MA111 - Homework Sec. 2.3

You may work together but do not copy other peoples' work and present it as your own.

Use the graphs to find a $\delta > 0$ such that for all $x$

$$0 < |x - c| < \delta \Rightarrow |f(x) - L| < \epsilon$$

1. \[
\begin{align*}
\text{Graph 1:} & \quad f(x) = 2x - 5, \\
& \quad c = 7, \\
& \quad L = 9, \\
& \quad \epsilon = -0.2
\end{align*}
\]

2. \[
\begin{align*}
\text{Graph 2:} & \quad f(x) = \sqrt{x}, \\
& \quad c = 4, \\
& \quad L = 2, \\
& \quad \epsilon = 1/4
\end{align*}
\]

3. Let $f(x) = \sqrt{20 - x}$, $L = 3$, $c = 11$, $\epsilon = 1$.
   a. Find an open interval about $c$ on which the inequality $|f(x) - L| < \epsilon$ holds.
   b. Give a value for $\delta > 0$ such that for all $x$ satisfying $0 < |x - c| < \delta$ the inequality $|f(x) - L| < \epsilon$ holds.

4. Let $f(x) = 7 - 2x$, $c = 3$, $\epsilon = 0.02$.
   a. Find $L = \lim_{x \to c} f(x)$.
   b. Find a number $\delta > 0$ such that for all $x$, $0 < |x - c| < \delta \Rightarrow |f(x) - L| < \epsilon$.

5. Prove that $\lim_{x \to 4}(11 - x) = 7$.

6. Prove that $\lim_{x \to 11} \sqrt{x - 7} = 2$. 
Answers and suggestions

1 0.1

4 a. 1  b. 0.01

5 Take $\delta = \epsilon$ and show that if $0 < |x - 4|\epsilon$ then $|(11 - x) - 7| < \epsilon$. 