Each question worth 10 points

100

Name :---ID # :--

Q1 If $x + \sin^{-1}(1/e) = \tan^{-1}(\pi - y)$, find y', then prove that $y'' = 2\,y'(\pi - y)$

Q2. Find $\dfrac{dy}{dx}$ if $\sin^{-1} t = ty$ and $\dfrac{dt}{dx} = \dfrac{1}{\sqrt{1 - t^2}}$

Q4. Find the nth derivative of   I. $y = x^2 + 2$ II. $y = e^{2x}$

Q5. If $f(x) = e^{\frac{x+1}{x-1}}$ find $f(x)^{-1}$, then find the domain of $f(x)^{-1}$.

Q7. Find the limit, if it exists $\lim\limits_{x \to 0} \left(\cot^2 x - \csc^2 x \right)$

Q8. Find the limit, if it exists $\lim\limits_{x \to 0^+} \left(1 + 3x \right)^{\csc x}$

x-coordinate is increasing at the rate of 6 units/second, when the particle is at $y = 2$.

- At what rate is the *y*-coordinate of the point changing at that instant?
- Is the particle rising or falling at that instant?

Q10. Find all equations of the tangent lines to the curve $xy^2 + xy = 2$ at $x = 1$