2025 적분 챔피언십: 본선 문제 모음

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최종 진출전

[각 문제당 제한시간 2분]

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

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

$$\int_0^1 \cos(1 + \log(x))\, dx$$

$$\sum_{n=2}^{\infty} \int_0^{\infty} \frac{x^2}{1 + 2nx^2 + (n^2 - 1)x^4}\, dx$$

$$\int \sec^2(x)(1 + 2\tan(x))e^x\, dx$$

$$\int \left(x - \frac{1}{x^3}\right) \cosh\left(\frac{1}{x}\right) e^x\, dx$$

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

$$\int \frac{\arctan x}{(x^2+1)^2}\, dx$$

$$\int \sqrt{e^x + 1}\, dx$$

$$\int_0^{2025\pi} \left\lfloor \frac{3}{2} + \sin x \right\rfloor dx$$

$$\int_0^1 \sqrt{1 - x^2} \arcsin(x)\, dx$$

$$\int \frac{1}{1 + 20\sin x + 25\cos x}\, dx$$

$$\int_{-\infty}^{\infty} 2^x 3^{-4^x}\, dx$$

$$\int \frac{1}{\sin^4 x + \cos^4 x}\, dx$$

$$\int_0^{2025} \frac{\log(2025 - x)}{\sqrt{2025x - x^2}}\, dx$$

8강

[각 문제당 제한시간 3분]

8강 1경기

$$\int_{-\infty}^{\infty} \det\left[\exp\begin{pmatrix} x^2 & x & 1 \\ ex^3 & -ex^2 & ex \\ -x^4 & x^3 & -x^2 \end{pmatrix}\right] dx$$

$$\lim_{n\to\infty} \int_1^2 \left(\sum_{k=1}^{n} \frac{1}{nx+k} \right) dx$$

$$\int_0^{\pi^2} \left(\sin\sqrt{x}\right)^{2025} dx$$

8강 2경기

$$\int \frac{x^4}{e^x - \left(1 + x + \frac{x^2}{2} + \frac{x^3}{6} + \frac{x^4}{24}\right)} dx$$

$$\int_0^{\infty} \left(\frac{1-e^{-x}}{x}\right)^2 dx$$

$$\lim_{A\to\infty} \int_0^{\pi} \sqrt{A} e^{-A\sin^2 x}\, dx$$

8강 3경기

$$\int_0^{\pi/3} \prod_{k=0}^{\infty} \left(1 + (\sin x)^{2^k}\right) dx$$

$$\int \frac{x}{\sqrt{(e^x - x - 1)(e^x + x + 1)}}\, dx$$

$$\int_0^{\infty} \frac{1}{\left(1 + x^{\frac{1+\sqrt{5}}{2}}\right)^{\frac{1+\sqrt{5}}{2}}}\, dx$$

8강 4경기

$$\int \frac{\sin x + \cos x}{\sin x + e^{-x}}\, dx$$

$$\int_0^1 \sqrt{1 + x\sqrt{1 + (x+1)\sqrt{1 + (x+2)\sqrt{1 + \cdots}}}}\, dx$$

$$\int_0^{2025} \left(\left\lceil \sqrt{\lfloor x \rfloor} \right\rceil - \left\lfloor \sqrt{\lceil x \rceil} \right\rfloor \right) dx$$

8강 타이브레이커

$$\int_0^{\pi} \frac{x \sin x}{1+\cos^2 x}\, dx$$

$$\int \frac{1}{x^{1/3}+x^{2/3}}\, dx$$

4강

[각 문제당 제한시간 4분]

4강 1경기

$$\int e^{\cos(x)-\sin(x)}\cos(2x+\sin(x)+\cos(x))\,dx$$

$$\int_0^\infty \log(1+e^{-2x}+e^{-3x}+e^{-4x}+e^{-5x}+e^{-6x}+e^{-7x}+e^{-9x})\,dx$$

$$\int_0^\infty \frac{xe^x}{e^{2x}-1}\,dx$$

$$\int_0^{\pi/6} \frac{e^{\sin x}(1+\cos^2 x)}{1-\sin x}\,dx$$

4강 2경기

$$\lim_{n\to\infty}\int_0^2 \left(e^{x-n}\sum_{k=0}^{n}\frac{x^2n^k}{k!}\right)dx$$

$$\int_1^\infty \frac{\log(x+1)-\log(x)}{x^2+1}\,dx$$

$$\int_0^1 \frac{1}{\sqrt[2025]{1-x^{2025}}}\,dx$$

$$\int_1^\infty \frac{\sin(\log x^\pi)\cos(\log x^e)}{x^2\log x}\,dx$$

4강 타이브레이커

$$\int_0^\infty (\log(e^x+1)-x)\,dx$$

결승

[각 문제당 제한시간 5분]

$$\int_0^{\pi/2} \log(2025 + \tan^2(x))\,dx$$

$$\int_{-\infty}^{\infty} \frac{2\cosh^2(8^x) - \cosh(8^x) - 1}{2\cosh^3(8^x) - \cosh(8^x)}\,dx$$

$$\int \left| \begin{pmatrix} \operatorname{sech}^2 x & \operatorname{csch}^2 x & \operatorname{sech}^2 x & \tanh^2 x \\ \sinh^2 x & \tanh^2 x & \cosh^2 x & \coth^2 x \\ \operatorname{csch}^2 x & \coth^2 x & \operatorname{csch}^2 x & \sinh^2 x \\ 2 & 0 & 2 & 5 \end{pmatrix} \right| dx$$

$$\int_0^{2\pi} \frac{\sin^4(12x)}{\sin(x)\sin(2x)\sin(3x)\sin(4x)}\,dx$$

$$\int_{-2025\pi}^{2025\pi} \frac{\cos^2(2025x)}{(1 + e^{x^{2025}})\cos^2(x)}\,dx$$

결승 타이브레이커

$$\int \frac{1}{x(1-x)} \arctan\left(\log\left(\frac{x}{1-x}\right)\right) dx$$