1. $\int \sqrt{x}\ln(x)dx$

> **Solution:** $\dfrac{2}{3}x^{3/2}\log(x) - \dfrac{4}{9}x^{3/2} + C$

2. $\int te^{-t}dt$

> **Solution:** $-te^{-t} - e^{-t} + C$

3. $\int_0^{\pi} x\sin(3x)dx$

> **Solution:** $\left. \dfrac{1}{9}\sin(3x) - \dfrac{1}{3}x\cos(3x) \right|_0^{\pi} = \dfrac{\pi}{3}$

4. $\int \arctan(x)dx$ (Hint: try $1 \cdot \arctan(x)$)

> **Solution:** $x\arctan(x) - \dfrac{1}{2}\log(x^2 + 1) + C$

5. $\int x^2 e^{-5x}dx$ (Hint: apply parts twice)

> **Solution:** $-\dfrac{1}{125}e^{-5x}(25x^2 + 10x + 2) + C$