1. If \( h(x) = \frac{1 + xf(x)}{g(x)} \), \( g(2) = 1 \), \( g'(2) = 3 \), \( f'(2) = 5 \) and \( h'(2) = 6 \), find \( f(2) \)

2. If \( y = \sqrt[3]{x^4} - \frac{1}{\sqrt[3]{x^3}} \). Then find \( \frac{dy}{dx} |_{x=1} \)
3. If the position of a particle is given by the equation

\[ S(t) = 2t^3 - 9t^2 + 12t, \]

where \( t \) is measured in seconds and \( S \) in meters, then the total distance traveled by the particle during the time interval \([0, 2]\) is:

4. Find \( \lim_{x \to 0} \frac{1 - \cos x}{x \sin x} \)
5. If \( f(x) = \begin{cases} 
3, & \text{if } x \leq 0 \\
3 - x, & \text{if } 0 < x < 2, \\
\frac{1}{3-x} & \text{if } x \geq 2 
\end{cases} \)

Then \( f \) is not differentiable at what point(s).
6. The normal line to the parabola \( y = x^2 + x \) at the point \((-1, 0)\) intersects the parabola a second time at what point.