

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

Group 4 - Stammfunkt #2

1)  $\int e^{3x} \sin(5x) dx$

$$u = \sin(5x) dx$$
$$du = 5 \cos(5x) dx$$

$$v = \frac{e^{3x}}{3}$$
$$dv = e^{3x} dx$$

$$= \frac{e^{3x} \sin(5x)}{3} - \frac{5}{3} \int e^{3x} \cos(5x) dx + C$$

$$= \frac{e^{3x} \sin(5x)}{3} - \frac{5 \cos(5x) e^{3x}}{9} + \frac{25}{9} \int e^{3x} \sin(5x) dx + C$$

$u = \cos(5x)$   
 $du = -5 \sin(5x) dx$

$$\int e^{3x} \sin(5x) dx = \frac{-9}{16} \left[ \frac{e^{3x} \sin(5x)}{3} - \frac{5e^{3x} \cos(5x)}{9} \right] + C$$

2)

$$\int (t+7) e^{2t+3} dt$$

$$u = t+7$$
$$du = dt$$

$$v = \frac{e^{2t+3}}{2}$$
$$dv = e^{2t+3} dt$$

$$= \frac{(t+7)e^{2t+3}}{2} - \frac{1}{2} \int e^{2t+3} dt + C$$

$$= \frac{(t+7)e^{2t+3}}{2} - \frac{e^{2t+3}}{4} + C$$

3)

$$\int_0^1 t e^{-t} dt$$

$$u = t$$
$$du = dt$$
$$v = -e^{-t}$$
$$dv = e^{-t} dt$$

$$= \left[ -te^{-t} + \int e^{-t} dt \right] \Big|_0^1$$

$$= \left[ -te^{-t} - e^{-t} \right] \Big|_0^1 = -\frac{2}{e} + 1$$