**Summary 5: Continuity**

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| **Continuity graphically:** If you can draw the graph of a function without lifting up the pencil, or if the graph has no holes or gaps, the function is continuous.**Definition of Continuity:** A function $f\left(x\right)$ is continuous at $x=a$ if1. $f(a)$ exists
2. $\lim\_{x\to a}f(x)$ exists
3. (i) = (ii), i.e. $\lim\_{x\to a}f(x)=f(a)$

**Types of Discontinuity:** If a function is not continuous at $x=a$, then the discontinuity is called:1. **Removable:** $\lim\_{x\to a}f(x)$ exists but is not equal to $f(a)$
2. **Jump:** $\lim\_{x\to a}f(x)$ and $\lim\_{x\to a}f(x)$ both exist but are unequa**l**
3. **Essential:** otherwise
 | **Examples**:  |