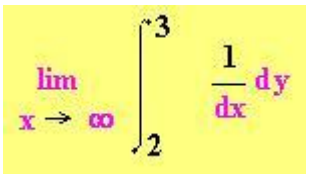

INDEFINITE INTEGRALS AND ANTIDERIVATIVES OF SOME TRANSCENDENTAL FUNCTIONS

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Problem 1:

Find the antiderivative for $\int \frac{3x^4 - 2x^3 + x^2 - 1}{3x^2}\,dx$.

Problem 2:

Integrate $\int 2(5^x)\,dx$. Note that "integrate" actually means to find the antiderivative for the function $f(x) = 2(5^x)$!!!

Problem 3:

Evaluate $\int \frac{1}{4\sec x}\,dx$. Note that "evaluate" actually means to find the antiderivative for the function $f(x) = \frac{1}{4\sec x}$!!!

Problem 4:

Evaluate $\int \frac{1}{\sin^2 x}\,dx$.

Problem 5:

Evaluate $\int \frac{\tan z}{\cos z}\,dz$.

Problem 6:

Evaluate $\int \frac{\sin^2 v}{1 - \sin^2 v}\,dv$

Problem 7:

Evaluate $\int (4 + 4\tan^2 x)\,dx$

Problem 8:

Evaluate $\int \frac{\csc\theta \cos\theta}{\sin\theta} d\theta$

Problem 9:

Evaluate $\int \sec y(\tan y - \sec y)\,dy$

Problem 10:

Evaluate $\int (\tan x - \sec x)^2\,dx$

Problem 11:

Evaluate $\int (1 + \cot^2 x)\,dx$

Problem 12:

Solve the differential equation $f'(x) = \csc x \cot x + x$ subject to the initial condition $f\left(\frac{\pi}{2}\right) = -1$.

Problem 13:

Solve the differential equation $f''(x) = 2\cos x - 5\sin x$ subject to the initial conditions $f'(\pi) = 3$ and $f(\pi) = 2 + 6\pi$.

Problem 14:

Evaluate $\int 4\cos 4x\ dx$

Problem 15:

Evaluate $\int 8\cos 4x \; dx$

Problem 16:

Evaluate $\int \frac{1}{2}\cos 4x \; dx$

Problem 17:

Evaluate $\int \cos 4x \; dx$

Problem 18:

Evaluate $\int 2x\cos 4x \; dx$

Problem 19:

Evaluate $\int \frac{1}{\sin(1-3x)\tan(1-3x)} dx$

Problem 20:

Evaluate $\int 7\sec 8x \tan 8x \; dx$

Problem 21:

Evaluate $\int \cot^2\left(\frac{x}{3}\right) dx$

Problem 22:

Evaluate $\int \frac{\sec 2x}{\cos 2x} dx$

Problem 23:

Evaluate $\int 3e^{3x+1} \; dx$

Problem 24:

Evaluate $\int 5xe^{-x^2}\,dx$

SOLUTIONS

You can find detailed solutions below the link for this problem set!

1. $F(x)=\frac{1}{x}x^3-\frac{1}{3}x^2-\frac{1}{3}\ln\lvert x\rvert+\frac{1}{3}x^{-1}+C$	2. $F(x)=\frac{2(5^x)}{\ln 5}+C$
3. $F(x)=\frac{1}{4}\sin x+C$	4. $F(x)=-\cot x+C$
5. $F(z)=\sec z+C$	6. $F(v)=\tan v-v+C$
7. $F(x)=4\tan x+C$	8. $F(\theta)=-\csc\theta+C$
9. $F(y)=\sec y-\tan y+C$	10. $F(x)=2\tan x-2\sec x-x$
11. $F(x)=-\cot x+C$	12. $f(x)=-\csc x+\frac{1}{2}x^2-\frac{\pi^2}{8}$
13. $f(x)=-2\cos x+5\sin x+8x-2\pi$	14. $F(x)=\sin 4x+C$
15. $F(x)=2\sin 4x+C$	16. $F(x)=\frac{1}{8}\sin 4x+C$
17. $F(x)=\frac{1}{4}\sin 4x+C$	18. Evaluation (integration) or finding an antiderivative is beyond the scope of this course.
19. $F(x)=\frac{1}{3}\csc(1-3x)+C$	20. $F(x)=\frac{7}{8}\sec 8x+C$
21. $F(x)=-3\cot\left(\frac{x}{3}\right)-x+C$	22. $F(x)=\frac{1}{2}\tan 2x+C$
23. $F(x)=e^{3x+1}+C$	24. $F(x)=-\frac{5}{2}e^{-x^2}+C$