Nishant Jindal

Q $\int \frac{\sin x}{\sin 3x} \cdot dx$

$\int \frac{dx}{3-4\sin^2 x}$

$\div \cos^2 x$

$\int \frac{\sec^2 x \cdot dx}{3+3\tan^2 x - 4\tan^2 x}$

$\int \frac{\sec^2 x \cdot dx}{3-(\tan x)^2}$

DY

Q (T3) $\int \frac{(a+b\sin x)\,dx}{(b+a\sin x)^2}$

$\div \cos^2 x$

$\int \frac{a\sec^2 x + \sec x \tan x \; dx}{(b\sec x + a\tan x)^2}$

$b\sec x + a\tan x = t$

$b\sec x\tan x + a\sec^2 x\,dx = dt$

$\int \frac{dt}{t^2} = -\frac{1}{t}$

Q $\int \frac{\sin^2 x \cdot dx}{1+\sin^2 x}$

$\int 1\,dx - \int \frac{1}{1+\sin^2 x}\,dx$

$\div \cos^2 x$

$\sin 2x \to (1+\sin 2x) - 1$

67 $\int \frac{\cos^3 x \cdot dx}{(\sin x + \cos x)}$

JM

68, 69

71, 72

73, 74

76, 75

17, 20, 25, 31, 32,

33, 35, 36, 37, 38, 39

52, 54, 55, 56, 57 $x^{1/6} = t$

58, 59, 61, 63, 67

$\boxed{2x+2 = 3\tan\theta}$

Nishant Jindal

Q25 $\displaystyle\int \frac{\sin x}{\sin 4x}\,dx$

$$\int \frac{\sin x\cdot dx}{2\sin 2x\cdot \cos 2x}$$

$$\int \frac{\sin x\cdot dx}{4\sin x\cdot \cos x\cdot \cos 2x}$$

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

$$\frac{1}{4}\int \frac{\cos x\cdot dx}{\cos^2 x\cdot \cos 2x}$$

$$\frac{1}{4}\int \frac{\cos x\cdot dx}{(1-\sin^2 x)(1-2\sin^2 x)} \qquad \sin x = t$$

$$\frac{1}{4}\int \frac{dt}{(t^2-1)(2t^2-1)}$$

$$\frac{1}{8}\int \frac{dt}{(t^2-1)(t^2-1/2)}$$

$$\frac{1}{8}\times\frac{1}{2}\int \frac{1}{t^2-1} - \frac{1}{(t^2-1/2)}$$

$$\frac{1}{16}\int \frac{1}{t^2-1^2} - \frac{1}{16}\times 2\int \frac{dt}{(\sqrt{2}t)^2-1^2}$$

$$\frac{1}{16}\times\frac{1}{2}\ln\left|\frac{t-1}{t+1}\right|$$

$$\frac{1}{4}\int 4\sin^2 x\cos^2 x$$

$$\frac{1}{4}\int (\sin^2 2x)\cdot dx$$

$$\frac{1}{4}\int \frac{1}{2} - \frac{\cos 4x}{2}\cdot dx$$

(35) $\displaystyle\int \frac{4\sin\phi\cos\phi - \cos\phi}{6-(1-\sin^2\phi)-4\sin\phi}$

$$\int \frac{(4\sin\phi - 1)\cos\phi\, d\phi}{5+\sin^2\phi - 4\sin\phi}$$

$\sin\phi = t$

$\int \frac{L}{Q}$ Solve

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36) $\int \frac{dx}{(1-\sin^2 x)(1+\sin^2 x)}$

$\int \frac{\sec^2 x \cdot dx}{1+\sin^2 x} \rightarrow T_3$

$\div \cos^2 x$

$\int \frac{\sec^2 x \cdot \sec^2 x \, dx}{1+2\tan^2 x}$

$\int \frac{(1+\tan^2 x)(\sec^2 x)}{(1+2\tan^2 x)} dx$

$\tan x = t$

38) $\int \frac{x\cos\alpha + 1}{(x^2+2x\cos\alpha+1)^{3/2}}$

$\int \frac{x\cos\alpha + 1 \cdot dx}{x^3\left(1+\frac{2\cos\alpha}{x}+\frac{1}{x^2}\right)^{3/2}}$

$\int \frac{\frac{\cos\alpha}{x^2} + \frac{1}{x^3} \cdot dx}{\left(1+\frac{2\cos\alpha}{x}+\frac{1}{x^2}\right)^{3/2}}$

$\rightarrow t$

$$\boxed{\begin{aligned} \sin^4 x + \cos^4 x &= 1 - 2\sin^2 x\cos^2 x \\ \sin^6 x + \cos^6 x &= 1 - 3\sin^2 x \cdot \cos^2 x \end{aligned}}$$

Q $\int \frac{dx}{\cos^6 x + \sin^6 x}$

$\Rightarrow \int \frac{dx}{1-3\sin^2 x\cos^2 x}$

$\div \cos^4 x$

$\Rightarrow \int \frac{\sec^4 x \cdot dx}{(1+\tan^2 x)^2 - 3\tan^2 x}$

$\Rightarrow \int \frac{(1+\tan^2 x)\sec^2 x \cdot dx}{\tan^4 x - \tan^2 x + 1}$

$\tan x = t$

$\Rightarrow \int \frac{(t^2+1) \cdot dt}{t^4 - t^2 + 1}$

10 lines

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Q $\int \operatorname{cosec}^{4/3}x \cdot \sec^{2/3}x \cdot dx$

Dr $\div \tan x$

$$\Rightarrow \int \frac{dx}{\frac{\sin^{4/3}x \cdot \cos^{2/3}x \cdot \cos^{4/3}x}{\cos^{4/3}x}}$$

$\tan x = t$

$$= \int \frac{\sec^2 x \cdot dx}{(\tan x)^{4/3}} = \int \frac{dt}{t^{4/3}}$$

Q $\int \frac{\sqrt{\cot x}}{\sin x \cdot \cos x} \cdot dx$

$$\int \frac{\sqrt{\cos x}}{\sin^{3/2}x \, \cos x \sqrt{\cos x}} = \int \frac{dx}{\frac{\sin^{3/2}x \cdot \cos^{1/2}x \cdot \cos^{3/2}x}{\cos^{3/2}x}}$$

$$\Rightarrow \int \frac{\sec^2 x}{(\tan x)^{3/2}} \cdot \tan x = t \Rightarrow \int \frac{dt}{t^{3/2}}$$

$$\int \frac{dx}{\sqrt{\sin^3 x \cdot \cos^5 x}}$$

$$\int \frac{dx}{\frac{\sin^{3/2}x \cdot \cos^{5/2}x \cos^{3/2}x}{\cos^{3/2}x}}$$

$\tan x = t$

$$\Rightarrow \int \frac{(1+\tan^2 x) \cdot \sec^2 x \, dx}{(\tan x)^{3/2}} \Rightarrow \int \frac{1+t^2}{t^{3/2}} \cdot dt$$

$$\int \frac{dx}{\sqrt[4]{\sin^3 x \cdot \cos^5 x}}$$

$$\int \frac{dx}{\frac{\sin^{3/4}x \cdot \cos^{5/4}x \cdot \cos^{3/4}x}{\cos^{3/4}x}}$$

$$\int \frac{\sec^2 x}{(\tan x)^{3/2}} = \int \frac{dt}{t^{3/2}}$$

Q $\int \sec^{25/13}x \cdot \operatorname{cosec}^{27/13}x$

$$\int \frac{dx}{\frac{\cos^{25/13}x \cdot \sin^{27/13}x \cdot \cos^{27/13}x}{\cos^{27/13}x}}$$

$$\int \frac{(1+\tan^2 x) \cdot \sec^2 x}{(\tan x)^{27/13}} = \int \frac{(1+t^2)}{t^{27/13}}$$

$$\int \frac{\cos^4 x \cdot dx}{\sin^3 x \, (\underbrace{\sin^5 x}_{\text{com.}} + \cos^5 x)^{3/5}}$$

$$\int \frac{\frac{\cos^4 x}{\cos^6 x}}{\frac{\sin^6 x}{\cos^6 x} \cdot (1 + \cot^5 x)^{3/5}}$$

$$\int \frac{\sec^2 x \cdot dx}{\tan^6 x \left(1 + \frac{1}{\tan^5 x}\right)^{3/5}}$$

$1 + \frac{1}{\tan^5 x} = t$

$$\int \frac{dt}{t^{3/5}}$$

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Q $\int \frac{dx}{(x-1)^{5/4}(x+2)^{3/4}}$ $\quad \frac{5}{4}+\frac{3}{4}=2$

किसी तरह Dr का deg 2 बनाओ

$$\int \frac{dx}{(x-1)^{5/4}\cdot(x-1)^{3/4}\cdot\frac{(x+2)^{3/4}}{(x-1)^{3/4}}}$$

$$\int \frac{dx}{(x-1)^{2}\cdot\left(\frac{x+2}{x-1}\right)^{3/4}}$$

$\frac{x+2}{x-1}=t$

$\frac{\cancel{x}-1-\cancel{x}-2}{(x-1)^2}\cdot dx=dt$

$-\frac{1}{3}\int\frac{dt}{t^{3/4}}$

$-\frac{1}{3}\int t^{-3/4}\cdot dt$

$-\frac{1}{3}\cdot\frac{t^{1/4}}{\frac{1}{4}}+C$

$$\int \frac{dx}{(x-p)\sqrt{(x-p)(x-q)}}$$

$$\int \frac{dx}{(x-p)^{3/2}\cdot(x-q)^{1/2}} \quad \frac{3}{2}+\frac{1}{2}=2$$

$$\int \frac{dx}{(x-p)^{3/2}\cdot(x-p)^{1/2}\left(\frac{x-q}{x-p}\right)^{1/2}}$$

$$\int \frac{dx}{(x-p)^{2}\cdot\left(\frac{x-q}{x-p}\right)^{1/2}} \quad \frac{x-q}{x-p}=t$$

$$\int \frac{2\,dx}{(2-x)^2}\cdot\sqrt[3]{\frac{2-x}{2+x}}\cdot dx$$

$$\int \frac{2\cdot dx}{(2-x)^2\cdot\left(\frac{2+x}{2-x}\right)^{1/3}}$$

$\frac{2+x}{2-x}=t$

$\frac{(2-\cancel{x})+(2+\cancel{x})}{(2-x)^2}\cdot dx=dt$

$\frac{dx}{(2-x)^2}=\frac{dt}{4}$

$\frac{2}{4}\int\frac{dt}{(t)^{1/3}}$

Nishant Jindal

T/F $\int \frac{a\sin x + b\cos x}{c\sin x + d\cos x}\,dx \quad \int \frac{ae^{x} + be^{-x}}{ce^{x} + de^{-x}}\,dx$

Q $\int \frac{\sin x + \cos x}{3\sin x + 2\cos x}\,dx$

Nr Replace

$\sin x + \cos x \equiv \lambda(3\sin x + 2\cos x) + \mu(3\cos x - 2\sin x)$

$\sin x \qquad \cos x$

$1 = 3\lambda - 2\mu \quad \times 2$

$1 = 2\lambda + 3\mu \quad \times 3$

$6\lambda - 4\mu = 2$

$6\lambda + 9\mu = 3$

$\mu = \frac{1}{13} \quad \lambda = \frac{5}{13}$

$\int \frac{\frac{5}{13}\cancel{(3\sin x + 2\cos x)}}{\cancel{3\sin x + 2\cos x}}\,dx + \int \frac{\frac{1}{13}(3\cos x - 2\sin x)\,dx}{3\sin x + 2\cos x} \to t$

$\frac{5}{13}\cdot x + \frac{1}{13}\ln|3\sin x + 2\cos x| + C$

Q $\int \frac{3\cos x + 4}{\sin x + 2\cos x + 3}\,dx$

Dr $\quad$ Dr'

$3\cos x + 4 = \lambda(\sin x + 2\cos x + 3) + \mu(\cos x - 2\sin x) + K$

$\sin x$

$0 = \lambda - 2\mu$

$3 = 2\lambda + \mu$

$4 = 3\lambda + K$

$\mu = \frac{3}{5}, \quad \lambda = \frac{6}{5}$

$K + \frac{18}{5} = \frac{20}{5} \Rightarrow K = \frac{2}{5}$

$= \int \frac{\frac{6}{5}\cancel{(\sin x + 2\cos x + 3)}}{\cancel{(\sin x + 2\cos x + 3)}} + \frac{\frac{3}{5}(\cos x - 2\sin x)}{(\sin x + 2\cos x + 3)} + \frac{\frac{2}{5}}{(\sin x + 2\cos x + 3)}$

t

$\frac{6}{5}x + \frac{3}{5}\ln(\sin x + 2\cos x + 3) + \frac{2}{5}\int \frac{dx}{\sin x + 2\cos x + 3}$

$'' \qquad '' + \frac{2}{5}\int \frac{\sec^2\frac{x}{2}\cdot dx}{2\tan\frac{x}{2} + 1 - \tan^2\frac{x}{2} + 5}$

$\tan\frac{x}{2} = t$

Q $\int \frac{1 + \cos\alpha\cdot\cos x}{\cos\alpha + \cos x}\,dx$

$1 + \cos\alpha\cdot\cos x = \lambda(\cos\alpha + \cos x) + \mu(-\sin x) + K$

Nishant Jindal

$$\int \frac{\text{Linear}}{\text{Linear}}, \int \frac{\text{Linear}}{\sqrt{\text{Linear}}}$$

Q $$\int \frac{3x+4}{4x+3} \cdot dx$$

$$\frac{3}{4}\int \frac{\cancel{4x+3}}{\cancel{4x+3}} + \left(4-\frac{9}{4}\right)\int \frac{dx}{4x+3}.$$

$$\frac{3x}{4} + \frac{7}{4} \cdot \frac{\ln|4x+3|}{4} + c$$

Q $$\int \frac{5x+7}{\sqrt{7x+9}} \cdot dx$$

$$\frac{5}{7}\int \frac{\cancel{7x+9}^{\sqrt{7x+9}}}{\cancel{\sqrt{7x+9}}} + \left(7-\frac{45}{7}\right)\int \frac{dx}{\sqrt{7x+9}}$$

$$\frac{5}{7} \cdot \frac{2}{3} \frac{(7x+9)^{3/2}}{7} + \frac{4}{7} \times \frac{2\sqrt{7x+9}}{7} + c$$

$$\int \frac{\text{Linear}}{\text{Quad}} \qquad \int \frac{\text{Linear}}{\sqrt{\text{Quad}}}$$

Q $$\int \frac{x+1 \cdot dx}{x^2+x+1}$$

$$\frac{1}{2}\int \frac{(2x+1)dx}{x^2+x+1} + \left(1-\frac{1}{2}\right)\int \frac{dx}{x^2+x+1}$$

du, t

$$\frac{1}{2} \ln|x^2+x+1| + \frac{1}{2}\int \frac{dx}{\left(x+\frac{1}{2}\right)^2 - \left(\frac{1}{2}\right)^2 + 1}$$

$$+ \frac{1}{2}\int \frac{dx}{\left(x+\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2}$$

$$+ \frac{1}{2} \times \frac{1}{\frac{\sqrt{3}}{2}} \tan^{-1}\left(\frac{x+\frac{1}{2}}{\frac{\sqrt{3}}{2}}\right) + c$$