

1. $4x - 5e^x$

2. $7(2.5)(\ln 3x)^{1.5} \left(\frac{3}{3x}\right)$

3. 2 (since $f(x) = \ln(e^{2x}) = 2x$)

4. $x = -\frac{4}{7} \ln 3$

$$\begin{aligned} e^{-7x^2} &= 3^{4x} \\ \ln(e^{-7x^2}) &= \ln(3^{4x}) \\ -7x^2 &= 4x \ln 3 \\ \frac{7}{4}x &= \ln 3 \\ x &= -\frac{4}{7} \ln 3 \end{aligned}$$