

[7.1] Integration by Parts

3. $\int x \cos 5x dx = \int x d(\frac{1}{5} \sin 5x).$

10. $\int \sin^{-1} x dx = \sin^{-1} x x - \int x d \sin^{-1} x.$

12. $\int p^5 \ln p dp = \int \ln p d(\frac{1}{6} p^6).$

13. $\int t \sec^2 2t dt = \int t \frac{1}{2} d \tan 2t.$

15. $\int (\ln x)^2 dx = (\ln x)^2 x - \int x d(\ln x)^2.$

25. $\int_0^1 \frac{y}{e^{2y}} dy = \int_0^1 y e^{-2y} dy.$

29. $\int \cos x \ln(\sin x) dx = \int \ln(\sin x) d(\sin x).$

35. Let $x = \theta^2$. Then $\int_{\sqrt{\pi/2}}^{\sqrt{\pi}} \theta^3 \cos(\theta^2) d\theta = \frac{1}{2} \int_{\sqrt{\pi/2}}^{\sqrt{\pi}} \theta^2 \cos(\theta^2) d\theta^2 = \frac{1}{2} \int_{\pi/2}^{\pi} x \cos x dx.$

47. $\int (\ln x)^n dx = (\ln x)x - \int x d(\ln x)^n.$

53. $\int_0^5 x e^{-0.4x} dx = \frac{1}{-0.4} \int_0^5 x d e^{-0.4x}.$