1. Consider the function $f(x) = 4x$ for $x$ near $a = 3$.

   (a) Find all inputs $x$ near $a = 3$ such that the outputs $f(x)$ are within 1 of 12. That is, $f(x)$ must be between 11 and 13.

   (b) Find all inputs $x$ near $a = 3$ such that the outputs $f(x)$ are within 0.5 of 12.

   (c) Find all inputs $x$ near $a = 3$ such that the outputs $f(x)$ are within 0.2 of 12.

   (d) Find all inputs $x$ near $a = 3$ such that the outputs $f(x)$ are within $\epsilon$ of 12.

   Note 1: The symbol $\epsilon$ is a lower case Greek letter called “epsilon.”

   Note 2: In this part, the tolerance is a variable. You should expect your result to depend on $\epsilon$.

2. Consider the function $f(x) = x^2$ for $x$ near $a = 3$.

   (a) Find all inputs $x$ near $a = 3$ such that the outputs $f(x)$ are within 1 of 9. That is, $f(x)$ must be between 8 and 10.

   (b) Find all inputs $x$ near $a = 3$ such that the outputs $f(x)$ are within 0.5 of 9.

   (c) Find all inputs $x$ near $a = 3$ such that the outputs $f(x)$ are within 0.2 of 9.

   (d) Find all inputs $x$ near $a = 3$ such that the outputs $f(x)$ are within $\epsilon$ of 9.