(39) $$\int_0^{\pi} x\sin 2x dx = \left[-\frac{1}{2}x\cos 2x + \frac{1}{2}\int_0^{\pi}\cos 2x dx\right]_0^{\pi} = \left[-\frac{1}{2}x\cos 2x + \frac{1}{4}\sin 2x\right]_0^{\pi}$$

$$u = x \qquad v = -\frac{1}{2}\cos 2x$$

$$du = dx \qquad dv = \sin 2x dx$$

$$\frac{1}{2}\int \cos 2x = \frac{1}{4}\sin 2x$$

$$\left[-\frac{1}{2}x\cos 2x + \frac{1}{4}\sin 2x\right]_0^{\pi} = \frac{1}{2}\left[-\pi\cos 2\pi + \frac{1}{2}\sin 2\pi\right] - \frac{1}{2}\left[0 + \frac{1}{2}\sin(0)\right] = \frac{\pi}{2}$$

(41) $$\int_0^{1} e^x \sin x dx = \left[\frac{1}{2}e(\sin x - \cos x)\right]_0^{1} = \frac{1}{2}\left[e[\sin 1 - \cos 1] - [-\cos 0]\right] = \frac{1}{2}[\sin 1 - \cos 1 + 1]$$

Note : use the result of exercise 65 of this section to solve the integral