Algebra RH

Essential Question: How do we evaluate composite functions?

Do Now:
Write in function notation.

a) $y = 2x + 5$

$f(x) = 2x + 5$

b) $C = 12n + 100$

$C(n) = 12n + 100$

Evaluate each function.

c) $g(n) = 4n - 5$; Find $g(6)$

$g(6) = 4(6) - 5$
$= 19$

d) $g(n) = n^2 + 4n$; Find $g(2)$

$g(2) = (2)^2 + 4(2)$
$= 4 + 8$
$= 12$

Evaluate each function.

1) $k(a) = 4a + 2$; Find $k(a - 3)$

$k(a-3) = 4(a-3) + 2$
$= 4a - 12 + 2$
$= 4a - 10$

2) $h(t) = -2t + 2$; Find $h(-3t)$

$h(-3t) = -2t + 2$
$= -2(-3t) + 2$
$= 6t + 2$

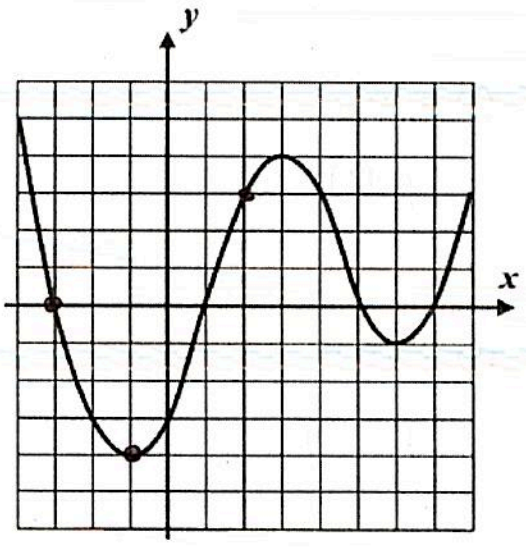
3) $h(n) = 3n + 5$; Find $h(-4n)$

$h(-4n) = 3(-4n) + 5$
$= -12n + 5$
$=$

4) $h(x) = x^2 + 1$; Find $h(\frac{x}{4})$

$h(\frac{x}{4}) = (\frac{x}{4})^2 + 1$
$= \frac{x^2}{16} + 1$

The function pictured to the right is represented by $g(x)$.



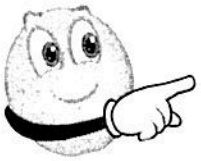
$g(2) =$ 3

$g(-3) =$ 0

What is the value of x when $g(x) = -4$? $x = -1$

For what values of x is $g(x) = 0$?

$x = -3, 1, 5, 7$



Composition of Functions

The term "composition of functions" or "composite function" refers to the combining of functions in a manner where the output from one function becomes the input for the next function (apply one rule, get a result, and then apply the second rule to what you obtained from the first rule).

The notation used for composition is:

$(f \circ g)(x) = f(g(x))$ **and is read** *"f composed with g of x"* **or** *"f of g of x"*

(1) Given:

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

Find:

a) $f(g(3))$

$g(3) = (3)^2 = 9$ → $f(9) = 2(9) - 4 = 14$

b) $f(g(-2))$

$g(-2) = (-2)^2 = 4$ → $f(4) = 2(4) - 4 = 4$

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

$f(-5) = 2(-5) - 4 = -14$ → $g(-14) = (-14)^2 = 196$

d) $(g \circ f)(7)$

$f(7) = 2(7) - 4 = 10$ → $g(10) = (10)^2 = 100$

(2) If $f(x) = -9x - 9$ and $g(x) = \sqrt{x-9}$, find $(f \circ g)(10)$

$g(10) = \sqrt{10-9} = \sqrt{1} = 1$ → $f(1) = -9(1) - 9 = -18$

(3) If $f(x) = -4x + 2$ and $g(x) = \sqrt{x-8}$, find $(f \circ g)(12)$

$g(12) = \sqrt{12-8} = \sqrt{4} = 2$ → $f(2) = -4(2) + 2 = -6$

(4) If $f(x) = -3x + 4$ and $g(x) = x^2$, find $(g \circ f)(-2)$

$f(-2) = -3(-2) + 4 = 10$ → $g(10) = (10)^2 = 100$