Section 2.3 Techniques for Computing Limits

# Topic 1: Limit Laws

**Theorem: Limit Laws**

Assume  and  exist. The following properties hold where *c* is a real number, and  and  are integers:

| **Name** | **Rule** |
| --- | --- |
| Sum |  |
| Difference |  |
| Constant Multiple |  |
| Product |  |
| Quotient |  , provided  |
| Power |  |
| Fractional Power | , provided  for *x* near *a* if *m* is even and  is reduced to lowest terms |

# Topic 2: Limits of Polynomial and Rational Functions

**Theorem: Limits of Polynomial and Rational Functions**

Assume$ p$ and $q$ are polynomials and $a$ is a constant.

* For polynomial functions, .
* For rational functions,  provided .

# Topic 3: Other Techniques for Finding Limits

Direct substitution cannot be used to find limits when  exists but . When this is the case, other strategies must be used to find the limit. Here is a list of some strategies to try when direct substitution does not work.

* Factor and cancel
* Multiply by a conjugate
* Simplify complex fractions

# Topic 4: The Squeeze Theorem

**The Squeeze Theorem:** Assume the functions *f*, *g*, and *h* satisfy  for all values of *x* near *a,* except possibly at $a$. If , then .

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