

Mathematics 300

Quiz 25

Name: _____

You must show your work to get full credit.

1. Let $y = xe^x$.

(a) Compute the first three derivatives of y

$$y' = \underline{\hspace{2cm}} \qquad y'' = \underline{\hspace{2cm}} \qquad y''' = \underline{\hspace{2cm}}$$

(b) Make a conjecture at for a formula for the n -th derivative of y . $y^{(n)} = \underline{\hspace{2cm}}$

(c) Prove your conjecture using induction.

Base case:

Induction step:

Induction hypothesis:

2. The contrapositive of $P \rightarrow Q$ is $\neg Q \rightarrow \neg P$. Use truth tables to show these are logically equivalent.