1. 9

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

3. $g'(x) = \dfrac{5x^2 + 7 - 10x \sin^{-1} x\sqrt{1-x^2}}{(5x^2+7)^2\sqrt{1-x^2}}$

4. $f'(x) = \dfrac{e^x(\cos x - \sin x)(x^2-2) - 2xe^x \cos x}{(x^2-2)^2}$

5. $y' = 7x^6 \sin(\ln x) + x^6 \cos(\ln x)$

6. $g'(x) = e^{\sin x}\cos^2 x - e^{\sin x}\sin x$

7. $h'(t) = 2te^{t^2}\ln t + \dfrac{e^{t^2}}{t}$

8. $r'(x) = 2e^{2x}\ln(\cos x) - e^{2x}\tan x$

9. $f'(x) = 4x + 1$

10. $f'(x) = 3x^2$

11. $\dfrac{7}{72}(3x^3+8)^{\frac{8}{7}} + C$

12. $\dfrac{1}{5(\pi+1)}(x^5+7)^{\pi+1} + C$

13. $\dfrac{2}{5}(x+3)^{\frac{5}{2}} - 2(x+3)^{\frac{3}{2}} + C$

14. $\dfrac{3}{7}(x-7)^{\frac{7}{3}} + \dfrac{21}{4}(x-7)^{\frac{4}{3}} + C$

15. $\dfrac{3}{2}\left(8^{\frac{2}{3}} - 7^{\frac{2}{3}}\right)$

16. $\dfrac{1}{2(\pi+1)}\left(3^{\pi+1} - 2^{\pi+1}\right)$

17. $g'(x) = \dfrac{\cos(\sec x)\sec x \tan x}{\sqrt{1 + \cos^{-1}(\sec x)}}$

18. $f'(x) = \ln\left(\dfrac{\sin(e^x)}{e^{2x}+7} - \sin^{-1}(e^{2x}-2)\right)e^x - \ln\left(\dfrac{\sin x}{x^2+7} - \sin^{-1}(x^2-2)\right)$

19. $F(x) = -3x^{-\frac{1}{3}} - x^3 + \dfrac{7}{5}x^5 + \ln|x| + C$

20. $F(x) = \ln|x| - 2x^{-\frac{1}{2}} - \frac{1}{2}x^4 + x^2 + C$

21. $\frac{5}{6}$

22. $\dfrac{39}{2}$

23. $\pi \displaystyle\int_0^1 \left[(2-x^2)^2 - (2-x)^2\right]\ dx$

24. $\pi \displaystyle\int_{-1}^1 (1-x^2)^2\ dx$

25. $2\pi \displaystyle\int_0^1 (2-x)(x-x^2)\ dx$

26. $2\pi \displaystyle\int_0^3 (3x^2-x^3)\ dx$

27. $\dfrac{1}{12}$

28. diverges

29. 2

30. diverges

31. 2

32. $\dfrac{1}{4}$