Application of integration by parts (twice) 1

Alan Windsor

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Complete the following integrals by using integration by parts twice.Use the Geogebra App to check your answers.

1. $\int x^2 \, e^x \, dx$

2. $\int x^2 \sin x \, dx$

3. $\int x^2 \, e^{-3x} \, dx$

4. $\int x^2 \cos x \, dx$

5. $\int 2x^2 \sin 2x \, dx$

6. $\int 2x^2 \sec^2 x \tan x \, dx$

Evaluate the following definite integrals. Use the Geogebra App to check your answers.

1. $\displaystyle\int_0^1 x^2\, e^x\, dx$ Answer $[e-2]$

2. $\displaystyle\int_0^{\pi/2} x^2 \sin x\, dx$ Answer $[\pi-2]$

3. $\displaystyle\int_0^1 x^2\, e^{-3x}\, dx$ Answer $\left[\frac{2e^3-17}{27e^3}\right]$

4. $\displaystyle\int_{\pi/6}^{\pi/2} x^2 \cos x\, dx$ Answer $\left[\frac{17\pi^2-12\sqrt{3}-72}{72}\right]$

5. $\displaystyle\int_0^{\pi/4} 2x^2 \sin 2x\, dx$ Answer $\left[\frac{\pi-2}{4}\right]$

6. $\displaystyle\int_0^1 2x^2 \sec^2 x \tan x\, dx$ Answer $\left[\frac{\pi^2-4\pi}{8} + \ln 2\right]$