Quiz 1 Form **B**
Sept 1, 2017

1.) Determine the <u>order</u> of the given differential equations and also state whether the equation is <u>linear or nonlinear</u>:

[3] 1a.) $ty + y' = 1$ is a <u>*first*</u> order <u>*linear*</u> differential equation.

[3] 1b.) $t + yy' = 1$ is a <u>*first*</u> order <u>*nonlinear*</u> differential equation.

[14] 2.) Solve and state where the solution is defined: $t^5 y' + 5t^4 y = \frac{1}{t}$

$t^5 y' + 5t^4 y = \frac{1}{t}$

$(t^5 y)' = \frac{1}{t}$

$\int (t^5 y)' dt = \int \frac{1}{t} dt$

$t^5 y = ln|t| + C$

$y = t^{-5}(ln|t| + c)$

Solution: <u>$y = t^{-5}(ln|t| + c)$</u>   Domain: <u>$t \neq 0$ or equivalently $(-\infty, 0) \cup (0, \infty)$</u>