Activity 1:

Evaluate using IBP:

(a) $\int x e^x \, dx$

(b) $\int t^2 \sin(t) \, dt$

Activity 2:

Evaluate using IBP:

(a) $\int_1^3 \ln(x) \, dx$

(b) $\int_0^1 \tan^{-1}(x) \, dx$

Activity 3:

Evaluate using IBP: $\int \cos(x)e^x\,dx$

In this activity, it feels like you go around in a circle.
You'll do IBPs twice and come back to the original integral. If we set $I = \int \cos(x)e^x\,dx$, then you can re-arrange to get $2I$ (after 2 IBPs).
So I call this the "$2I$-trick."

Activity 4:

Use the reduction formula to evaluate: $\int \sin^3(x)\,dx$

Evaluate the following:

(a) $\displaystyle\int_0^{\pi/3} e^{2x} \cos(3x)\, dx$

(b) $\displaystyle\int x^7 (x^4 + 1)^{2/3}\, dx$

    (Hint: By taking x^3 and grouping it with the $(x^4 + 1)^{2/3}$ term we can pull off the integration using u-sub. So, choose $dv = (x^4 + 1)^{2/3}(4x^3)dx$ and $u = \frac{1}{4}x^4$)

(c) $\displaystyle\int \frac{x^3 e^{x^2}}{(x^2 + 1)^2}\, dx$