1. Given the function $f(x) = 7x - 1$. Prove that $f(x) = 7x - 1$ is continuous at $x = 0$. You must prove any claims you make about limits. [25 pts]

2. Given the function $f(x) = 5 - 3x$. Prove that $f(x) = 5 - 3x$ is continuous at $x = 1$. You must prove any claims you make about limits. [25 pts]

3. Define the following function:

$$f(x) = \begin{cases} 
2 + 6x & \text{if } x \geq 10 \\
 x + 51 & \text{if } x < 10 
\end{cases}$$

Prove that $f(x)$ is not continuous at $x = 10$. You do not need to prove any claims you make about limits. [25 pts]

4. Define the following function:

$$f(x) = \begin{cases} 
\frac{1}{x-42} & \text{if } x \neq 42 \\
0 & \text{if } x = 42 
\end{cases}$$

Prove that $f(x)$ is not continuous at $x = 42$. You do not need to prove any claims you make about limits. [25 pts]