

2.4 Solving Log + Exp Eqns

① $\log_4 2x + \log_4 8 = 3$
 $\log_4 16x = 3$
 $4^3 = 16x$
 $x = 4$

② $(3x-1)\ln 5 = \ln 15$
 $x = \frac{\ln 15 + \ln 5}{3\ln 5}$

③ $9^{k-5} = 24$
 $(k-5)\ln 9 = \ln 24$
 $k = \frac{\ln 24 + 5\ln 9}{\ln 9}$

④ $\ln \frac{10x^2}{2x} = 2$
 $e^2 = 5x^2$
 $x = \frac{e^2}{5}$

⑤ $\log_2 [(x+2)(x-5)] = 3$
 $2^3 = x^2 - 3x - 10$
 $0 = x^2 - 3x - 18$
 $0 = (x-6)(x+3)$
 $x = 6$ ~~$x = -3$~~

⑥ $b = \frac{\ln 19 + 7}{4}$

⑦ $x \ln 5 = (x+2)\ln 2$
 $x \ln 5 - x \ln 2 = 2 \ln 2$
 $x = \frac{2 \ln 2}{\ln 5 - \ln 2}$

⑧ $\log \frac{x}{x-2} = 1$
 $10^1 = \frac{x}{x-2}$
 $10x - 20 = x$
 $9x = 20$
 $x = \frac{20}{9}$

⑨ $(2x+1)\ln 3 = (x+1)\ln 5$
 $2x \ln 3 - x \ln 5 = \ln 5 - \ln 3$
 $x = \frac{\ln 5 - \ln 3}{2\ln 3 - \ln 5}$

⑩ $\frac{x+12}{x-3} = 6$
 $6(x-3) = x+12$
 $5x = 30$
 $x = 6$

2a