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## Answers

### Round 1

1.  $\frac{1}{8} \ln(x^8 + 1) + \frac{1}{4} \tan^{-1}(x^4)$

2.  $\frac{23}{12}$

3.  $\frac{1}{7} \ln\left(\frac{13}{6}\right)$

4.  $-\frac{x^5}{10(1+x^{10})} + \frac{1}{10} \tan^{-1}(x^5)$

5. 0

6.  $\frac{\pi^2}{2\sqrt{5}}$

7.  $1 + \frac{\pi}{4}$

8.  $4052\sqrt{2}$

9.  $e^{x \ln x + \ln x - x}$

10.  $\frac{\pi^2}{8}$

11.  $-\frac{1}{2026(\sec x + \tan x)^{2026}}$

12.  $\frac{\sqrt{\pi}}{2e}$

13.  $\frac{\pi}{2} \ln\left(\frac{2}{3}\right)$

14.  $\frac{1}{2}$

15.  $\sqrt{e^x(\sin x - \cos x)}$

### Round 2

1.  $\frac{1}{2} \sin^{-1}\left(\frac{x^2-8}{2}\right)$

2.  $\frac{1}{2}$

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

4.  $2 \tan^{-1}\left(\sqrt{\sqrt{2}-1}\right)$

5.  $\frac{\pi}{2}$

6.  $\frac{\pi}{3}$

7.  $\frac{\tan^{-1}\frac{3}{2} - \frac{\pi}{4}}{\ln\left(\frac{3}{2}\right)}$

8.  $-\frac{e^{-2x}}{8x^2 + 2}$

9.  $x(\ln(\ln x) - \frac{1}{\ln x})$

10.  $3 \ln\left(\sec\frac{x}{3} + \tan\frac{x}{3}\right)$

11.  $\frac{4\pi}{\sqrt{3}}$

12.  $\frac{\pi}{4}$

13.  $\frac{3x^2}{2}$

14.  $\frac{e^{\sqrt{3}}}{4} - \frac{3e^{1/\sqrt{3}}}{4}$

### Semi-Final 1

1.  $\frac{1}{2} \ln \left( \frac{1+x\sqrt{\sqrt{x^4+1}-x^2}}{1-x\sqrt{\sqrt{x^4+1}-x^2}} \right)$

2.  $\frac{\pi^2}{6\sqrt{3}}$

3.  $\frac{1}{8}$

### Semi-Final 2

1.  $x - \ln(2x - \sin x + \cos x)$

2.  $\frac{\ln^2 2}{2}$

3.  $\frac{1}{2} \left( (\sqrt{2}-1)e^{2+\sqrt{2}} - e \right)$

### Final

1. 45

2.  $4\pi \ln 2$

3.  $\frac{\pi^2}{8}$

4.  $\frac{e^{-10x}(-5x^{12}-6x^{11})}{2}$

5.  $2027! - 1$



Integration Bee 2026

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