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MAC 2302 Quiz 4  
Thursday September 12th

Solve the linear differential equation by first finding an integrating factor.

$$y' + y = e^{5x}$$

This has the form  $y' + P(x)y = Q(x)$ .  
We know an integrating factor will be  $e^{\int P(x)dx}$ .

$$P(x) = 1 \Rightarrow \int P(x)dx = x \Rightarrow e^{\int P(x)dx} = e^x$$

Multiply both sides of d.e. by  $e^x$ :

$$e^x y' + e^x y = e^{6x}$$

looks like result of  
product rule

$$\frac{d}{dx}(e^x y) = e^{6x}$$

$$e^x y = \int e^{6x} dx = \frac{1}{6} e^{6x} + C$$

$$y = e^{-x} \cdot \left( \frac{1}{6} e^{6x} + C \right)$$

$$y = \frac{1}{6} e^{5x} + C e^{-x}$$