

۱۲، ۱۴

جلسه اول

تابع

$$y = f(x)$$

$$y = 2x + 9$$

$$y = 1x^3 - 10x^2$$

مشتق

۱

$$(x^n)' = nx^{n-1}$$

$$(x^2)' = 2x \quad (x^3)' = 3x^2 \quad (x)' = 1$$

۲

$$(u^n)' = n u' u^{n-1}$$

۳

$$(\sin x)' = \cos x$$

$$(\cos x)' = -\sin x$$

۴

$$(\sin u)' = u' \cos u$$

$$(\cos u)' = -u' \sin u$$

$$(\sin x^2)' = 2x \cos x^2$$

$$\left(\cos \overset{u}{a} \right)' = - \overset{u}{a}' \sin a$$

$$\left(\sin \overset{u}{a} \right)' = \overset{u}{a}' \cos a$$

$$\left(\sin \overset{u}{a} \right)' = \overset{u}{a}' \cos a \sin a$$

$n \quad u' \quad u^{n-1}$

$$(u^n)'$$

$$\left(\cos \overset{u}{a} \right)' = - \overset{u}{a}' \sin a \cos a$$

2

$$(e^a)' = e^a$$

$$y = e^u \Rightarrow y' = e^u u'$$

3

$$(e^u)' = u' e^u$$

$$(e^{a^y})' = y a^{y-1} e^{a^y}$$

$$(e^{\sin a})' = \cos a e^{\sin a}$$

4

$$(\ln a)' = \frac{1}{a}$$

$$y = \log_e a = \ln a$$

5

$$(\ln u)' = \frac{u'}{u}$$

$$(\ln 0)' = \frac{0'}{0}$$

$$\left(\ln a^x \right)' = \frac{x a^x}{a^x}$$

$$\left(\ln \sin x \right)' = \frac{\cos x}{\sin x}$$

نکته 8

① $\left(f(x) \pm g(x) \right)' = f'(x) \pm g'(x)$

$$\left(x^x + \sin x \right)' = x^x + \cos x$$

② $\left(f(x) g(x) \right)' = f'(x) g(x) + g'(x) f(x)$
 اولی مشتق دومی + دومی مشتق اولی

$$\left(x^x \sin x \right)' = x^x \sin x + \cos x (x^x)$$

صورت = مشتق خارج - خارج مشتق صورت

③ $\left(\frac{f(x)}{g(x)} \right)' = \frac{f'(x) g(x) - g'(x) f(x)}{g^2(x)}$

$$\left(\frac{\sin x}{x} \right)' = \frac{(\cos x)(x) - (1)(\sin x)}{x^2}$$

④

$$(k f(x))' = k f'(x)$$

$$(\lambda \sin x)' = \lambda \cos x$$

⑤

$$(x)' = 0$$

$$(\lambda)' = 0 \quad (a)' = 0$$