Assume that f and g are odd functions defined for all real numbers.

1. What does it mean for a function $f(x)$ to be odd?
2. Give an example of an odd function, and use the definition to show that it is odd.
3. Define a new function $h(x) = f(x)g(x)$. Use the definition to show that h is an even function.
4. Define another function $k(x) = f(g(x)) = (f \circ g)(x)$. Use the definition of an odd function to show that k is odd.

Note: For this problem, you should not put any examples in for f and g when you are trying to show that h is even and k is odd. You need to leave f and g as general (unknown) functions and use the fact that they are even/odd to get the result you want.