

How to get marks for Integration by Parts questions

1. $u =$ and $\frac{du}{dx} =$
2. $\frac{dv}{dx} =$ and $v =$
3. Correct substitution of (your) terms into parts formula
4. Correct integration and correct final answer

(Note that there may be more marks available if question is more complicated)

How to get marks for Integration by Parts Questions

Question	$\int x^2 e^{-\frac{x}{4}} dx$	$\int x e^{6x} dx$	$\int (\ln x)^2 dx$	$\int x^2 \sin 2x dx$	$\int x \sec^2 x dx$
$u =$ and $\frac{du}{dx} =$					
$\frac{dv}{dx} =$ and $v =$					
Correct substitution of (your) terms into parts formula					
Correct integration and correct final answer					
Exam Paper Ref.	Jan 12 (7bi)	June 12 (4a)	June 13 (10a _{ii})	June 14 (6a)	June 15 (5b)

How to get marks for Integration by Parts Questions - Answers

Question	$\int x^2 e^{-\frac{x}{4}} dx$	$\int x e^{6x} dx$	$\int (\ln x)^2 dx$	$\int x^2 \sin 2x dx$	$\int x \sec^2 x dx$
$u =$ and $\frac{du}{dx} =$	$u = x^2, \quad \frac{du}{dx} = 2x$ Then $u = 2x, \quad \frac{du}{dx} = 2$	$u = x$ $\frac{du}{dx} = 1$	$u = (\ln x)^2, \frac{du}{dx} = \frac{2 \ln x}{x}$ Or $u = \ln x, \frac{du}{dx} = \frac{1}{x}$	$u = x^2, \quad \frac{du}{dx} = 2x$ Then $u = 2x, \quad \frac{du}{dx} = 2$	
$\frac{dv}{dx} =$ and $v =$	$\frac{dv}{dx} = e^{-\frac{x}{4}}, v = -4e^{-\frac{x}{4}}$ Then $\frac{dv}{dx} = e^{-\frac{x}{4}}, v = -4e^{-\frac{x}{4}}$	$\frac{dv}{dx} = e^{6x}$ $v = \frac{1}{6} e^{6x}$	$\frac{dv}{dx} = 1, \quad v = x$ Or $\frac{dv}{dx} = \ln x, v = x \ln x - x$	$\frac{dv}{dx} = \sin 2x$ $v = -\frac{1}{2} \cos 2x$	
Correct substitution of (your) terms into parts formula	$-4x^2 e^{-\frac{x}{4}} - \int -8x e^{-\frac{x}{4}} dx$ Then $-4x^2 e^{-\frac{x}{4}} + 8 \left[-8x e^{-\frac{x}{4}} - \int -8e^{-\frac{x}{4}} dx \right]$	$x(\ln x)^2 - \int 2 \ln x dx$	$x(\ln x)^2 - x \ln x - \int \ln x - 1 dx$ Or $x(\ln x)^2 - \int 2 \ln x dx$		
Correct integration and correct final answer	$-4x^2 e^{-\frac{x}{4}} - 32x e^{-\frac{x}{4}} - 128e^{-\frac{x}{4}}$ $+C$	$\frac{1}{6} x e^{6x} - \frac{1}{36} e^{6x}$ $+C$	$x(\ln x)^2 - 2x \ln x + 2x$ $+C$	$\frac{-x^2 \cos 2x}{2} + \frac{x \sin 2x}{2} - \frac{\cos 2x}{4}$ $+C$	$x \tan x - \ln(\sec x)$ $+C$
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