Gradescope Assignment: Due 1/27/21

0 pts for no work

2 pts for attempt

4 pts for full answer

1. Using integration-by-parts $\left(\int udv = uv - \int vdu\right)$, show that

$$\int \cos(2x)e^x dx = \frac{e^x}{5}\left(\cos(2x) + 2\sin(2x)\right) + C$$

2. For the function $f(t) = e^{\int_0^t \cos(x^2)dx}$, using the chain-rule $(d/dt(f(g(t))) = f'(g(t))g'(t))$ and the Fundamental-Theorem of Calculus, show that

$$\frac{df}{dt} = e^{\int_0^t \cos(x^2)dx}\cos(t^2)$$

3. Suppose A and B are two $n \times n$ matrices which commute with respect to matrix products, i.e. $AB = BA$. Show that A^2 and B commute, or that $A^2B = BA^2$. Note, $A^2 = AA$.