Given these functions: $g(x) = 3x - 2$ $h(x) = 2x + 1$

Find h(g(h(5))).

1ST $h(5) = 2(5)+1 = 11$

$h(g(h(5)))$ is now $h(g(11))$

2nd $g(11) = 3(11)-2 = 31$

$h(g(11))$ is now $h(31)$

3rd $h(31) = 2(31)+1 = 63$

$h(g(h(5))) = 63$

Another way to write a composite is:

$$f(g(x)) \rightarrow \boxed{(f \circ g)(x)}$$

Use these two functions:
f(x) = x + 5 g(x) = 3x - 2

1. Find g(f(-1))

1ST: $f(-1) = -1 + 5 = 4$

$g(f(-1))$ is now $g(4)$

2nd: $g(4) = 3(4)-2 = 10$

$g(f(-1)) = 10$

Given these functions: $g(x) = 3x - 2$ $h(x) = 2x + 1$

Find g(h(g(x))).

1ST $h(g(x)) = 2(3x-2)+1 = 6x-4+1 = 6x-3$

$g(h(g(x)))$ is now $g(6x-3)$

$g(6x-3) = 3(6x-3)-2$

$= 18x-9-2 = 18x-11$

$g(h(g(x))) = 18x-11$

Use these two functions:
f(x) = x + 5 g(x) = 3x - 2

2. Find $(g \circ f)(5) \Rightarrow g(f(5))$

1ST $f(5) = (5)+5 = 10$

$(g \circ f)(5) = g(f(5))$ which is now $g(10)$

2nd $g(10) = 3(10)-2 = 30-2 = 28$

$(g \circ f)(5) = 28$

Use these two functions:
$f(x) = x + 4$ $g(x) = 3x^2 - 2x + 5$

1. Find f(g(x))

$(3x^2-2x+5) + 4$

$= \boxed{3x^2-2x+9}$

Use these two functions:
$f(x) = x + 4$ $g(x) = 3x^2 - 2x + 5$

2. Find $(g \circ f)(x) = g(f(x))$

$= 3(x+4)^2 - 2(x+4) + 5$

$= 3(x^2+8x+16) - 2(x+4) + 5$

$= 3x^2 + 24x + 48 - 2x - 8 + 5$

$\boxed{3x^2 + 22x + 45}$

$(x+4)^2 = (x+4)(x+4)$

	x	$+4$
x	x^2	$+4x$
$+4$	$+4x$	$+16$

$= x^2 + 8x + 16$

Use these two functions: $f(x) = 2x + 1$ $g(x) = \frac{5x}{6x-8}$

1. Find f(g(x)). Simplify.

$= 2\left(\frac{5x}{6x-8}\right) + 1$

$= \frac{10x}{6x-8} + 1$ $= \frac{5x}{3x-4} + 1$

$= \frac{5x}{3x-4} + \frac{3x-4}{3x-4}$

$= \boxed{\frac{8x-4}{3x-4}}$

Use these two functions: $f(x) = 2x + 1$ $g(x) = \frac{5x}{6x-8}$

2. Find g(f(x)). Simplify.

$\frac{5(2x+1)}{6(2x+1)-8} = \frac{10x+5}{12x+6-8}$

$= \boxed{\frac{10x+5}{12x-2}}$