Quiz 5b **Calculus 2** **4/8/2005**

Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. Does the differential equation $\frac{dH}{dt} = 375 - H$ have the function $H = 375 - Ae^{-t}$ as a solution?

$H' = 0 + Ae^{-t}$

$Ae^{-t} \stackrel{?}{=} 375 - (375 - Ae^{-t})$

$Ae^{-t} \stackrel{?}{=} 0 + Ae^{-t}$

$Ae^{-t} = Ae^{-t}$

Excellent

So yes $H = 375 - Ae^{-t}$ is a solution

2. Does the differential equation $y'' - 2y' - 15y = 0$ have the function $y = e^{-3t}$ as a solution?

$y = e^{-3t}$

$y' = -3e^{-3t}$

$y'' = 9e^{-3t}$

$9e^{-3t} - 2(-3e^{-3t}) - 15e^{-3t} = 0$

$9e^{-3t} + 6e^{-3t} - 15e^{-3t} = 0$

$15e^{-3t} - 15e^{-3t} = 0$

$0 = 0$

Excellent

yes, $y = e^{-3t}$ is a solution for the differential equation $y'' - 2y' - 15y = 0$