

Handout # 4

Derivatives:

$$1) \quad f'(x) = \lim_{z \rightarrow x} \frac{f(z) - f(x)}{z - x} = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$2) \quad c' = 0$$

$$3) \quad x' = 1$$

$$4) \quad (u^n)' = nu^{n-1}u'$$

$$5) \quad (\sqrt{u})' = \frac{1}{2\sqrt{u}}u'$$

$$6) \quad (\sin u)' = (\cos u)u'$$

$$7) \quad (\cos u)' = (-\sin u)u'$$

$$8) \quad (\tan u)' = \frac{1}{\cos^2 u}u'$$

$$9) \quad (\cot u)' = \frac{-1}{\sin^2 u}u'$$

$$10) \quad (u \pm v)' = u' \pm v'$$

$$11) \quad (uv)' = u'v + v'u$$

$$12) \quad (cu)' = cu'$$

$$13) \quad \left(\frac{u}{c}\right)' = \frac{u'}{c}$$

$$14) \quad \left(\frac{c}{u}\right)' = \frac{-c}{u^2}u'$$

$$15) \quad \left(\frac{u}{v}\right)' = \frac{u'v - v'u}{v^2}$$

$$16) \quad \left(\frac{c}{u^n}\right)' = \frac{-cn}{u^{n+1}}u'$$

$$17) \quad (e^u)' = e^u u'$$

$$18) \quad (a^u)' = a^u (\ln a)u'$$

$$19) \quad (\ln u)' = \frac{1}{u}u'$$

$$20) \quad (\log_a u)' = \frac{1}{u \ln a}u'$$

$$21) \quad (\arcsin u)' = \frac{1}{\sqrt{1-u^2}}u'$$

$$22) \quad (\arccos u)' = \frac{-1}{\sqrt{1-u^2}}u'$$

$$23) \quad (\arctan u)' = \frac{1}{1+u^2}u'$$

$$24) \quad (\text{arc cot } u)' = \frac{-1}{1+u^2}u'$$