Calculus BC

Section 5.1 - The Natural Log Function - Differentiation

Obj: - To develop and use properties of $y = \ln x$
- To find the derivatives of functions involving the natural log function.

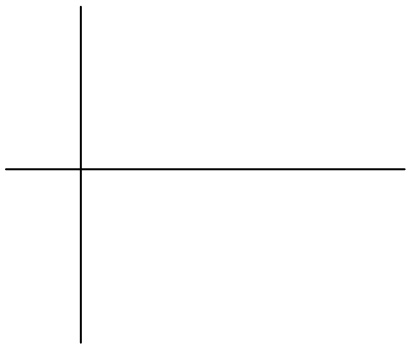
Recall: Properties of Logarithm

- $\ln(mn) =$
- $\ln\left(\frac{m}{n}\right) =$
- $\ln x^r =$

The graph of $y = \ln x$ or $y = \log_e x$

Domain:

Range:



$\frac{d}{dx}\ln x =$	$\frac{d}{dx}\ln u =$

1. find $\frac{d}{dx}\left[\ln\left(3x^4\right)\right]$

2. find $\frac{d}{dx}\left[\ln\left|\sin x^2\right|\right]$

3. find $\frac{d}{dx}\left[\ln \sin^2 x\right]$

4. find $\frac{d}{dx}\left[(\ln 3x)^{2/3}\right]$

5. find $\frac{d}{dx}\left[x \ln(\sin x)\right]$

Logarithmic Differentiation - using properties of logarithm to aid in differentiation.

6. Use logarithmic differentiation to find $\frac{dy}{dx}$ given

$$y = \sqrt{\frac{(x+1)^{10}}{(2x+1)^5}}$$

-take ln of both sides

-expand completely using properties of log

-differentiate