1. $f'(x) = e^x + e^{-x}(-1) + ex^{e-1} - ex^{-e-1} + \frac{1}{e} + 0 - 2ex^{-3} + e - \frac{3}{e^3}x^{-4}$

$\int f(x)\,dx = e^x + \frac{e^{-x}}{-1} + \frac{x^{e+1}}{e+1} + \frac{x^{-e+1}}{-e+1} + \frac{1}{e}\cdot\frac{x^2}{2} + e\cdot x + e\frac{x^{-1}}{-1} + e\cdot\frac{x^2}{2} + \frac{1}{e^3}\cdot\frac{x^{-2}}{-2} + C$

2. $f'(x) = e^{7x}\cdot 7 + \frac{1}{7}e^{-7x}(-7) + 0 + 7e^{-x}(-1) + 0 + e^{7-x}(-1) + e^{-7+x}\cdot(1) + e^{\sqrt{7-x}}\cdot\frac{1}{2\sqrt{7-x}}(-1)$

3. $f'(x) = e^{\tan x}\cdot\sec^2 x + e^{-\sec x}\cdot(-\sec x\tan x)$

4. $f'(x) = e^{-\tan x}\cdot\sec^2 x + \left[\sec(e^x)\cdot\tan(e^x)\right]\cdot e^x$

5. $f'(x) = -\sin\sqrt{e^x+e^7}\cdot\frac{1}{2\sqrt{e^x+e^7}}\cdot e^x + e^{\sqrt{7x+7\cos x}}\cdot\frac{1}{2\sqrt{7x+7\cos x}}\cdot(7-7\sin x) + \cdots$

Continued $\cdots + \frac{1}{2\sqrt{e^{7x}-\sin x}}\cdot\left(e^{7x}\cdot 7 - \cos x\right)$

6. $f'(x) = e^{-\sqrt{7x+\sin x}}\cdot\frac{-1}{2\sqrt{7x+\sin x}}\cdot(7+\cos x) - \frac{1}{2}\left(e^{7x}-\sin x\right)^{-3/2}\left(e^{7x}\cdot 7 - \cos x\right)$

7. $-\dfrac{2}{e^{1+\sqrt{x}}} + C$

8. $\dfrac{e^{-3x}}{-3} + 2x + \dfrac{e^{3x}}{3} + C$

9. $-\dfrac{1}{3(1+e^{3x})} + C$

10. $\dfrac{1}{15(1+e^{-3x})^5} + C$

11. $\dfrac{(1+e^{3x})^7}{21} + C$

12. $\dfrac{e^{3x}}{3} - \dfrac{1}{e^x} - \dfrac{1}{2e^{2x}} - \dfrac{1}{6e^{6x}} + C$

13. $f(x) = 3e^x - 5\sin x + 4x - 2$

14. 0

15. 1

16. 5

17. 6

18. 36

19. $\dfrac{1}{16}$

20. 10

21. $\dfrac{7-\ln 6}{4}$

22. $\dfrac{e^2+10}{3}$