Composition and Decomposition of Functions

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1. $f(x) = x^2 - 3x + 5$ and $g(x) = 2x - 7$ A. Find $(f \circ g)(x)$. B. Find $(g \circ g)(-4)$.	2. The number N of bacteria in a refrigerated food is given by $N(T) = 20T^2 - 80T + 500, 2 \le T \le 14$ Where T is the temperature of the food in degrees C. When the food is removed from refrigeration, the temperature of the food is given by $T(t) = 4t + 2, 0 \le t \le 3$ Where t is the time in hours. (A) Find the composition of $(N \circ T)(t)$ and interpret its meaning in this context. (B) Find the bacteria count after 1.5 hours. (C) Find the time when the bacteria count reaches 2000.

3.
A. Use the graphs of f and (f + g) to make a table showing the values of g(x) when x = 1, 2, 3, 4, 5 and 6. Explain your reasoning.

B. Use the graphs of f and (f – h) to make a table showing the values of h(x) when x = 1, 2, 3, 4, 5 and 6. Explain your reasoning.
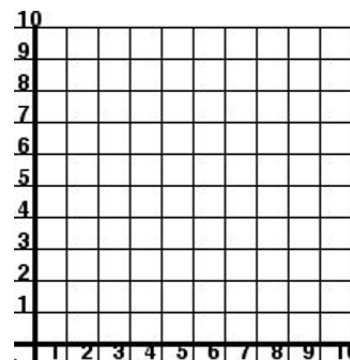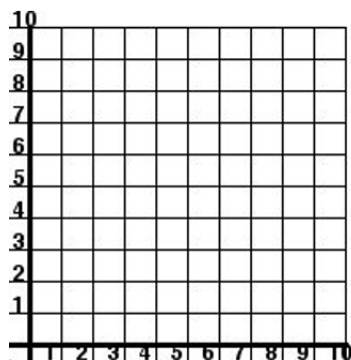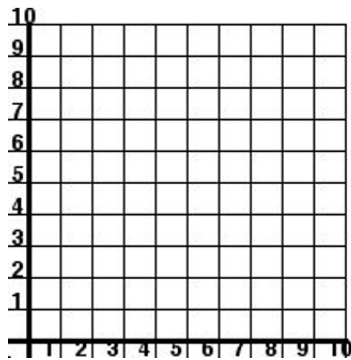
4. Find two functions f and g such that $(f \circ g)(x) = h(x)$. $$h(x) = (2x + 1)^2$$	5. Find two functions f and g such that $(f \circ g)(x) = h(x)$. $$h(x) = (1 - x)^3$$
6. Find two functions f and g such that $(f \circ g)(x) = h(x)$. $$h(x) = \frac{1}{x + 2}$$	7. Find two functions f and g such that $(f \circ g)(x) = h(x)$. $$h(x) = \frac{4}{(5x + 2)^2}$$
8. Find two functions f and g such that $(f \circ g)(x) = h(x)$. $$h(x) = 9x^2 + 6x + 3$$	9. Find two functions f and g such that $(f \circ g)(x) = h(x)$. $$h(x) = \frac{27x^3 + 6x}{10 - 27x^3}$$