1. $\int \frac{\mathrm{d}x}{x^2+2x}$

$$\boxed{\frac{1}{2}\ln\left|\frac{x}{x+2}\right| + C}$$

2. $\int \frac{\mathrm{d}x}{x^2-1}$

$$\boxed{\frac{1}{2}\ln\left|\frac{x-1}{x+1}\right| + C}$$

3. $\int \frac{\mathrm{d}x}{x^3+x}$

$$\boxed{\ln|x| - \frac{1}{2}\ln|1+x^2| + C}$$

4. $\int \frac{\mathrm{d}x}{(x-1)(x-2)(x-3)}$

$$\boxed{\frac{1}{2}\ln|x-1| - \ln|x-2| + \frac{1}{2}\ln|x-3| + C}$$

5. $\int \frac{\mathrm{d}x}{x(x+1)^2}$

$$\boxed{\ln|x| - \ln|1+x| + \frac{1}{1+x} + C}$$

6. $\int \frac{2x^2+41x-91}{(x-1)(x+3)(x-4)}\mathrm{d}x$

$$\frac{2x^2+41x-91}{(x-1)(x+3)(x-4)} = \frac{A}{x-1} + \frac{B}{x+3} + \frac{C}{x-4} = \frac{A(x^2-x-12)+B(x^2-5x+4)+C(x^2+2x-3)}{(x-1)(x+3)(x-4)} =$$

$$= \frac{(A+B+C)x^2+x(-A-5B+2C)+(-12A+4B-3C)}{(x-1)(x+3)(x-4)}$$

$$\begin{aligned} A+B+C&=2 \\ -A-5B+2C&=41 \qquad A=4, B=-7, C=5 \\ -12A+4B-3C&=-91 \end{aligned}$$

$$\int \frac{2x^2+41x-91}{(x-1)(x+3)(x-4)}\mathrm{d}x = \int \frac{4}{x-1}\mathrm{d}x - \int \frac{7}{x+3}\mathrm{d}x + \int \frac{5}{x-4}\mathrm{d}x = 4\ln|x-1| - 7\ln|x+3| + 5\ln|x-4| + C$$

$$\boxed{4\ln|x-1| - 7\ln|x+3| + 5\ln|x-4| + C}$$

7. $\int \frac{2\,\mathrm{d}x}{x^2+2x+5}$

$$\boxed{\operatorname{arctg}\frac{x+1}{2} + C}$$

8. $\int \frac{\mathrm{d}x}{3x^2+5}$

$$\boxed{\frac{1}{\sqrt{15}}\operatorname{arctg}\frac{\sqrt{3}x}{\sqrt{5}} + C}$$

9. $\int \frac{\mathrm{d}x}{x^3+1}$

$$\boxed{\frac{1}{3}\ln|x+1| - \frac{1}{6}\ln(x^2-x+1) + \frac{\sqrt{3}}{3}\operatorname{arctg}\frac{2x-1}{3} + C}$$

10. $\int \frac{\mathrm{d}x}{x^3+x^2+x}$

$$\boxed{\ln|x| - \frac{1}{2}\ln|x^2+x+1| - \frac{1}{\sqrt{3}}\operatorname{arctg}\frac{2x+1}{\sqrt{3}} + C}$$

11. $\int \frac{x^2}{x^2-6x+10}\mathrm{d}x$

$$\boxed{x + 3\ln|x^2-6x+10| + 8\operatorname{arctg}(x-3) + C}$$

12. $\int \frac{2x-3}{(x^2-3x+2)^2}\mathrm{d}x$

$$\boxed{-\frac{1}{x^2-3x+2} + C}$$

13. $\int \frac{9x-14}{9x^2-24x+16}\mathrm{d}x$

$$\boxed{\ln|3x-4| + \frac{2}{3}\frac{1}{3x-4} + C}$$

14. $\int \frac{\mathrm{d}x}{2x^2+5x-12}$

$$\boxed{\frac{1}{11}\left(\ln|2x-3|-\ln|x+4|\right)+C}$$

15. $\int \frac{3x^2+32x-120}{(x-2)(x+2)(x-5)}\mathrm{d}x$

$$\boxed{\frac{11}{3}\ln|x-2|-\frac{43}{7}\ln|x+2|+\frac{125}{21}\ln|x-5|+C}$$

16. $\int \frac{5x^3-15x^2+15x-3}{x^3-8x^2+17x-10}\mathrm{d}x$

$$\boxed{5x+\frac{1}{2}\ln|x-1|-\frac{7}{3}\ln|x-2|+\frac{161}{6}\ln|x-5|+C}$$

17. $\int \frac{5x^3+9x^2-22x-8}{x^3-4x}\mathrm{d}x$

$$\boxed{5x+2\ln|x|+3\ln|x-2|+4\ln|x+2|+C}$$

18. $\int \frac{x^3+x+1}{(x^2+1)^2}\mathrm{d}x$

$$\boxed{\frac{1}{2}\ln(x^2+1)-\frac{1}{1+x^2}+C}$$

19. $\int \frac{2x^3-7x^2+12x-10}{x^4-4x^3+8x^2-8x+12}\mathrm{d}x$

$$\boxed{\frac{1}{2}\ln(x^2+2)-\frac{\sqrt{2}}{2}\mathrm{arctg}\,\frac{x}{\sqrt{2}}+\frac{1}{2}\ln|x^2-4x+6|+C}$$

20. $\int \frac{9x^4+3x^3-23x^2+x}{9x^3-6x^2-5x+2}\,dx$

$$\boxed{\frac{x^2}{2}+x-\ln|x-1|+\frac{1}{3}\ln|3x-1|-\frac{2}{3}\ln|3x+2|+C}$$

21. $\int_1^2(x^2-3x+2)\,\mathrm{d}x=\left[\frac{1}{3}x^3-\frac{3}{2}x^2+2x\right]_1^2=\frac{2}{3}-\frac{5}{6}$

$$\boxed{-\frac{1}{6}}$$

22. $\int_0^3|1-3x|\mathrm{d}x=\int_0^{\frac{1}{3}}(1-3x)\,\mathrm{d}x+\int_{\frac{1}{3}}^3(3x-1)\,\mathrm{d}x=\left[x-\frac{3}{2}x^2\right]_0^{\frac{1}{3}}+\left[\frac{3}{2}x^2-x\right]_{\frac{1}{3}}^3=$
$=\frac{1}{6}+\frac{21}{2}+\frac{1}{6}=\frac{65}{6}$

$$\boxed{\frac{65}{6}}$$

23. $\int_{-4}^{-2}\frac{1}{x}\mathrm{d}x=[\ln|x|]_{-4}^{-2}=\ln 2-\ln 4$

$$\boxed{-\ln 2}$$

24. $\int_0^1\frac{\mathrm{d}x}{1+x^2}=[\mathrm{arctg}\,x]_0^1=\frac{\pi}{4}$

$$\boxed{\frac{\pi}{4}}$$

25. $\int_0^2\frac{x}{x^2+3x+2}\mathrm{d}x=\frac{1}{2}\int_0^2\frac{2x+3-3}{x^2+3x+2}\mathrm{d}x=\frac{1}{2}\int_0^2\frac{2x+3}{x^2+3x+2}-\frac{3}{2}\int_0^2\frac{\mathrm{d}x}{(x+1)(x+2)}=\frac{1}{2}\left[\ln|x^2+3x+2|\right]_0^2-$
$-\frac{3}{2}\int_0^2\frac{(x+2)-(x+1)}{(x+1)(x+2)}\mathrm{d}x=\frac{1}{2}\ln 6-\frac{3}{2}[\ln|x+1|]_0^2+\frac{3}{2}[\ln|x+2|]_0^2=\frac{1}{2}\ln 6-\frac{3}{2}\ln 3+\frac{3}{2}(\ln 4-\ln 2)=$
$=2\ln 2-\ln 3=\ln\frac{4}{3}$

$$\boxed{\ln\frac{4}{3}}$$

26. $\int_0^\pi\cos x\,\mathrm{d}x=[\sin x]_0^\pi=0$

$$\boxed{0}$$

27. $\int_0^\pi|\cos x|\,\mathrm{d}x=\int_0^{\frac{\pi}{2}}\cos x\,\mathrm{d}x-\int_{\frac{\pi}{2}}^\pi\cos x\,\mathrm{d}x=[\sin x]_0^{\frac{\pi}{2}}-[\sin x]_{\frac{\pi}{2}}^\pi=2$

$$\boxed{2}$$

28. $\int_0^\pi\sin^3 x\,\mathrm{d}x=\int_0^\pi\sin x(1-\cos^2 x)\mathrm{d}x=\int_0^\pi\sin x\,\mathrm{d}x-\int_0^\pi\sin x\cos^2 x\,dx=$
$[-\cos x]_0^\pi-\int_0^\pi\sin x\cos^2 x\,\mathrm{d}x=2-\int_0^\pi\sin x\cos^2 x\,\mathrm{d}x=\left|\begin{matrix}t=\cos x & \pi\to-1\\ \mathrm{d}t=-\sin x\,\mathrm{d}x & 0\to 1\end{matrix}\right|$

$= 2 + \int_1^{-1} t^2\,\mathrm{d}t = 2 + \left[\frac{1}{3}t^3\right]_1^{-1} = \frac{4}{3}$

$$\boxed{\frac{4}{3}}$$

29. $\int_3^7 \frac{x}{x^2-4}\,dx = \left|\begin{matrix} t = x^2 & 7 \to 49 \\ \mathrm{d}t = 2x\,\mathrm{d}x & 3 \to 9 \end{matrix}\right| = \frac{1}{2}\int_9^{49} \frac{\mathrm{d}t}{t-4} = \left[\frac{1}{2}\ln|t-4|\right]_9^{49} = \frac{1}{2}\ln 9$

$$\boxed{\ln 3}$$

30. $\int_0^{\frac{\pi}{2}} \cos x \cdot \sin^2 x\,dx = \left|\begin{matrix} t = \sin x & \frac{\pi}{2} \to 1 \\ \mathrm{d}t = \cos x\,\mathrm{d}x & 0 \to 0 \end{matrix}\right| = \int_0^1 t^2 \mathrm{d}t = \left[\frac{1}{3}t^3\right]_0^1 = \frac{1}{3}$

$$\boxed{\frac{1}{3}}$$

31. $\int_0^1 \frac{\sqrt{x}}{1+\sqrt{x}}\,dx = \left|\begin{matrix} t = \sqrt{x} & 1 \to 1, 0 \to 0 \\ \mathrm{d}t = \frac{\mathrm{d}x}{2\sqrt{x}} & \mathrm{d}x = 2\sqrt{x}\,\mathrm{d}t \end{matrix}\right| = \int_0^1 \frac{2\sqrt{x}\sqrt{x}\,\mathrm{d}t}{1+\sqrt{x}} = 2\int_0^1 \frac{t^2}{t+1}\,\mathrm{d}t = 2\int_0^1 \frac{t^2-1+1}{t+1}\mathrm{d}t$

$= 2\int_0^1 (t-1)\,\mathrm{d}t + 2\int_0^1 \frac{1}{1+t}\mathrm{d}t = 2\left[\frac{1}{2}t^2 - t + \ln|1+t|\right]_0^1 = 2\ln 2 - 1$

$$\boxed{\ln 4 - 1}$$

32. $\int_{-1}^1 \frac{\mathrm{d}x}{(1+x^2)^2}$

$\pi = [\mathrm{arctg}\,x]_{-1}^1 = \int_{-1}^1 \frac{\mathrm{d}x}{1+x^2} = \left|\begin{matrix} \frac{1}{1+x^2} & 1 \\ -\frac{2x}{(1+x^2)^2} & x \end{matrix}\right| = \left[\frac{x}{1+x^2}\right]_{-1}^1 + 2\int_{-1}^1 \frac{x^2}{(1+x^2)^2} =$

$1 + 2\int_{-1}^1 \frac{x^2+1-1}{(x^2+1)^2}\mathrm{d}x = 1 + 2\int_{-1}^1 \frac{\mathrm{d}x}{1+x^2} - 2\int_{-1}^1 \frac{\mathrm{d}x}{(1+x^2)^2} = 1 + 2\pi - 2\int_{-1}^1 \frac{\mathrm{d}x}{(1+x^2)^2}$

$\int_{-1}^1 \frac{\mathrm{d}x}{(1+x^2)^2} = \frac{1}{2}(1+\pi)$

$$\boxed{\frac{\pi+1}{2}}$$

33. $\int_0^{\sqrt{2}} \sqrt{4-x^2}\,dx = \left|\begin{matrix} x = 2\sin t & t = \arcsin\frac{t}{2} \\ \mathrm{d}x = 2\cos t\,\mathrm{d}t & \sqrt{2} \to \frac{\pi}{4}, 0 \to 0 \end{matrix}\right| = \int_0^{\frac{\pi}{4}} 2\sqrt{4 - 4\sin^2 t}\cos t\,\mathrm{d}t =$

$= 4\int_0^{\frac{\pi}{4}} \cos^2 t\,\mathrm{d}t = 4\int_0^{\frac{\pi}{4}} \frac{\cos 2t + 1}{2}\mathrm{d}t = 4\left[\frac{1}{4}\sin 2t + \frac{t}{2}\right]_0^{\frac{\pi}{4}} = 1 + \frac{\pi}{2}$

$$\boxed{1 + \frac{\pi}{2}}$$

34. $\int_0^{\ln 5} \frac{e^x\sqrt{e^x-1}}{e^x+3}\,dx = \left|\begin{matrix} t = \sqrt{e^x-1} & \ln 5 \to 2 \\ \mathrm{d}t = \frac{1}{2}\frac{e^x}{\sqrt{e^x-1}}\mathrm{d}x & 0 \to 0 \end{matrix}\right| = \int_0^2 \frac{\sqrt{e^x-1}}{e^x+3} 2\sqrt{e^x-1}\,\mathrm{d}t = 2\int_0^2 \frac{e^x-1}{e^x-1+4}\mathrm{d}t =$

$= 2\int_0^2 \frac{t^2}{t^2+4} = 2\int_0^2 \frac{t^2+4-4}{t^2+4}\mathrm{d}t = 2\int_0^2 1\,dt - 8\int_0^2 \frac{\mathrm{d}t}{t^2+4} = \left|\begin{matrix} t = 2s & s = \frac{t}{2} \\ \mathrm{d}t = 2\mathrm{d}s & 2 \to 1, 0 \to 0 \end{matrix}\right| =$

$= 4 - 16\int_0^1 \frac{\mathrm{d}s}{4+4s^2} = 4 - 4\int_0^1 \frac{\mathrm{d}s}{1+s^2} = 4 - 4\,[\mathrm{arctg}\,s]_0^1 = 4 - \pi$

$$\boxed{4 - \pi}$$

35. $\int_1^2 \frac{\mathrm{d}x}{\sqrt{3+2x-x^2}} = \int_1^2 \frac{\mathrm{d}x}{\sqrt{4-(x-1)^2}} = \left|\begin{matrix} t = x-1 & 2 \to 1 \\ \mathrm{d}t = \mathrm{d}x & 1 \to 0 \end{matrix}\right| = \int_0^1 \frac{\mathrm{d}t}{\sqrt{4-t^2}} =$

$= \left|\begin{matrix} t = 2\sin s & s = \arcsin\frac{t}{2} \\ \mathrm{d}t = 2\cos s\,\mathrm{d}s & 1 \to \frac{\pi}{6}, 0 \to 0 \end{matrix}\right| = \int_0^{\frac{\pi}{6}} \frac{2\cos s\,\mathrm{d}s}{\sqrt{4-4\sin^2 s}} = \int_0^{\frac{\pi}{6}} 1\,\mathrm{d}s = \frac{\pi}{6}$

$$\boxed{\frac{\pi}{6}}$$

36. $\int_0^{\frac{\pi}{2}} \frac{\sin\varphi}{6 - 5\cos\varphi + \cos^2\varphi}\mathrm{d}\varphi = \left|\begin{matrix} t = \cos\varphi & \frac{\pi}{2} \to 0 \\ \mathrm{d}t = -\sin\varphi\,\mathrm{d}\varphi & 0 \to 1 \end{matrix}\right| = \int_1^0 \frac{-\mathrm{d}t}{6-5t+t^2} = \int_0^1 \frac{\mathrm{d}t}{(t-3)(t-2)} =$

$= \int_0^1 \frac{(t-2)-(t-3)}{(t-3)(t-2)}\mathrm{d}t = \int_0^1 \frac{\mathrm{d}t}{t-3} - \int_0^1 \frac{\mathrm{d}t}{t-2} = [\ln|t-3|]_0^1 - [\ln|t-2|]_0^1 = 2\ln 2 - \ln 3$

$$\boxed{\ln\frac{4}{3}}$$

37. $\int_0^1 xe^{-x}\mathrm{d}x = \left|\begin{matrix} x & e^{-x} \\ 1 & -e^{-x} \end{matrix}\right| = -[xe^{-x}]_0^1 + \int_0^1 e^{-x}\mathrm{d}x = -\frac{1}{e} - [e^{-x}]_0^1 = 1 - \frac{2}{e}$

$$\boxed{\frac{e-2}{e}}$$

38. $\int_1^e \ln x\,dx = \begin{vmatrix} \ln x & 1 \\ \frac{1}{x} & x \end{vmatrix} = [x\ln x]_1^e - \int_1^e 1\,\mathrm{d}x = e - [x]_1^e = e-(e-1) = 1$

$$\boxed{1}$$

39. $\int_0^{\frac{\pi}{2}} x\sin x\,dx = \begin{vmatrix} x & \sin x \\ 1 & -\cos x\end{vmatrix} = -[x\cos x]_0^{\frac{\pi}{2}} + \int_0^{\frac{\pi}{2}}\cos x\,\mathrm{d}x = [\sin x]_0^{\frac{\pi}{2}} = 1$

$$\boxed{1}$$

40. $\int_1^2 x\ln x\,dx = \begin{vmatrix}\ln x & x\\ \frac{1}{x} & \frac{1}{2} x^2\end{vmatrix} = \frac{1}{2}\left[x^2\ln x\right]_1^2 - \frac{1}{2}\int_1^2 x\,dx = 2\ln 2 - \frac{1}{4}\left[x^2\right]_1^2 = 2\ln 2 - \frac{3}{4}$

$$\boxed{2\ln 2 - \frac{3}{4}}$$

41. $\int_0^1 x^3e^{2x}\mathrm{d}x = \begin{vmatrix} x^3 & e^{2x}\\ 3x^2 & \frac{1}{2}e^{2x}\end{vmatrix} = \left[\frac{1}{2}x^3e^{2x}\right]_0^1 - \frac{3}{2}\int_0^1 x^2e^{2x}\mathrm{d}x = \frac{e^2}{2} - \frac{3}{2}\int_0^1 x^2e^{2x}\mathrm{d}x$

$\int_0^1 x^2e^{2x}\mathrm{d}x = \begin{vmatrix} x^2 & e^{2x}\\ 2x & \frac{1}{2}e^{2x}\end{vmatrix} = \left[\frac{1}{2}x^2e^{2x}\right]_0^1 - \int_0^1 xe^{2x}\mathrm{d}x = \frac{e^2}{2} - \int_0^1 xe^{2x}\mathrm{d}x (= \frac{e^2-1}{4})$

$\int_0^1 xe^{2x}\mathrm{d}x = \begin{vmatrix} x & e^{2x}\\ 1 & \frac{1}{2}e^{2x}\end{vmatrix} = \left[\frac{1}{2}xe^{2x}\right]_0^1 - \frac{1}{2}\int_0^1 e^{2x}\mathrm{d}x = \frac{e^2}{2} - \frac{1}{2}\left[\frac{1}{2}e^{2x}\right]_0^1 = \frac{e^2+1}{4}$

$$\boxed{\frac{e^2+3}{8}}$$

42. $\int_0^{\frac{\pi}{2}} e^{2x}\sin x\,\mathrm{d}x = \begin{vmatrix} e^{2x} & \sin x\\ 2e^{2x} & -\cos x\end{vmatrix} = \left[-e^{2x}\cos x\right]_0^{\frac{\pi}{2}} + 2\int_0^{\frac{\pi}{2}} e^{2x}\cos x\,dx = 1 + 2\int_0^{\frac{\pi}{2}} e^{2x}\cos x\,dx$

$\int_0^{\frac{\pi}{2}} e^{2x}\cos x\,\mathrm{d}x = \begin{vmatrix} e^{2x} & \cos x\\ 2e^{2x} & \sin x\end{vmatrix} = \left[e^{2x}\sin x\right]_0^{\frac{\pi}{2}} - 2\int_0^{\frac{\pi}{2}} e^{2x}\sin x\,\mathrm{d}x = e^{\pi} - 2\int_0^{\frac{\pi}{2}} e^{2x}\sin x\,\mathrm{d}x$

$\int_0^{\frac{\pi}{2}} e^{2x}\sin x\,\mathrm{d}x = 1 + 2e^{\pi} - 4\int_0^{\frac{\pi}{2}} e^{2x}\sin x\,\mathrm{d}x$

$$\boxed{\frac{2}{5}e^{\pi} + \frac{1}{5}}$$

43. $\int_{\frac{\pi}{3}}^{\frac{\pi}{4}} x\sin^{-2}x\,dx = \begin{vmatrix} x & \frac{1}{\sin^2 x}\\ 1 & \mathrm{tg}\,x\end{vmatrix} = [x\,\mathrm{tg}\,x]_{\frac{\pi}{3}}^{\frac{\pi}{4}} - \int_{\frac{\pi}{3}}^{\frac{\pi}{4}}\mathrm{tg}\,x\,\mathrm{d}x = \frac{\pi}{4} - \frac{\pi}{3}\sqrt{3} + [\ln|\cos x|]_{\frac{\pi}{3}}^{\frac{\pi}{4}} =$

$= ... + \ln\frac{\sqrt{2}}{2} - \ln\frac{1}{2}$

$$\boxed{\frac{\pi}{3} - \frac{\sqrt{3}}{3}\pi + \frac{1}{2}\ln 2}$$

44. $\int_{-1}^1 \arccos x\,\mathrm{d}x = \begin{vmatrix} \arccos x & 1\\ -\frac{1}{\sqrt{1-x^2}} & x\end{vmatrix} = [x\arccos x]_{-1}^1 + \int_{-1}^1 \frac{x}{\sqrt{1-x^2}}\,dx = \pi - \left[\sqrt{1-x^2}\right]_{-1}^1 = \pi$

$$\boxed{\pi}$$

45. $\int_0^{\sqrt{3}} x\,\mathrm{arctg}\,x\,\mathrm{d}x = \begin{vmatrix}\mathrm{arctg}\,x & x\\ \frac{1}{1+x^2} & \frac{x^2}{2}\end{vmatrix} = \left[\frac{1}{2}x^2\mathrm{arctg}\,x\right]_0^{\sqrt{3}} - \frac{1}{2}\int_0^{\sqrt{3}}\frac{x^2}{1+x^2}dx = \frac{3}{2}\mathrm{arctg}\,\sqrt{3} -$

$-\frac{1}{2}\int_0^{\sqrt{3}}\left(1 - \frac{1}{1+x^2}\right)dx = \frac{3}{2}\frac{\pi}{3} - \frac{1}{2}[x]_0^{\sqrt{3}} + \frac{1}{2}\int_0^{\sqrt{3}}\frac{1}{1+x^2}\mathrm{d}x = \frac{\pi}{2} - \frac{\sqrt{3}}{2} + \frac{1}{2}[\mathrm{arctg}\,x]_0^{\sqrt{3}} =$

$= \frac{\pi}{2} - \frac{\sqrt{3}}{2} + \frac{1}{2}\frac{\pi}{3} = \frac{2}{3}\pi - \frac{\sqrt{3}}{2}$

$$\boxed{\frac{2}{3}\pi - \frac{\sqrt{3}}{2}}$$

46. $\int_0^{\ln 2} x\cosh x\,\mathrm{d}x = \begin{vmatrix} x & \cosh x\\ 1 & \sinh x\end{vmatrix} = [x\sinh x]_0^{\ln 2} - \int_0^{\ln 2}\sinh x\,\mathrm{d}x = \ln 2\sinh\ln 2 - [\cosh x]_0^{\ln 2} =$

$= \ln 2\frac{e^{\ln 2} - e^{-\ln 2}}{2} - \left(\frac{e^{\ln 2} + e^{-\ln 2}}{2} - \frac{e^0+e^0}{2}\right) = \ln 2\frac{2-\frac{1}{2}}{2} - \left(\frac{2+\frac{1}{2}}{2} - 1\right) = \frac{1}{4}(3\ln 2 - 1)$

$$\boxed{\frac{1}{4}(3\ln 2 - 1)}$$

47. $I_n = \int_0^{\frac{\pi}{2}} \sin^n x \,\mathrm{d}x = \begin{vmatrix} \sin^{n-1} x & \sin x \\ (n-1)\sin^{n-2} x \cos x & -\cos x \end{vmatrix} = \left[-\sin^{n-1} x \cos x\right]_0^{\frac{\pi}{2}} +$

$+(n-1)\int_0^{\frac{\pi}{2}} \sin^{n-2} x \cos^2 x \, dx = (n-1)\int_0^{\frac{\pi}{2}} \sin^{n-2} x(1-\sin^2 x)\,\mathrm{d}x = (n-1)I_{n-2} - (n-1)I_n$

Teda $nI_n = (n-1)I_{n-2}, n > 1,\ I_n = \frac{n-1}{n} I_{n-2}, n \geq 2$

$I_0 = \int_0^{\frac{\pi}{2}} \sin^0 x \, dx = \int_0^{\frac{\pi}{2}} 1 \, dx = \frac{\pi}{2},\ I_1 = \int_0^{\frac{\pi}{2}} \sin x \,\mathrm{d}x = [-\cos x]_0^{\frac{\pi}{2}} = 1$

$$\boxed{I_0 = \frac{\pi}{2},\ I_1 = 1,\ I_n = \frac{n-1}{n} I_{n-2}, n \geq 2}$$