

58. $A(x) = 1.05x$. $(A \circ A)(x) = A(A(x)) = A(1.05x) = 1.05(1.05x) = (1.05)^2x$.
 $(A \circ A \circ A)(x) = A(A \circ A(x)) = A((1.05)^2x) = 1.05[(1.05)^2x] = (1.05)^3x$.
 $(A \circ A \circ A \circ A)(x) = A(A \circ A \circ A(x)) = A((1.05)^3x) = 1.05[(1.05)^3x] = (1.05)^4x$. A represents the amount in the account after 1 year; $A \circ A$ represents the amount in the account after 2 years; $A \circ A \circ A$ represents the amount in the account after 3 years; and $A \circ A \circ A \circ A$ represents the amount in the account after 4 years. We can see that if we compose n copies of A , we get $(1.05)^n x$.

60. $g(x) = 2x + 1$ and $h(x) = 4x^2 + 4x + 7$

Notice that $(2x + 1)^2 = 4x^2 + 4x + 1$. We see that adding 6 to this quantity gives $(2x + 1)^2 + 6 = 4x^2 + 4x + 1 + 6 = 4x^2 + 4x + 7$, which is $h(x)$. So let $f(x) = x^2 + 6$, and we have $(f \circ g)(x) = (2x + 1)^2 + 6 = h(x)$.

$$\underline{f(x) = 3x + 5 \text{ and } h(x) = 3x^2 + 3x + 2}$$

We wish to find g so that

$$(f \circ g)(x) = h(x). \text{ Thus } f(g(x)) = 3x^2 + 3x + 2 \quad \Leftrightarrow \quad 3(g(x)) + 5 = 3x^2 + 3x + 2 \quad \Leftrightarrow$$
$$3(g(x)) = 3x^2 + 3x - 3 \quad \Leftrightarrow \quad g(x) = x^2 + x - 1.$$