Differential coefficients of standard functions are given below to remember and to make use of them in the problems.

them in the problems.

1. 
$$\frac{d}{dx}(c) = 0$$

2.  $\frac{d}{dx}[k \cdot f(x)] = k \cdot \frac{d}{dx}f(x)$ 

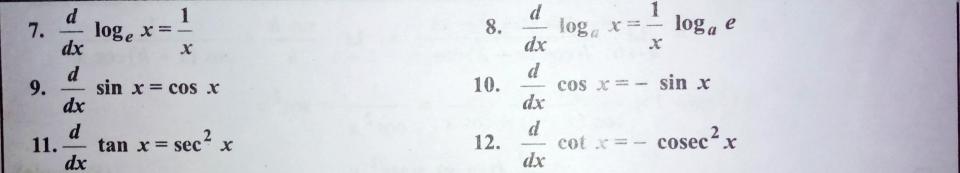
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3.  $\frac{d}{dx}[k \cdot f(x)] = k \cdot \frac{d}{dx}f(x)$   
4.  $\frac{d}{dx}x^n = nx^{n-1}$ 

3. 
$$\frac{d}{dx}[f_1(x) \pm f_2(x)] = \frac{d}{dx}f_1(x) \pm \frac{d}{dx}f_2(x)$$
 4.  $\frac{d}{dx}x^n = nx^{n-1}$ 

3. 
$$\frac{1}{dx}[f_1(x) \pm f_2(x)] = \frac{1}{dx}f_1(x) \pm \frac{1}{dx}f_2(x)$$
 4.  $\frac{1}{dx}x^n = nx^n$ 

$$\frac{dx}{dx} = \frac{dx}{dx} = \frac{dx$$

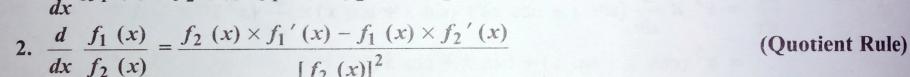


11.  $\frac{1}{dx} \tan x = \sec^{-x} x$ 12.  $\frac{1}{dx} \cot x = - \csc x$ 13.  $\frac{d}{dx} \sec x = \sec x \tan x$ 14.  $\frac{d}{dx} \csc x = - \csc x \cot x$ 

## AID TO MEMORY

1. 
$$\frac{d}{dx} [f_1(x) \times f_2(x)] = f_1(x) \times f_2'(x) + f_2(x) \times f_1'(x)$$

 $dx f_2(x)$ 



(Product Rule)

## **AID TO MEMORY**

Laws of logarithms:

1. 
$$\log_a(m \times n) = \log_a m + \log_a n$$

$$3. \quad \log_a m^n = n \log_a m$$

$$\log_a m = \frac{1}{m}$$

$$5. \quad \log_a m = \frac{1}{\log_m a}$$

differentiate.

$$\log_a n \qquad \qquad 2. \quad \log_a \left(\frac{m}{n}\right) = \log_a m - \log_a n$$

$$4. \quad \log_a m = \frac{\log m}{\log a}$$

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6. If the function is of the form  $y = x^x$  or  $y = (\sin x)^{\cos x}$ , then take log of both sides and then

## AID TO MEMORY

## Differential Coefficient of Inverse functions:

Remember the differentials of the inverse functions given below to use directly in the problems.

Remember the differentials of the inverse functions given below to use directly in the problems

1. 
$$\frac{d}{dx} (\sin^{-1} x) = \frac{1}{\sqrt{1-x^2}}$$

2.  $\frac{d}{dx} (\cos^{-1} x) = \frac{-1}{\sqrt{1-x^2}}$ 

4.  $\frac{d}{dx} \cot^{-1} x = \frac{-1}{1+x^2}$ 

 $6. \quad \frac{d}{dx}\operatorname{cosec}^{-1}x = \frac{-1}{x\sqrt{x^2 - 1}}$ 

3.  $\frac{d}{dx} (\tan^{-1} x) = \frac{1}{1+x^2}$ 

5.  $\frac{d}{dx} \sec^{-1} x = \frac{1}{x\sqrt{x^2 - 1}}$ 

1. 
$$\frac{d}{dx} (\sinh x) = \cosh x$$
 2.  $\frac{d}{dx} \cosh x = \sinh x$  3.  $\frac{d}{dex} (\tanh x) = \operatorname{sech}^2 x$ 
4.  $\frac{d}{dx} \coth x = -\operatorname{cosech}^2 x$  5.  $\frac{d}{dx} (\operatorname{sech} x) = -\operatorname{sech} x \tanh x$  6.  $\frac{d}{dx} \operatorname{cosech} x = -\operatorname{coseh} x \coth x$