Function Notation

Functions can be expressed as equations.
For example:

$y=3|x-2|+7$ $\quad y=-\frac{1}{2}\sqrt{x+3}-4$ $\quad y=\frac{1}{x-4}+5$

$y=2x^2-4$ $\quad y=3x^3-5$

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We can use function notation to express these exact same functions:

$f(x)=3|x-2|+7$ $\quad f(x)=-\frac{1}{2}\sqrt{x+3}-4$ $\quad f(x)=\frac{1}{x-4}+5$

$f(x)=2x^2-4$ $\quad f(x)=3x^3-5$

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Function notation is very handy for finding ordered pairs.

Example: $y=3x^2-2$ is the equation.....

Find the value of y if the value of x is -5

$y=3(-5)^2-2$
$=3(25)-2$
$=75-2$
$=73$

$\therefore (-5,73)$ is a point on the parabola

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If we use function notation for the equation

$f(x)=3x^2-2$ is the equation.....

Find f(-5)

$f(-5)=3(-5)^2-2$
$=3(25)-2$
$=75-2$
$=73$

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Given:

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

Example 1

(a) f(-3)
(b) h(-7)
(c) g($\frac{1}{2}$)

$g(\frac{1}{2})=\frac{1}{\frac{1}{2}+2}$
$=\frac{1}{\frac{5}{2}}=\frac{2}{5}$

$\therefore (\frac{1}{2},\frac{2}{5})$ is on the curve

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Given:

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

Example 2

(a) f(2x)
(b) h(-x+5)
(c) g(h(x))

(a) $f(2x)=2(2x)^2-4$
$=2(4x^2)-4$
$=8x^2-4$

b) $h(-x+5)$
$=-(-x+5)-1$
$=x-5-1$
$=x-6$

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c) $g(h(x)) = g(-x-1)$

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

$= \frac{1}{-x+1}$

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Given:

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

$h(x) = -x - 1$

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

Example 3

(a) f(x-3)

(b) h(f(x))

(c) g(f(-5))

(a) $f(x-3)$

$= 2(x-3)^2 - 4$

$= 2(x^2 - 6x + 9) - 4$

$= 2x^2 - 12x + 18 - 4$

$= 2x^2 - 12x + 14$

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b) $h(f(x))$

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

$= -(2x^2 - 4) - 1$

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

$= -2x^2 + 3$

c) $g(f(-5))$

$f(-5) = 2(-5)^2 - 4$

$= 2(25) - 4$

$= 50 - 4$

$= 46$

$g(46) = \frac{1}{46+2}$

$= \frac{1}{48}$

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