Name (first and last): _____

UNI: _____

Time in: _____ Time out: _____

INTEGRATION BEE QUALIFYING ROUND

Duration: ONE HOUR

Columbia University February 20, 2026

write the final answer in the space provided. you have one hour. no calculator allowed.

1. $\displaystyle\int \frac{x^3}{1+x^2}\,dx$ Answer: _____.

2. $\displaystyle\int \frac{\ln\sqrt{x}}{x^2}\,dx$ Answer: _____.

3. $\displaystyle\int_0^{\pi/2} x\sin x\,dx$ Answer: _____.

4. $\displaystyle\int_0^1 x^2\ln(1+x)\,dx$ Answer: _____.

5. $\displaystyle\int \frac{\sqrt{1+x}}{x^2}\,dx$ Answer: _____.

6. $\displaystyle\int \frac{dx}{1+\sin x}$ Answer: _____.

7. $\displaystyle\int_0^{2\pi} \frac{\sin(2x)}{2+\cos x}\,dx$ Answer: _____.

8. $\displaystyle\int \frac{x^2}{x^6+9}\,dx$ Answer: _____.

9. $\displaystyle\int \frac{1}{\sin x-\cos x}\,dx$ Answer: _____.

10. $\displaystyle\int \ln\Big(x+\sqrt{x^2+1}\Big)\,dx$ Answer: _____.

11. $\displaystyle\int_0^1 \frac{\arctan x}{1+x}\,dx$ Answer: _____.

12. $\displaystyle\int \frac{dx}{\sqrt{1+\sin x}}$ Answer: _____.

13. $\displaystyle\int_0^1 \frac{\sqrt{x}}{\sqrt{2-x}}\,dx$ Answer: _____.

14. $\displaystyle\int \frac{dx}{x^2+2x\cos a+1}$ $(a \in (0,\pi))$ Answer: _____.

15. $\displaystyle\int \frac{x^2+1}{x^4+1}\,dx$ Answer: _____.

16. $\displaystyle\int \frac{1}{\sqrt{x}}\,\ln\!\left(\frac{1+\sqrt{x}}{1-\sqrt{x}}\right)\,dx$ Answer: _____.

17. $\displaystyle\int_{-1}^1 \frac{\arctan x}{x^2+1}\,dx$ Answer: _____.

18. $\displaystyle\int_0^\infty \frac{e^{-x}-e^{-2x}}{x}\,dx$ Answer: _____.

19. $\displaystyle\int_0^1 \frac{x-1}{\ln x}\,dx$ Answer: _____.

20. $\displaystyle\int_0^{\pi/2} \frac{dx}{1+(\tan x)^\pi}$ Answer: _____.

21. $\displaystyle\int \frac{x}{1+x+e^x}\,dx$ Answer: _____.

22. $\displaystyle\int (x+1)^2 e^{x-\frac{1}{x}}\,dx$ Answer: _____.

23. $\displaystyle\int_0^1 \lfloor nx \rfloor^2\,dx$ $(n \in \mathbb{N})$ Answer: _____.

24. $\displaystyle\int_0^{\pi/2} \frac{\sin^{2026} x}{\cos^{2026} x+\sin^{2026} x}\,dx$ Answer: _____.