

Name: _____ Student Number: _____

1. (5 points) Evaluate the integral $\int_1^2 \frac{e^{1/x}}{x^2} dx$.

Solution:

Try the substitution $u = \frac{1}{x}$. Then $\frac{du}{dx} = -\frac{1}{x^2}$, and $dx = -x^2 du$.

$$= \int_{x=1}^{x=2} \frac{e^{1/x}}{x^2} dx$$

$$= \int_{x=1}^{x=2} \frac{e^u(-x^2)}{x^2} du$$

$$= - \int_{x=1}^{x=2} e^u du$$

$$= -[e^u]_{x=1}^{x=2}$$

$$= -[e^{1/x}]_{x=1}^{x=2}$$

$$= -[\{e^{1/2}\} - \{e^{1/1}\}]$$

$$= -[e^{1/2} - e]$$

$$= -[\sqrt{e} - e]$$

$$= e - \sqrt{e}$$

$$= \sqrt{e}(\sqrt{e} - 1)$$

2. (5 points) Differentiate the function: $y = x^{\sin(x)}$.

Solution:

$$y = x^{\sin(x)}$$

$$y = (e^{\ln(x)})^{\sin(x)}$$

$$y = e^{\ln(x) \sin(x)}$$

$$\frac{d}{dx}[y] = \frac{d}{dx}[e^{\ln(x) \sin(x)}]$$

...show all work...show all work...show all work...show all work...show all work...show all work...

Math 1700 Summer 2013

Quiz 3

Monday June 10 2013

No Work = No Credit

Name: _____ Student Number: _____

$$\frac{d}{dx}[y] = e^{\ln(x) \sin(x)} \frac{d}{dx}[\ln(x) \sin(x)]$$

$$\frac{d}{dx}[y] = e^{\ln(x) \sin(x)} \left[\sin(x) \frac{d}{dx}[\ln(x)] + \ln(x) \frac{d}{dx}[\sin(x)] \right]$$

$$\frac{d}{dx}[y] = e^{\ln(x) \sin(x)} \left[\sin(x) \left(\frac{1}{x} \right) + \ln(x) (\cos(x)) \right]$$