

# Lecture Notes

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## 1 Continuity

A useful identity:  $\lim_{x \rightarrow 0} \frac{\sin(x)}{x} = 1$

For  $f(x)$  to be continuous at a point,  $a$ , it must satisfy three requirements:

- $\lim_{x \rightarrow a} f(x)$  must exist
- $f(a)$  exists
- $\lim_{x \rightarrow a} f(x) = f(a)$

There are three different types of continuity:

- Removable Discontinuity

$$f(x) = \frac{x^2-9}{x-3}$$

- Infinite Discontinuity
- Jump Discontinuity