Some limits evaluate to or . These were previously said to not exist, but now, this section will teach their true nature as *intermediate forms*. To evaluate such, this section will also teach *l’Hospital’s rule*.

# Intermediate Forms

Intermediate form (object) – an expression inside of a limit that multiple rules derive different values for, such that it may or may not exist.

* Only exist inside of limits
* Must be converted to an intermediate quotient

|  |  |  |
| --- | --- | --- |
| **Intermediate Form** | **Expression** | **To convert to an intermediate quotient…** |
| Quotients () | or | (already is an intermediate quotient) |
| Products () |  |  |
| Differences () |  | Use a common denominator |
| Powers () | or or | If , then |

# L’Hospital’s Rule

L’Hospital’s rule (method) – the method of evaluating intermediate forms by converting them to a fraction of derivatives.

1. Convert the intermediate form to a quotient intermediate form.
2. If the quotient equals or , continue.
3. .

**Warning**: L’Hospital’s rule only works on intermediate forms. It may not get correct answers elsewhere. Do not apply it to expressions that are not intermediate forms.

# What Did You Learn?

* What is an intermediate form? How are all intermediate forms convertible to quotients?
* What is l’Hospital’s rule? What does it do? How does it work?
* How can intermediate forms be combined? What is ?