a) $\dfrac{e^{1+x}}{e^{x+2}} = e^{(1+x)-(x+2)} = e^{1+x-x-2} =$

$= e^{-1} = \dfrac{1}{e}$

b) $\dfrac{e^{3x} + e^{x}}{e^{2x} + e^{x}} = \dfrac{e^{2x+x} + e^{x}}{e^{x+x} + e^{x}} = \dfrac{e^{2x}\,e^{x} + e^{x}}{e^{x}\,e^{x} + e^{x}} =$

$= \dfrac{e^{x}\left(e^{2x} + 1\right)}{e^{x}\left(e^{x} + 1\right)} = \dfrac{e^{2x} + 1}{e^{x} + 1}$

c) $\left(\dfrac{e}{e^{-x}}\right)^{4} = \dfrac{e^{4}}{\left(e^{-x}\right)^{4}} = \dfrac{e^{4}}{e^{-4x}} = e^{4-(-4x)} =$

$= e^{4+4x}$

$\left(\dfrac{e}{e^{-x}}\right)^{4} = \left(\dfrac{e^{1}}{e^{-x}}\right)^{4} = \left(e^{1-(-x)}\right)^{4} =$

$= \left(e^{1+x}\right)^{4} = e^{(1+x)4} = e^{4+4x}$