

$$\begin{aligned}
f(x) &= (x-3)^{e^{-x/2}} \\
&= u(v(x)), u = (x-3)^v, v = e^{-x/2} \\
f'(x) &= u'(v) \cdot v'(x), u' = (x-3)^{v-1}, v' = -e^{x/2} \\
f'(x) &= (x-1)^{e^{-x/2}-1} \left( -\frac{1}{2}e^{-x/2} \right)
\end{aligned}$$

$$\begin{aligned}
f''(x) &= \left( (x-1)^{e^{-x/2}-1} \right)' \cdot \left( -\frac{1}{2}e^{-x/2} \right) \\
&\quad + (x-1)^{e^{-x/2}-1} \cdot \left( -\frac{1}{2}e^{-x/2} \right)' \\
f''(x) &= (x-1)^{e^{-x/2}-2} \cdot \left( -\frac{1}{2}e^{-x/2} \right)^2 \\
&\quad + (x-1)^{e^{-x/2}-1} \left( +\frac{1}{4}e^{-x/2} \right)
\end{aligned}$$