Quiz 3 (substitutional) (Dr. AL-Homidan)(161)

Name:- ID:-

Q1. Find y' where $y + x = \cot^{-1}(\sin^3(\sqrt{x+y}))$.

$$y' + 1 = \underbrace{\frac{-1}{1+\sin^6\sqrt{x+y}}\, 3\sin^2\sqrt{x+y}\cos\sqrt{x+y}\cdot\frac{1}{2\sqrt{x+y}}}_{A}(1+y')$$

$$y' + 1 = A(1+y') \Rightarrow y' - Ay' = A - 1$$

$$y'(1-A) = A - 1$$

$$y' = \frac{A-1}{-(A-1)} = -1$$

Q2. Find $\frac{d^{101}y}{dx^{101}} \ln(x+1)$

$$y' = \frac{1}{x+1} = (x+1)^{-1}$$

$$y'' = -1(x+1)^{-2} \qquad y''' = (-1)(-2)(x+1)^{-3}$$

$$y^{(n)} = (-1)^{n+1}(x+1)^{-n}(n-1)!$$

$$y^{(101)} = 100!\,(x+1)^{-101}$$