Some classes of functions have simple, easy rules that take their derivatives. This section will teach some of those rules, divided into what kind of function they are. Section 2-4 will cover more rules.

# Constant Functions

A constant function never changes. At every point it is the same. Thus, its slope anywhere is zero, because it does not change.

# Linear Functions

A linear function has a constant slope. The slope does not change. The derivative of a function for any point is the slope at that point, so the linear function has a constant derivative.

# Power Functions

A power function has an exponent that controls how much its growth is based off its current situation. Centuries ago, this formula was found to calculate the derivative of any mathematical power. It works for any real value of and any real exponent , and it was proved with the Binomial Theorem:

# Constant Multiples

If any function is multiplied by a constant , the derivative of , if it exists, will also be multiplied by :

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# Sums and Differences

The sum or difference of two functions, when differentiated, will be the sum or difference of their derivatives (assuming their derivatives exist).

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# Sines and Cosines

The sine wave and cosine wave are very similar, just out-of-phase by . Their derivatives are also closely related, making a circle of derivatives.

# What Did You Learn?

* Why is the derivative of a constant always zero?
* Why is the -derivative of always one?
* What is the derivative of a power of ?
* What happens when a constant multiplied by a function is differentiated?
* How do you take the derivative of addition of functions? Of subtraction?
* Why does the fourth derivative of a cosine or sine equal itself?