

# CALCULUS

Power Rule  $a \cdot n \cdot x^{n-1}$

Product Rule  $f \cdot g' + f' \cdot g$

Quotient Rule  $\frac{g \cdot f' - f \cdot g'}{g^2}$

Chain Rule  $f'(g(x)) \cdot g'(x)$

$f(a) = b$  then  $g'(a) = \frac{1}{f'(b)}$

$g'(b) = \frac{1}{f'(a)}$

$e^y = x \iff y = e^\pi \rightarrow y' = \pi e^\pi$   
 $y = e^{\pi x} \rightarrow y' = \pi e^{\pi x}$

DERIVATIVE RULES

BASIC DIFFERENTIATION RULES

DERIVATIVE RULES

DERIVATIVE RULES

DIFFERENTIATION RULES

BASIC DIFFERENTIATION RULES



## Derivative Rules Foldable®

*with Transcendental Functions*

# FLAMINGO MATH

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## DERIVATIVES FOLDABLE WITH TRANSCENDENTAL FUNCTIONS

Use this activity is a graphic organizer for Calculus students to review and drill the derivative rules for polynomials, trigonometric and other transcendental functions. There are two types for your needs.

**Type 1:** is a two-sided stand alone foldable

**Type 2:** is a single sheet notebook foldable

### Making the two-sided Foldable®:

- Copy on card stock for durability.
- **Flip on short side** when copying.
- Have students complete the organizer with their notes or teacher-directed, as necessary.

### Making the single-sheet notebook Foldable:

- Copy on colorful paper and
- cut around the outside of the foldable
- Place glue along the two tabs where the title reads "Basic Derivative Rules"
- Glue the entire sheet into your notebook.
- Cut up the center line to open the two sides.
- Cut each derivative "flap" in order to write the rule underneath each "door."

You may be interested in purchasing the [Differentiability and Continuity Stations Activity](#).

|                                      |
|--------------------------------------|
| $\frac{d}{dx}[\sin^{-1} u]$          |
| $\frac{d}{dx}[\cos^{-1} u]$          |
| $\frac{d}{dx}[\tan^{-1} u]$          |
| <i>g(x) is the inverse of f(x)</i>   |
| $\frac{d}{dx}[g(x)]$                 |
| $\frac{d}{dx}[\ln u]$                |
| $\frac{d}{dx}[e^u]$                  |
| $\frac{d}{dx}[a^u]$                  |
| $\frac{d}{dx}[\log_a u]$             |
| Exponential Form to Logarithmic Form |

# DERIVATIVE RULES

Properties of Logarithms, Exponent Rules, and More

|  |
|--|
| $\frac{d}{dx}[cx]$                     |
| $\frac{d}{dx}[ax^n]$                   |
| $\frac{d}{dx}[f \cdot g]$              |
| $\frac{d}{dx}\left[\frac{f}{g}\right]$ |
| $\frac{d}{dx}[f(g(x))]$                |
| $\frac{d}{dx}[\sin x]$                 |
| $\frac{d}{dx}[\cos x]$                 |
| $\frac{d}{dx}[\tan x]$                 |
| $\frac{d}{dx}[\csc x]$                 |
| $\frac{d}{dx}[\sec x]$                 |
| $\frac{d}{dx}[\cot x]$                 |

Two-Sided Foldable

TWO OPTIONS

BASIC DIFFERENTIATION RULES

## Notebook Foldable

**NOTEBOOK FOLDABLE:** This is a foldable that is meant to be used in an interactive Student Notebook. Copy one sheet per student. Have students glue the tabs into their notebook. Then, cut with scissors up the middle. Then, cut each derivative flap over to the tab. Write the derivative rules under the flaps.

|                        |  |                                      |                        |
|------------------------|--|--------------------------------------|------------------------|
| BASIC DERIVATIVE RULES | $\frac{d}{dx}[cx]$                     | $\frac{d}{dx}[\sin^{-1} u]$          | BASIC DERIVATIVE RULES |
|                        | $\frac{d}{dx}[ax^n]$                   | $\frac{d}{dx}[\cos^{-1} u]$          |                        |
|                        | $\frac{d}{dx}[f \cdot g]$              | $\frac{d}{dx}[\tan^{-1} u]$          |                        |
|                        | $\frac{d}{dx}\left[\frac{f}{g}\right]$ | <i>g(x) is the inverse of f(x)</i>   |                        |
|                        | $\frac{d}{dx}[f(g(x))]$                | $\frac{d}{dx}[g(x)]$                 |                        |
|                        | $\frac{d}{dx}[\sin x]$                 | $\frac{d}{dx}[\ln u]$                |                        |
|                        | $\frac{d}{dx}[\cos x]$                 | $\frac{d}{dx}[e^u]$                  |                        |
|                        | $\frac{d}{dx}[\tan x]$                 | $\frac{d}{dx}[a^u]$                  |                        |
|                        | $\frac{d}{dx}[\csc x]$                 | $\frac{d}{dx}[\log_a u]$             |                        |
|                        | $\frac{d}{dx}[\sec x]$                 | Exponential Form to Logarithmic Form |                        |
| $\frac{d}{dx}[\cot x]$ |  |                                      |                        |

Glue under each tab before cutting the flaps apart.



# DERIVATIVE RULES

Properties of Logarithms,  
Exponent Rules, and More

$$b^m \cdot b^n = b^{m+n}$$

$$(b^m)^n = b^{m \cdot n}$$

$$\frac{1}{b^n} = b^{-n}$$

$$\ln(MN) = \ln M + \ln N$$

$$\ln\left(\frac{M}{N}\right) = \ln M - \ln N$$

$$\ln M^p = p \cdot \ln M$$

$$e^{\ln f(x)} = f(x)$$

Constant multiple rule

$c$

Power Rule

$$a \cdot n x^{n-1}$$

Product Rule

$$f \cdot g' + f' \cdot g$$

Quotient Rule

$$\frac{g \cdot f' - f \cdot g'}{g^2}$$

Chain Rule

$$f'(g(x)) \cdot g'(x)$$

$$\frac{u'}{\sqrt{1-u^2}}$$

$$\frac{-u'}{\sqrt{1-u^2}}$$

$$\frac{u'}{1+u^2}$$

$f(a) = b$  then  $g(b) = a$

$$g'(x) = \frac{1}{f'(g(x))}$$

$$g'(b) = \frac{1}{f'(a)}$$

Derivatives of  
inverse functions  
have reciprocal  
rates of change.  
"slopes"

$$\cos x$$

$$\frac{u'}{u}$$

$$-\sin x$$

$$e^u \cdot u'$$

$$\sec^2 x$$

$$a^u \cdot \ln a \cdot u'$$

$$-\csc x \cot x$$

$$\frac{u'}{u \ln a}$$

$$\sec x \tan x$$

$$e^y = x \leftrightarrow \ln x = y$$

$$-\csc^2 x$$

$$y = e^{\pi x} \rightarrow y' = \pi e^{\pi x}$$

BASIC DIFFERENTIATION RULES

$$\frac{d}{dx} [\sin^{-1} u]$$

$$\frac{d}{dx} [\cos^{-1} u]$$

$$\frac{d}{dx} [\tan^{-1} u]$$

$g(x)$  is the inverse  
of  $f(x)$

$$\frac{d}{dx} [g(x)]$$

$$\frac{d}{dx} [\ln u]$$

$$\frac{d}{dx} [e^u]$$

$$\frac{d}{dx} [a^u]$$

$$\frac{d}{dx} [\log_a u]$$

Exponential Form to  
Logarithmic Form

# DERIVATIVE RULES

Properties of Logarithms,  
Exponent Rules, and More

$$\frac{d}{dx} [cx]$$

$$\frac{d}{dx} [ax^n]$$

$$\frac{d}{dx} [f \cdot g]$$

$$\frac{d}{dx} \left[ \frac{f}{g} \right]$$

$$\frac{d}{dx} [f(g(x))]$$

$$\frac{d}{dx} [\sin x]$$

$$\frac{d}{dx} [\cos x]$$

$$\frac{d}{dx} [\tan x]$$

$$\frac{d}{dx} [\csc x]$$

$$\frac{d}{dx} [\sec x]$$

$$\frac{d}{dx} [\cot x]$$



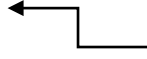
## BASIC DIFFERENTIATION RULES

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# BASIC DERIVATIVE RULES

|  |   |
|--|---|
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| $\frac{d}{dx}\left[\frac{f}{g}\right]$ | <i>g(x) is the inverse of f(x)</i>      |
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| $\frac{d}{dx}[\csc x]$                 | $\frac{d}{dx}[\log_a u]$                |
| $\frac{d}{dx}[\sec x]$                 | Exponential Form to<br>Logarithmic Form |
| $\frac{d}{dx}[\cot x]$                 |   |

# BASIC DERIVATIVE RULES



Glue under each tab before cutting the flaps apart.

$$\frac{d}{dx} [\sin^{-1} u]$$

$$\frac{d}{dx} [\cos^{-1} u]$$

$$\frac{d}{dx} [\tan^{-1} u]$$

$g(x)$  is the inverse of  $f(x)$

$$\frac{d}{dx} [g(x)]$$

$$\frac{d}{dx} [\ln u]$$

$$\frac{d}{dx} [e^u]$$

$$\frac{d}{dx} [a^u]$$

$$\frac{d}{dx} [\log_a u]$$

Exponential Form to Logarithmic Form

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$$\frac{d}{dx} \left[ \frac{f}{g} \right]$$

$$\frac{d}{dx} [f(g(x))]$$

$$\frac{d}{dx} [\sin x]$$

$$\frac{d}{dx} [\cos x]$$

$$\frac{d}{dx} [\tan x]$$

$$\frac{d}{dx} [\csc x]$$

$$\frac{d}{dx} [\sec x]$$

$$\frac{d}{dx} [\cot x]$$



constant  
multiple rule

$$c$$

$$\frac{u}{\sqrt{1-u^2}}$$

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$$\frac{-u'}{\sqrt{1-u^2}}$$

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$$\sec^2 x$$

$$a^u \cdot \ln a \cdot u'$$

$$-\csc x \cot x$$

$$\frac{u'}{u \ln a}$$

$$\sec x \tan x$$

$$e^y = x \iff \ln x = y$$

$$-\csc^2 x$$

$$y = e^{\pi} \rightarrow y' = 0$$

$$y = e^{\pi x} \rightarrow y' = \pi e^{\pi x}$$

## BASIC DIFFERENTIATION RULES

# FLAMINGO MATH

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