

Integration – Review of Various Techniques

I. Evaluate the following

1. Find $\frac{d}{dx} \int_5^{3x} (t^2 - t) dt$	2. $\int xe^{2x} dx$	3. $\int \frac{1}{x^3 + x^2 - 2x} dx$
4. $\int \frac{e^x + e^{-x}}{e^x - e^{-x}} dx$	5. $\int_{-4}^4 x dx$	6. $\int \sec x (\sec x + \tan x) dx$
7. $\int \frac{dx}{(x-1)^2}$	8. $\int \frac{dx}{x(1+\ln^2 x)}$	9. $\int \frac{e^{3x} dx}{1+e^{6x}}$
10. $\int \frac{dx}{\sqrt{9-4x^2}}$	11. $\int \frac{\sin 2x}{(1-\cos 2x)^3} dx$	12. $\int_{-\infty}^0 e^x dx$
13. $\int_1^4 \frac{dx}{1-x}$	14. $\int_{-\infty}^{\infty} x^3 dx$	15. $\int 7^{\sin x} \cos x dx$
16. $\int \frac{\cos^3 x + 4}{\cos^2 x} dx$	17. $\int \ln^2 x dx$	18. $\int \frac{x+4}{(x-1)(x+6)} dx$
19. $\int \frac{\sec^2 x}{\tan x} dx$	20. $\int x^{\frac{1}{3}} (2+x) dx$	21. $\int x^2 \cos x dx$

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Answers

1. $27x^2 - 9x$	2. $.5x^{2x} - .25e^{2x} + C$	3. $-1/2\ln x + 1/6\ln x+2 + 1/3\ln x-1 + C$
4. $\ln e^x - e^{-x} + C$	5. 16	6. $\tan x + \sec x + C$
7. $-1/(x-1) + C$	8. $\tan^{-1}(\ln x) + C$	9. $\ln(1+e^x) + C$
10. $1/2\sin^{-1}(2/3x) + C$	11. $-1/4(1-\cos 2x)^{-2} + C$	12. 1
13. Diverges	14. Diverges	15. $7^{\sin x}/\ln 7 + C$
16. $\sin x + 4 \tan x + C$	17. $x\ln^2 x - 2x\ln x + 2x + C$	18. $5/7\ln x-1 + 2/7\ln x+6 $
19. $\ln \tan x + C$	20. $3/2x^{4/3} + 3/7x^{7/3} + C$	21. $x^2 \sin x + 2x \cos x - 2 \sin x + C$