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

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

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

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

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

Final

1. 45

2. $4\pi\ln 2$

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

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

5. $2027!-1$