

Let  $u$  be a differentiable function of  $x$ .

$$\frac{d}{dx}[\ln x] = \frac{1}{x} \quad \frac{d}{dx}[\ln u] = \frac{1}{u} u' = \frac{u'}{u} \quad \frac{d}{dx}[\ln |u|] = \frac{1}{u} u' = \frac{u'}{u}$$

Differentiate the following functions

$$f(x) = \ln(3x)$$

$$f(x) = (\ln 2x)^3$$

Let  $u$  be a differentiable function of  $x$ .

$$\frac{d}{dx}[\ln x] = \frac{1}{x} \quad \frac{d}{dx}[\ln u] = \frac{1}{u} u' = \frac{u'}{u} \quad \frac{d}{dx}[\ln |u|] = \frac{1}{u} u' = \frac{u'}{u}$$

Differentiate the following functions

$$f(x) = \ln(x^3 + 2)$$

$$f(x) = \ln(x^3(2x + 1))$$

Let  $u$  be a differentiable function of  $x$ .

$$\frac{d}{dx}[\ln x] = \frac{1}{x} \quad \frac{d}{dx}[\ln u] = \frac{1}{u} u' = \frac{u'}{u} \quad \frac{d}{dx}[\ln |u|] = \frac{1}{u} u' = \frac{u'}{u}$$

Differentiate the following functions

$$f(x) = x \ln(x + 1)$$

$$f(x) = \ln\left(\frac{x^2}{(3x + 5)}\right)$$

Let  $u$  be a differentiable function of  $x$ .

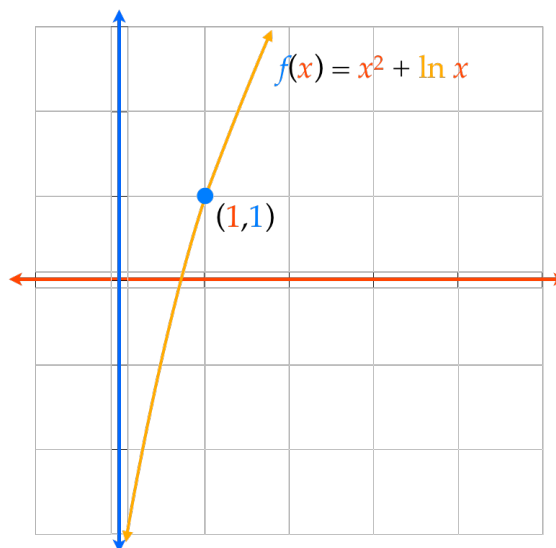
$$\frac{d}{dx}[\ln x] = \frac{1}{x} \quad \frac{d}{dx}[\ln u] = \frac{1}{u} u' = \frac{u'}{u} \quad \frac{d}{dx}[\ln |u|] = \frac{1}{u} u' = \frac{u'}{u}$$

Differentiate the following functions

$$f(x) = \ln\left(\frac{x^3(x + 1)}{(3x + 4)^2}\right)$$

Find the equation of the **tangent line** to the graph of  $f$  at the given point.

$$f(x) = x^2 + \ln x \quad \text{at } (1, 1)$$



Let  $u$  be a differentiable function of  $x$ .

$$\frac{d}{dx}[\ln x] = \frac{1}{x} \quad \frac{d}{dx}[\ln u] = \frac{1}{u} u' = \frac{u'}{u} \quad \frac{d}{dx}[\ln |u|] = \frac{1}{u} u' = \frac{u'}{u}$$