State the Three Conditions for Continuity:

1.

2.

3.

In the following, use the definition to determine if the function is continuous. If discontinuous tell which part of the definition it failed. (Hint, you only need to check end points)

$f(x)=\begin{cases}\dfrac{x^2-9}{x-3} & \text{if } x\neq 3\\ 8 & \text{if } x=3\end{cases}$	$f(x)=\begin{cases}2x-3 & \text{if } x\leq 2\\ x^2 & \text{if } x>2\end{cases}$	$f(x)=\begin{cases}x^3 & \text{if } x<-1\\ x & \text{if } -1\leq x<1\\ 1-x & \text{if } x\geq 1\end{cases}$
$g(x)=\begin{cases}x^2+4, & x\leq -1\\ 4+x, & x>-1\end{cases}$	$f(x)=\begin{cases}2x+1 & \text{if } x\leq -1\\ 3x & \text{if } -1<x<1\\ 2x-1 & \text{if } x\geq 1\end{cases}$	$f(x)=\begin{cases}(x-1)^3 & \text{if } x<0\\ (x+1)^3 & \text{if } x\geq 0\end{cases}$
$f(x)=\begin{cases}1/x & \text{if } x<-1\\ x & \text{if } -1\leq x\leq 1\\ 1/x^2 & \text{if } x>1\end{cases}$	$f(x)=\begin{cases}\sqrt{x+1}, & 0\leq x\leq 3\\ 5-x, & 3<x\leq 5\end{cases}, \quad x=3.$	$f(x)=\begin{cases}-2x+3, & x<1\\ x^2, & x\geq 1\end{cases}, \quad x=1.$

Find the values to make the function continuous

$f(x)=\begin{cases} 7x-2 & \text{if } x\le 1 \\ ax^2 & \text{if } x>1 \end{cases}$	$f(x)=\begin{cases} ax^2 & \text{if } x\le 2 \\ 2x+a & \text{if } x>2 \end{cases}$	$f(x)=\begin{cases} x+1 & \text{if } x<1 \\ ax+b & \text{if } 1\le x<2 \\ 3x & \text{if } x\ge 2 \end{cases}$
$h(x)=\begin{cases} 2x & \text{if } x<1 \\ cx^2+d & \text{if } 1\le x\le 2 \\ 4x & \text{if } x>2 \end{cases}$	$f(x)=\begin{cases} ax-1, & x<-1 \\ -x^2+1, & -1\le x<2 \\ \frac{1}{2}x+b, & x\ge 2 \end{cases}$	$f(x)=\begin{cases} 2x+a, & x\le -1 \\ x^2+1, & -1<x\le 2 \\ bx-1, & x>2 \end{cases}$
$f(x)=\begin{cases} x^3, & x\le 2 \\ ax^2, & x>2 \end{cases}$	$f(x)=\begin{cases} 2, & x\le -1 \\ ax+b, & -1<x<3 \\ -2, & x\ge 3 \end{cases}$	$f(x)=\begin{cases} 2x+a, & x\le -1 \\ x^2+1, & -1<x\le 2 \\ bx-1, & x>2 \end{cases}$