in for X.

1 $f(x) = x + 7$

a. $f(5) = 5 + 7 = 12$ (5, 12)

When $x = 5$ $y = ?$

b. $f(-1) = -1 + 7 = 6$ (−1, 6)

c. $f(-3) = -3 + 7 = 4$ (−3, 4)

2 $g(x) = 3x - 8$

a. $g(1) = 3(1) - 8 = -5$

b. $g(-3) = 3(-3) - 8 = -17$
$-9 - 8$

c. $g(0) = 3(0) - 8 = -8$

3 $h(x) = \frac{2}{3}x - 1$

a. $h(-3) = \frac{2}{\cancel{3}}(-\cancel{3}) - 1 = -3$

b. $h(0) = \frac{2}{3}(0) - 1 = -1$

c. $h(9) = \frac{2}{\cancel{3}}(\overset{3}{\cancel{9}}) - 1 = 5$

4 $f(x) = x^2 - x$

a. $f(-4) = (-4)^2 - (-4) = 20$
$16 + 4$

b. $f(-1) = (-1)^2 - (-1) = 2$
$1 + 1$

c. $f(7) =$

7 $g(x) = -\frac{1}{2}x + 9$

a. $g(-8) = -\frac{1}{\cancel{2}_1}(-\overset{4}{\cancel{8}}) + 9 = 13$

b. $g(-2) = -\frac{1}{\cancel{2}}(-\cancel{2}) + 9 = 10$

c. $g(0) = -\frac{1}{2}(0) + 9 = 9$

8 $h(x) = 2 - 4x$

a. $h(-5) = 2 - 4(-5) = 22$

b. $h(-2) = 2 - 4(-2) = 10$

c. $h(4) = 2 - 4(4) = -14$

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Combining Functions Practice

Examples:

1. Given the functions $g(x) = 2x - 1$ and $h(x) = 3x - 4$

   Find $g(x) - h(x)$

   $2x - 1 - (3x - 4)$

   $2x - 1 - 3x + 4$

   $\boxed{-x + 3}$

2. Given the functions $f(x) = 2t - 4$ and $g(x) = x^2 - 3$

   Find $2f(x) + 3g(x)$

3. Given the functions $f(x) = 6x^2 - x + 3$ and $g(x) = x^2 + 3x$

   Find $2f(x) - 5g(x)$

   $2(6x^2 - x + 3) - 5(x^2 + 3x)$

   $12x^2 - 2x + 6 - 5x^2 - 15x$

   $\boxed{7x^2 - 17x + 6}$

ıctice:

ɜn the functions $f(x) = 4x + 8$ and $g(x) = 2x - 12$

4. Find $2f(x) + 3g(x)$

   $2(4x + 8) + 3(2x - 12)$

   $8x + 16 + 6x - 36$

   $\boxed{14x - 20}$

5. Find $g(x) - f(x)$

   $2x - 12 - (4x + 8)$

   $2x - 12 - 4x - 8$

   $\boxed{-2x - 20}$

Given the functions $f(x) = 4x^2 - 2x + 5$ and $g(x) = x^2 + 7x - 8$

6. Find $f(x) + g(x)$

7. Find $g(x) - f(x)$

8. Find $5f(x) + g(x)$

9. Find $g(x) - 4f(x)$

10. Find $f(-2) - g(3)$

11. Find $g(-2) - f(3)$

Given the functions $f(x) = 5x^2 - 9x + 2$ and $g(x) = x^2 + 3x - 8$ and $h(x) = -2x^2$

12. Find $4f(x) + 6g(x)$

$4(5x^2 - 9x + 2) + 6(x^2 + 3x - 8)$

$20x^2 - 36x + 8 + 6x^2 + 18x - 48$

$26x^2 - 18x - 40$

13. Find $h(x) - f(x)$

$-2x^2 - (5x^2 - 9x + 2)$

$-2x^2 - 5x^2 + 9x - 2$

$-7x^2 + 9x - 2$

14. Find $-2f(x) + 2g(x)$

$-2(5x^2 - 9x + 2) + 2(x^2 + 3x - 8)$

$-10x^2 + 18x - 4 + 2x^2 + 6x - 16$

$-8x^2 + 24x - 20$

15. Find $h(3) + g(-4)$ $= -18 - 4 = -22$

$h(x) = -2x^2$ $\quad g(x) = x^2 + 3x - 8$

$h(3) = -2(3)^2$ $\quad g(-4) = (-4)^2 + 3(-4) - 8$

$= -18$ $\quad = -4$

Given the functions: $f(x) = 3x^2 - 7x - 1$ and $g(x) = -x^2 + 4x - 10$ and $h(x) = 6x^2$

16. Find $3f(x) + 6h(x)$

17. Find $g(x) - h(x)$

$-x^2 + 4x - 10 - (6x^2)$

$-x^2 + 4x - 10 - 6x^2$

$-7x^2 + 4x - 10$

18. Find $h(x) \bullet g(x)$

19. Find $5f(x) + 7g(x)$

20. Find $-6g(x) - h(x)$

21. Find $h(2) - f(-1)$

22. Find $3f(x) \bullet h(x)$

23. Find $f(-2) + g(5)$

$f(x) = 3x^2 - 7x - 1$

$f(-2) = 3(-2)^2 - 7(-2) - 1$

$= 25$

$g(x) = -x^2 + 4x - 10$

$g(5) = -(5)^2 + 4(5) - 10$

$= -15$

$25 + -15 = 10$

24. Find $f(-7) \bullet g(6)$