$$\int_0^{\pi} e^x \sin(\pi - x)\, dx$$

$u = \sin(\pi - x)$ $\quad dv = e^x dx$

$du = -\cos(\pi - x)\, dx$ $\quad v = e^x$

$$= e^x \sin(\pi - x)\Big|_0^{\pi} - \int_0^{\pi} -\cos(\pi - x) e^x\, dx$$

0 since $\sin(\pi) = \sin(0) = 0$

$$= \int_0^{\pi} \cos(\pi - x) e^x\, dx$$

$u = \cos(\pi - x)$ $\quad dv = e^x dx$

$du = \sin(\pi - x)\, dx$ $\quad v = e^x$

$$= e^x \cos(\pi - x)\Big|_0^{\pi} - \int e^x \sin(\pi - x)\, dx$$

$\cos(0) = 1$

$\cos(\pi) = -1$

This is what we started with... Call it A

So $A = e^{\pi}\cos(0) - e^0 \cos(\pi) - A = e^{\pi} + 1 - A$

$$\Rightarrow \quad 2A = e^{\pi} + 1 \Rightarrow A = \frac{e^{\pi} + 1}{2}$$