## A general note on theorems

* Recall, a key objective of mathematics is to discover patterns and relationships.

* Theorems are, essentially, a general statement of a relationship that can be logically proven starting from some minimum set of accepted facts (axioms).

* Most theorems look like the following statement:

"If **A**, then **B**."

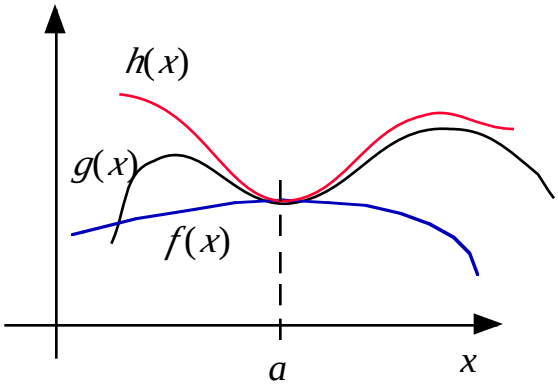
"If ***hypothesis***, then ***conclusion***."

E.g., "If two odd numbers are added, then the result is an even number."

* The hypothesis and the conclusion are both key components of a theorem. It doesn't make sense to omit (or misstate) either part.

* Some theorems have a long and detailed hypothesis, with a very short conclusion. The Squeeze Theorem is a perfect example of this!

## The Squeeze Theorem




Hypothesis:

* Suppose we want to find $\lim_{x \to a} g(x)$ for some function $g(x)$.

* Suppose we can find two other functions $f(x)$ and $h(x)$ that completely enclose $g(x)$ from above and below when $x$ is in the neighborhood of $a$.

In mathematical terms: $f(x) \le g(x) \le h(x)$ in some open interval containing $a$ except, possibly, at $a$ itself.

* Lastly, suppose $\lim_{x \to a} f(x)$ and $\lim_{x \to a} h(x)$ have the same numerical value, say $L$.

Conclusion:

* Then $\lim_{x \to a} g(x) = L$. In other words, $\lim_{x \to a} f(x) = \lim_{x \to a} g(x) = \lim_{x \to a} h(x)$.