

$$y = a^x \iff x \rightarrow \log_a y$$

Exciting Log Practice Problems

Name: Key

No Calculator!

1. $\log_5(x+2) = \log_5(2x+1)$

$$x+2 = 2x+1$$

$$x = 1$$

2. $\log \sqrt[3]{10} = x$

$$10^x = 10^{1/3}$$

$$x = \frac{1}{3}$$

3. $\log_2 4 + \log_2 6 = \log_2 x$

$$\log_2 24 = \log_2 x$$

$$x = 24$$

4. $2\log_6 4 - \frac{1}{4}\log_6 16 = \log_6 x$

$$\log_6 \frac{16}{2} = \log_6 x$$

$$x = 8$$

5. $\log_8 48 - \log_8 x = \log_8 4$

$$\frac{48}{x} = 4$$

$$x = 12$$

6. $4\log_2 x + \log_2 5 = \log_2 405$

$$5x^4 = 405$$

$$x^4 = 81$$

$$x = 3$$

8. $\log_4(3x-5) - \log_4 x = -\frac{1}{2}$

$$\log_4 \frac{3x-5}{x} = -\frac{1}{2}$$

$$4^{-1/2} = \frac{3x-5}{x} = \frac{1}{2}$$

$$6x - 10 = x$$

$$5x = 10$$

$$x = 2$$

7. $3\log_7 4 + 4\log_7 3 = \log_7 x$

$$4^3(3^4) = x$$

$$x = 5184$$

9. $\log_2(x+1) - \log_2 x = 3$

$$\log_2 \frac{x+1}{x} = 3$$

$$\frac{x+1}{x} = 8$$

$$x+1 = 8x$$

$$x = \frac{1}{7}$$

11. $\log_5 x = \log_5(x+5) - \log_5 2$

$$\log_5 x = \log_5 \frac{x+5}{2}$$

$$x = \frac{x+5}{2}$$

$$2x = x+5$$

$$x = 5$$

10. $2\log_2(2x) = 5$

$$\log_2 4x^2 = 5$$

$$4x^2 = 32$$

$$x^2 = 8$$

$$x = \sqrt{8}$$

$$x = 2\sqrt{2}$$

12. $\log_3 x + \log_3(x-2) = 1$

$$\log_3 x^2 - 2x = 1$$

$$x^2 - 2x = 3$$

$$x^2 - 2x - 3 = 0$$

$$(x-3)(x+1)$$

$$x = 3, -1$$

-1 is

extraneous

$$13) 16^{n-7} + 5 = 24$$

$$16^{n-7} = 19$$

$$\log_{16} 16^{n-7} = \log_{16} 19$$

$$n-7 = 1.06$$

$$n = 8.06$$

$$15) 5 \cdot 6^{3m} = 20$$

$$6^{3m} = 4$$

$$\log_6 6^{3m} = \log_6 4$$

$$3m = .77$$

$$m = .26$$

$$17) 3.4e^{2-2n} - 9 = -4$$

$$e^{2-2n} = 1.47$$

$$\ln e^{2-2n} = \ln 1.47$$

$$2-2n = .39$$

$$n = .81$$

$$19) -e^{-3.9n-1} - 1 = -3$$

$$e^{-3.9n-1} = 2$$

$$\ln e^{-3.9n-1} = \ln 2$$

$$-3.9n-1 = .69$$

$$n = -.43$$

$$21) -3e^{7a+9} + 6 = -6$$

$$e^{7a+9} = 4$$

$$\ln e^{7a+9} = \ln 4$$

$$7a+9 = 1.39$$

$$a = -1.09$$

$$23) -e^{6-9p} + 5 = -48.4$$

$$e^{6-9p} = 53.4$$

$$\ln e^{6-9p} = \ln 53.4$$

$$6-9p = 3.98$$

$$p = .22$$

$$25) 6e^{-4k-10} - 4 = 63$$

$$e^{-4k-10} = 11.17$$

$$-4k-10 = 2.41$$

$$k = -3.10$$

$$14) 20^{-6n} + 6 = 55$$

$$20^{-6n} = 49$$

$$\log_{20} 20^{-6n} = \log_{20} 49$$

$$-6n = 1.299$$

$$n = -.22$$

$$16) 8^{-5a} - 5 = 53$$

$$8^{-5a} = 58$$

$$\log_8 8^{-5a} = \log_8 58$$

$$-5a = 1.95$$

$$a = -.39$$

$$18) -6e^{8n+8} - 3 = -23$$

$$e^{8n+8} = 3.33$$

$$\ln e^{8n+8} = \ln 3.33$$

$$8n+8 = 1.2$$

$$n = -.85$$

$$20) -2e^{7v+5} - 10 = -17$$

$$e^{7v+5} = 3.5$$

$$\ln e^{7v+5} = \ln 3.5$$

$$7v+5 = 1.25$$

$$v = -.54$$

$$22) -3e^{9x-1} + 6 = -58$$

$$e^{9x-1} = 21.33$$

$$\ln e^{9x-1} = \ln 21.33$$

$$9x-1 = 3.06$$

$$x = .45$$

$$24) -10e^{2-2b} - 6 = -66$$

$$e^{2-2b} = 6$$

$$\ln e^{2-2b} = \ln 6$$

$$2-2b = 1.79$$

$$b = .10$$

$$26) 6e^{5x-6} - 4 = 50$$

$$e^{5x-6} = 9$$

$$5x-6 = 2.197$$

$$x = 1.64$$

Name: Key

13) $\log(16+2b) = \log(b^2-4b)$

$$16+2b = b^2-4b$$

$$b^2-6b-16=0$$

$$(b-8)(b+2)=0$$

$$b=8 \text{ or } -2$$

15) $\log x + \log 8 = 2$

$$\log(8x) = 2$$

$$10^2 = 8x$$

$$x = \frac{100}{8}$$

17) $\log 2 + \log x = 1$

$$\log(2x) = 1$$

$$10^1 = 2x$$

$$x = 5$$

19) $\log_8 2 + \log_8 4x^2 = 1$

$$\log_8(8x^2) = 1$$

$$8^1 = 8x^2$$

$$x = \pm 1$$

21) $\log_6(x+1) - \log_6 x = \log_6 29$

$$\log_6 \frac{x+1}{x} = \log_6 29$$

$$\frac{x+1}{x} = 29$$

$$29x = x+1$$

$$x = \frac{1}{28}$$

23) $\ln 2 - \ln(3x+2) = 1$

$$\ln \frac{2}{3x+2} = 1$$

$$e^1 = \frac{2}{3x+2}$$

$$x = -.42$$

$$e(3x+2) = 2$$

25) $\ln(x-3) - \ln(x-5) = \ln 5$

$$\ln \frac{x-3}{x-5} = \ln 5$$

$$\frac{x-3}{x-5} = 5$$

$$x = \frac{22}{4}$$

$$5x-25 = x-3$$

14) $\ln(n^2+12) = \ln(-9n-2)$

$$n^2+12 = -9n-2$$

$$n^2+9n+14=0$$

$$(n+7)(n+2)=0$$

$$n = -7 \text{ or } -2$$

16) $\log x - \log 2 = 1$

$$\log \frac{x}{2} = 1$$

$$10^1 = \frac{x}{2}$$

$$x = 20$$

18) $\log x + \log 7 = \log 37$

$$\log 7x = \log 37$$

$$7x = 37$$

$$x = 37/7$$

20) $\log_9(x+6) - \log_9 x = \log_9 2$

$$\log_9 \frac{x+6}{x} = \log_9 2$$

$$\frac{x+6}{x} = 2$$

$$2x = x+6$$

$$x = 6$$

22) $\log_5 6 + \log_5 2x^2 = \log_5 48$

$$\log_5(12x^2) = \log_5 48$$

$$12x^2 = 48$$

$$x = \pm 2$$

24) $\ln(-3x-1) - \ln 7 = 2$

$$\ln \frac{-3x-1}{7} = 2$$

$$e^2 = \frac{-3x-1}{7}$$

$$7(e^2) = -3x-1$$

$$x = -17.57$$

26) $\ln(4x+1) - \ln 3 = 5$

$$\ln \frac{4x+1}{3} = 5$$

$$e^5 = \frac{4x+1}{3}$$

$$3(e^5) = 4x+1$$

$$x = 111.06$$