

Solving L&E equations

$$1) \log_3 5m + 10 = 14 \quad (2) \log_{11} (x+8) - 7 = -9 \quad (3) 7 \log_5 6x = 14$$

$$\log_3 5m = 4$$

$$3^4 = 5m$$

$$5m = 81$$

$$m = \frac{81}{5}$$

$$\log_{11} (x+8) = -2$$

$$x+8 = 11^{-2}$$

$$x+8 = \frac{1}{121}$$

$$x = -\frac{967}{121}$$

$$\log_5 6x = 2$$

$$6x = 5^2$$

$$6x = 25$$

$$x = \frac{25}{6}$$

$$(4) \log_9 4r - 6 = -2$$

$$\log_9 4r = 4$$

$$4r = 9^4$$

$$4r = 6561$$

$$r = \frac{6561}{4}$$

$$(5) -9 + \log_7 7k = -18$$

$$\log_7 7k = 2$$

$$7k = 10^2$$

$$7k = 100$$

$$k = \frac{100}{7}$$

$$(6) -9 + \log_7 (m+8) = -11$$

$$\log_7 (m+8) = -2$$

$$m+8 = 7^{-2}$$

$$m+8 = \frac{1}{49}$$

$$m = -\frac{391}{49}$$

$$(7) 9 + \log_{11} -10k = 7$$

$$\log_{11} -10k = -2$$

$$-10k = 11^{-2}$$

$$-10k = \frac{1}{121}$$

$$k = -\frac{1}{1210}$$

$$(8) 10 + \log_{12} 6k = 9$$

$$\log_{12} 6k = -1$$

$$6k = 12^{-1}$$

$$6k = \frac{1}{12}$$

$$k = \frac{1}{72}$$

$$(9) -4 \log_{11} -7a = -16$$

$$\log_{11} -7a = 4$$

$$-7a = 11^4$$

$$-7a = 14641$$

$$a = -\frac{14641}{7}$$

$$(10) 8 + \log_5 -2n = 10$$

$$\log_5 -2n = 2$$

$$-2n = 5^2$$

$$-2n = 25$$

$$n = -\frac{25}{2}$$

$$(11) -9 \log_8 (9p-2) - 3 = -12$$

$$-9 \log_8 (9p-2) = -9$$

$$\log_8 (9p-2) = 1$$

$$9p-2 = 8^1$$

$$9p-2 = 8$$

$$9p = 10$$

$$p = \frac{10}{9}$$

$$(12) -2 - 2 \log_8 (6k-4) = -6$$

$$-2 \log_8 (6k-4) = -4$$

$$\log_8 (6k-4) = 2$$

$$6k-4 = 8^2$$

$$6k-4 = 64$$

$$6k = 68$$

$$k = \frac{34}{3}$$

Solving Log E eqs, pg 2

⑬ $-4 \log_2(-4x+1) + 9 = 13$

$$\begin{aligned} -4 \log_2(-4x+1) &= 4 \\ \log_2(-4x+1) &= -1 \\ -4x+1 &= 2^{-1} \\ -4x+1 &= \frac{1}{2} \\ -4x &= -\frac{1}{2} \end{aligned}$$

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

⑭ $-10 \log_{11}(2n-8) + 4 = 24$

$$\begin{aligned} -10 \log_{11}(2n-8) &= 20 \\ \log_{11}(2n-8) &= -2 \\ 2n-8 &= 11^{-2} \\ 2n-8 &= \frac{1}{121} \\ 2n &= \frac{969}{121} \end{aligned}$$

$$\boxed{n = \frac{969}{242}}$$

⑮ $-9 - 10 \log_3(-5n-7) = -39$

$$\begin{aligned} -10 \log_3(-5n-7) &= -30 \\ \log_3(-5n-7) &= 3 \\ -5n-7 &= 3^3 \\ -5n-7 &= 27 \\ -5n &= 34 \end{aligned}$$

$$\boxed{n = -\frac{34}{5}}$$

⑯ $10 \log_6(2n+1) + 3 = 13$

$$\begin{aligned} 10 \log_6(2n+1) &= 10 \\ \log_6(2n+1) &= 1 \\ 2n+1 &= 6^1 \end{aligned}$$

$$2n+1 = 6$$

$$2n = 5$$

$$\boxed{n = \frac{5}{2}}$$

⑰ $8 \log_5(2x-5) + 9 = 41$

$$\begin{aligned} 8 \log_5(2x-5) &= 32 \\ \log_5(2x-5) &= 4 \\ 2x-5 &= 5^4 \end{aligned}$$

$$2x-5 = 625$$

$$2x = 630$$

$$\boxed{x = 315}$$

⑰ $-\log_6(5b+1) - 3 = -7$

$$\begin{aligned} -\log_6(5b+1) &= -4 \\ \log_6(5b+1) &= 4 \\ 5b+1 &= 6^4 \end{aligned}$$

$$5b+1 = 1296$$

$$5b = 1295$$

$$\boxed{b = 259}$$

⑱ $1 + 8 \log_2(-6k-3) = -15$

$$\begin{aligned} 8 \log_2(-6k-3) &= -16 \\ \log_2(-6k-3) &= -2 \\ -6k-3 &= 2^{-2} \end{aligned}$$

$$-6k-3 = \frac{1}{4}$$

$$-6k = \frac{13}{4}$$

$$\boxed{k = -\frac{13}{24}}$$

⑳ $7 + 4 \log_7(-3n-3) = 19$

$$\begin{aligned} 4 \log_7(-3n-3) &= 12 \\ \log_7(-3n-3) &= 3 \\ -3n-3 &= 7^3 \end{aligned}$$

$$-3n-3 = 343$$

$$-3n = 346$$

$$\boxed{n = -\frac{346}{3}}$$

㉑ $7^{4v} + 1 = 57$

$$7^{4v} = 56$$

$$\log_7 56 = 4v$$

$$4v = \frac{\log 56}{\log 7}$$

$$v = \frac{\log 56}{4 \log 7}$$

$$\boxed{v = 0.5172}$$

㉒ $10 \cdot 4^{a-5} = 43$

$$4^{a-5} = 4.3$$

$$\log_4 4.3 = a-5$$

$$a-5 = \frac{\log 4.3}{\log 4}$$

$$a = \frac{\log 4.3}{\log 4} + 5$$

㉓ $4^{9k} + 8 = 105$

$$4^{9k} = 97$$

$$\log_4 97 = 9k$$

$$9k = \frac{\log 97}{\log 4}$$

$$k = \frac{\log 97}{9 \log 4}$$

$$\boxed{k = 0.3667}$$

㉔ $-5 \cdot 4^{2k} = -3$

$$4^{2k} = 0.6$$

$$\log_4 0.6 = 2k$$

$$2k = \frac{\log 0.6}{\log 4}$$

$$k = \frac{\log 0.6}{2 \log 4}$$

$$\boxed{k = 0.1842}$$

$$\boxed{a = 6.0522}$$

Solve L&E eqs. pg. 3

25 $3 \cdot 12^{2n} = 20$

$12^{2n} = \frac{20}{3}$

$\log_{12} \frac{20}{3} = 2n$

$2n = \frac{\log \frac{20}{3}}{\log 12}$

$n = \frac{\log \frac{20}{3}}{\log 12} \div 2$

$n = 0.3817$

26 $9 \cdot 17^{-2m} = -36$

$17^{-2m} = 4$

$\log_{17} 4 = -2m$

$-2m = \frac{\log 4}{\log 17}$

$m = \frac{\log 4}{\log 17} \div -2$

$m = -0.2447$

27 $-6 \cdot 15^{k+b} = -19$

$15^{k+b} = \frac{19}{6}$

$\log_{15} \frac{19}{6} = k+b$

$k+b = \frac{\log \frac{19}{6}}{\log 15}$

$k = \frac{\log \frac{19}{6}}{\log 15} - b$

$k = -5.5744$

28 $6^{8n} - 1 = 23$

$6^{8n} = 24$

$\log_6 24 = 8n$

$n = \frac{\log 24}{\log 6} \div 8$

$n = 0.2217$

29 $-9 \cdot 11^{x-2} = -72$

$11^{x-2} = 8$

$\log_{11} 8 = x-2$

$x = \frac{\log 8}{\log 11} + 2$

$x = 2.8672$

30 $-4 \cdot 7^{-7n} = -46$

$7^{-7n} = 11.5$

$\log_7 11.5 = -7n$

$n = \frac{\log 11.5}{\log 7} \div -7$

$n = -0.1793$

31 $3 \cdot 10^{9b+4} - 1 = 54$

$3 \cdot 10^{9b+4} = 55$

$10^{9b+4} = \frac{55}{3}$

$\log \frac{55}{3} = 9b+4$

$9b = \log \frac{55}{3} - 4$

$b = \frac{(\log \frac{55}{3} - 4)}{9}$

$b = -0.3041$

32 $-10 \cdot 18^{7b-7} + 9 = -65$

$-10 \cdot 18^{7b-7} = -74$

$18^{7b-7} = 7.4$

$\log_{18} 7.4 = 7b-7$

$7b = \frac{\log 7.4}{\log 18} + 7$

$b = \frac{(\frac{\log 7.4}{\log 18} + 7)}{7}$

$b = 1.0289$

33 $-2 \cdot 6^{-10r-b} = -20$

$6^{-10r-b} = 10$

$\log_6 10 = -10r-b$

$-10r = \frac{\log 10}{\log 6} + b$

$r = \frac{(\frac{\log 10}{\log 6} + b)}{-10}$

$r = -0.7285$

34 $8 \cdot 14^{10x+10} + 2 = 6$

$8 \cdot 14^{10x+10} = 4$

$14^{10x+10} = .5$

$10x = \frac{\log .5}{\log 14} - 10$

$x = \frac{(\frac{\log .5}{\log 14} - 10)}{10}$

$x = -1.0263$

35 $x = 0.8972$

36 $x = -3.6404$

37 $x = -0.2374$

38 $p = -0.2823$

39 $v = 0.4931$

40 $m = -1.9709$