

## Integration by parts

Formula:  $\int u dv = uv - \int v du$

Example 1: Evaluate  $\int xe^{x/2} dx$ .

Use  $u = x$  and  $dv = e^{x/2} dx$ . Then we get  $du = dx$  and  $v = 2e^{x/2}$ . This can be summarized:

$$\begin{array}{ll} u = x & dv = e^{x/2} dx \\ du = dx & v = 2e^{x/2} \end{array}$$

It follows that

$$\begin{aligned} \int xe^{x/2} dx &= 2xe^{x/2} - \int 2e^{x/2} dx \\ &= 2xe^{x/2} - 4e^{x/2} + C \end{aligned}$$