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

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

Round 2

1. -2
2. $\frac{1}{2}\sin^{-1}\left(\frac{x^2-8}{2}\right)$
3. $\frac{1}{2}$
4. $\frac{1}{2\sqrt{2}}\tan^{-1}\left(\frac{1}{\sqrt{2}}\left(x^2+\frac{1}{x^2}\right)\right)$
5. $2\tan^{-1}\left(\sqrt{\sqrt{2}-1}\right)$
6. $\frac{\pi}{2}$
7. $\frac{\pi}{3}$
8. $\frac{\tan^{-1}\frac{3}{2}-\frac{\pi}{4}}{\ln\left(\frac{3}{2}\right)}$
9. $-\frac{e^{-2x}}{8x^2+2}$
10. $x\left(\ln(\ln x)-\frac{1}{\ln x}\right)$
11. $3\ln\left(\sec\frac{x}{3}+\tan\frac{x}{3}\right)$
12. $\frac{4\pi}{\sqrt{3}}$
13. $\frac{\pi}{4}$
14. $\frac{3x^2}{2}$
15. $\frac{e^{\sqrt{3}}}{4}-\frac{3e^{1/\sqrt{3}}}{4}$

Final

1. 45
2. $4\pi\ln 2$
3. $\frac{\pi^2}{8}$
4. $\frac{e^{-10x}(-5x^{12}-6x^{11})}{2}$
5. $2027!-1$