$g(x) = \log_b x$ and $f(x) = b^x$ are inverses.

so …

$\log_b b^x = x$ $\quad b^{\log_b x} = x$

Simplify the expression.

a. $5^{\log_5 x}$ $= x$

b. $\log_4 4^x$ $= x$

c. $3^{\log_3 25}$ $= 25$

d. $\log_5 125$ $\log_5 5^3 = 3$

e. $10^{\log x}$ $10^{\log_{10} x} = x$

f. $\log 1000^x$ $\log_{10} 10^{3x} = 3x$