Quiz 2 Show your work
Feb 19, 2016 Circle your answer.

[10] 1.) Given that $y(t) = \frac{1}{t}$ and $y(t) = t^{\frac{3}{2}}$ are solutions to $2t^2y'' + ty' - 3y = 0$, state the general solution to this 2nd order homogeneous linear differential equation:

Given two linearly independent solutions to a 2nd order homogeneous linear differential equation, one can create the general solution by taking their linear combination. Thus the answer is

$$y(t) = \frac{c_1}{t} + c_2 t^{\frac{3}{2}}$$

In other words, $\{\frac{1}{t}, t^{\frac{3}{2}}\}$ forms a basis for the solution set (since every solution can be written uniquely as a linear combination of these two functions).

[10] 2.) Solve: $y' = ycos(x)$.

Separate variables: $\frac{dy}{dx} = ycos(x)$.

$\frac{dy}{y} = cos(x)dx$

$\int \frac{dy}{y} = \int cos(x)dx$

$ln|y| = sin(x) + C$

$ln|y| = sin(x) + C$

$|y| = e^{sin(x)+C} = e^C e^{sin(x)}$

Thus $y = Ce^{sin(x)}$

Answer: $y = Ce^{sin(x)}$