Definition 1. A function \( f \) is continuous at \( a \) if
\[
\lim_{x \to a} f(x) = f(a).
\]
It is important to realize that this means all 3 of the following things happen:

1. \( f(a) \) is defined;
2. \( \lim_{x \to a} f(x) \) exists;
3. \( \lim_{x \to a} f(x) = f(a) \).

1. Explain why the following function is not continuous at \( a = 2 \).
   
   a) \( f(x) = \frac{1}{2 - 3x + x^2} \)
   
   b) \( g(x) = \frac{2 - x}{2 - 3x + x^2} \)
   
   c) \( h(x) = \begin{cases} \frac{2-x}{2-3x+x^2} & \text{if } x \neq 2 \\ 1 & \text{if } x = 2 \end{cases} \)
2. What value \( c \) would make the function continuous at \( a = 0 \)?

\[ f(x) = \begin{cases} c - x^2 & \text{if } x \geq 0 \\ \cos x & \text{if } x < 0 \end{cases} \]

b) \[ g(x) = \begin{cases} \frac{\sqrt{4 + x} - 2}{x} & \text{if } x \neq 0 \\ c & \text{if } x = 0 \end{cases} \]

3. Find the points at which the function \( f(x) = \frac{1}{1 - \cos x} \) is not continuous.