Soln Set 28

13.1/ 2. a) $\log_5 14$ = log base 5 of 14. It's the power 5 must be raised to, to get 14.

b) log base 4 of 8, the power 4 is raised to to get 8.

c) $\ln 5$, "natural log of 5"

13.2/ 1. a) $3^{\log_3 2} = \boxed{2}$

b) $\log x + \log x^2 - 3\log x = \log x + 2\log x - 3\log x = \boxed{0}$

c) $2\log(x+3) - 3\log(x+3) + \log 10^{\sqrt{7}} = -1\log(x+3) + \sqrt{7}\log 10$

$= \boxed{\sqrt{7} - \log(x+3)}$

d) $10^{\log x^2} = \boxed{x^2}$

e) $10^{3\log x} = 10^{\log x^3} = \boxed{x^3}$

2. a) $\log_2(u^2 w) = \log_2 u^2 + \log_2 w = 2\log_2 u + \log_2 w = \boxed{2A+B}$

b) $\log_2(u^3/w^2) = \log_2 u^3 - \log_2 w^2 = 3\log_2 u - 2\log_2 w = \boxed{3A-2B}$

c) $\log_2(w^{-1/2}) = -\frac{1}{2}\log_2 w = \boxed{-\frac{1}{2}B}$

d) $\log_2\left(\frac{2}{\sqrt{uw}}\right) = \log_2 2 - \log_2 (uw)^{1/2} = 1 - \boxed{\log_2 u^{1/2} + \log_2 w^{1/2}}$

$= 1 - \frac{1}{2}\log_2 u - \frac{1}{2}\log_2 w = \boxed{1 - \frac{1}{2}A - \frac{1}{2}B}$

6. a) $2^{\log_2 3 + 3} = 2^{\log_2 3} \cdot 2^3 = 3 \cdot 8 = \boxed{24}$

b) $e^{2\ln A + 1} = e^{\ln A^2} \cdot e = \boxed{A^2 \cdot e}$

15. $\ln\sqrt{x} - \frac{1}{2}\ln x^3 - 3\ln x = \frac{1}{2}\ln x - \frac{3}{2}\ln x - 3\ln x$

$= -4\ln x = \boxed{\ln x^{-4}}$