Quiz 23

1. $4e^{3x} = 40 \Rightarrow e^{3x} = \frac{40}{4} = 10 \Rightarrow$

$3x = \ln e^{3x} = \ln 10 \Rightarrow \boxed{x = \frac{\ln 10}{3}}$

2. $\ln 4x = 5 \Rightarrow$

$4x = e^{\ln 4x} = e^5 \Rightarrow$

$\boxed{x = \frac{e^5}{4}}$

3. $\frac{100}{4+e^x} = 5 \Rightarrow 100 = 5(4+e^x) \Rightarrow$

$20 = \frac{100}{5} = 4+e^x \Rightarrow$

$16 = e^x \Rightarrow \boxed{x = \ln e^x = \ln 16}$

4. $\ln x = \ln(x+4) - \ln(x+1) = \ln \frac{x+4}{x+1} \Rightarrow$

$x = e^{\ln x} = e^{\ln \frac{x+4}{x+1}} = \frac{x+4}{x+1} \Rightarrow$

$x(x+1) = x+4 \Rightarrow x^2 - 4 = 0 \Rightarrow$

$x = \pm 2$. $x = -2$ not in domain, so

only solution is $\boxed{x = 2}$