Solution: Quiz 4

1. Prove the following statement:

   "*For all integers m, if m is even then $7m + 3$ is odd.*"

   Solution:

   We can use the **direct proof** to show that this statement is true.

   Suppose m is even. That is, $m = 2a$ for some integer a. We want to show that $7m + 3$ is odd. In particular, by substitution,

   $$7m + 3 = 7(2a) + 3 = 14a + 3 = 14a + 2 + 1 = 2(7a + 1) + 1 = 2b + 1$$

   where $b = 7a + 1$ is an integer (because $a \in \mathbb{Z}$).

   Therefore, $7m + 3 = 2b + 1$ is odd. ■