1. Q — $\int x\cos(6x)dx$

A —

Let $u = x; v' = \cos(6x)$. Therefore $v = \frac{1}{6}\sin(6x)$

According to integration by parts:

$$\int uv' = uv - \int vu'$$

Therefore $\int x\cos(6x)dx = x\frac{1}{6}\sin(6x) - \int \frac{1}{6}\sin(6x)dx$

$= x\frac{1}{6}\sin(6x) - \frac{1}{6}\int \sin(6x)dx$

$= x\frac{1}{6}\sin(6x) + \frac{1}{36}\cos(6x) + C$