Logarithms worksheet

Remembering that single fractional powers mean roots, evaluate the following **without** using a calculator:

(1) $\log_{10}(100)$ **(2)** $\log_5(25)$ **(3)** $\log_{73}(1)$ **(4)** $\log_4 64$

(5) $\log_9 3$ **(6)** $\log_2 2$ **(7)** $\log_{64} 4$ **(8)** $\log_{99} 1$

(9) $\log_{27} 3$ **(10)** $\ln e^1$ **(11)** $\log_b b^3$

Express in terms of log *x*, log *y* and log *z*.

(12) $\log xy$ **(13)** $\log \frac{x}{yz}$ **(14)** $\log \frac{y}{z^2}$ **(15)** $\log \frac{x^2y^3}{z}$

(16) $\log \sqrt{\frac{y}{z}}$ **(17)** $\log x^n y^m$

Simplify.

(18) $n\log x - \log y$ **(19)** $\log x + 2\log y - 3\log z$

Express as the sum or difference of the simplest possible logarithms.

(20) $\ln \frac{x}{x+1}$ **(21)** $\ln x.(x+4)$ **(22)** $\ln e.x$

(23) $\ln(e^2.x.(x-e))$

Express as a single logarithm:

(24) $2\ln x - \ln 4$ **(25)** $2 + \ln x$ **(26)** $2\ln x - 3\ln y$

Expand:

(27) $\log(xy^2\sqrt{\pi})$

Simplify:

(28) $3\log x + 3\log y - 4\log\pi$