Q#1 Use method of separation of variables to solve 
\((x^2 + 1)\frac{dy}{dx} + y = 0\) when \(y(0)=1\).

Q#2 Construct and solve an equation that shows that the time rate of change of \(f(t)\) is inversely proportional to the function itself.

Q#3 Find the integrating factor of \(\frac{dy}{dt} + \csc(t)y = g(t)\).
Q#1  In 4 hours temperature in a given room became 3 times hotter than it was just before the sun rose. Assuming a constant change in the temperature find t at which the temperature reached twice the initial temperature?

Q#2 Work out the integrating factor for the equation
\[ \frac{dy}{dx} + \frac{y}{(1 - x^2)^{1/2}} = e^{\sin x} \]

Q#3 Use the variable separable method to solve \((1 + t^2)\frac{dy}{dt} + 2ty = 0\) such that \(y(0)=1\).