$$\int e^x \sin(2x)\,dx$$

$u = e^x \qquad dv = \sin 2x\,dx$

$du = e^x dx \qquad v = -\frac{1}{2}\cos 2x$

$$= -\frac{1}{2}e^x \cos 2x - \int -\frac{1}{2}\cos 2x\, e^x\,dx$$

$$= -\frac{1}{2}e^x \cos 2x + \frac{1}{2}\int e^x \cos 2x\,dx$$

Do IBP

LIPET

$$= \frac{1}{2}e^x \sin 2x - \int \frac{1}{2}\sin 2x\, e^x\,dx$$

$$\int e^x \cos 2x\,dx$$

$u = e^x \qquad dv = \cos 2x$

$du = e^x dx \qquad v = \frac{1}{2}\sin 2x$

$x = f - x$

$$\int e^x \sin 2x\,dx = -\frac{1}{2}e^x \cos 2x + \frac{1}{2}\left(\frac{1}{2}e^x \sin 2x - \frac{1}{2}\int e^x \sin 2x\,dx\right)$$

$$= -\frac{1}{2}e^x \cos 2x + \frac{1}{4}e^x \sin 2x - \frac{1}{4}\int e^x \sin 2x\,dx$$

$$\frac{5}{4}\int e^x \sin 2x\,dx = -\frac{1}{2}e^x \cos 2x + \frac{1}{4}e^x \sin 2x$$

$$\int e^x \sin 2x\,dx = \frac{-\frac{1}{2}e^x \cos 2x + \frac{1}{4}e^x \sin 2x}{\frac{5}{4}}$$

LIPET

(19) $\int x \cos(2-x)\,dx$

$u = x \qquad dv = \cos(2-x)$

$du = dx \qquad v = -\sin(2-x)$

$= -x\sin(2-x) - \int -\sin(2-x)\,dx$

$= -x\sin(2-x) + \int \sin(2-x)\,dx$

$-x\sin(2-x) + \cos(2-x) + C$