New Functions from Old Functions

For all of the following problems,

$$f(x) = x^3\,, \quad g(x) = x + 3\,.$$

1. Complete the following table. On the last line, where I put x in the x column, determine a formula the three functions.

x	$f(x)$	$f(x+2)$	f(x) + 2
-3			
-2			
-1			
0			
1			
2			
3			
x			

2. On the same set of axes, make qualitatively accurate sketches of the three functions.

3. Complete the following table.

x	$f(x)$	$2f(x)$	f(2x)
-3			
-2			
-1			
0			
1			
2			
3			
x			

4. On the same set of axes, make qualitatively accurate sketches of the three functions.

5. Complete the following table.

x	$f(x)$	$f(g(x))$	g(f(x))	f(x)g(x)
-3				
-2				
-1				
0				
1				
2				
3				
x				

6. On the same set of axes, make qualitatively accurate sketches of the three functions.

Determine functions $f(x)$ and $g(x)$ such that $h(x) = f(g(x))$. Do not choose $f(x) = x$ and $g(x) = x$.

1. $4x + 1$
2. $\frac{x^2-1}{4}$
3. x^8
4. $(x/9 - x^3)^4$