

$$\log x = \log 4 + \log 9 - \log 12 \quad (1)$$

$$\log x = \log\left(\frac{4 \cdot 9}{12}\right)$$

$$\boxed{x = 3}$$

$$\log_9 x = \frac{1}{2} + \log_9 z \quad (14)$$

$$\log_9 x - \log_9 z = \frac{1}{2}$$

$$\log_9 \frac{x}{z} = \frac{1}{2}$$

$$9^{\frac{1}{2}} = \frac{x}{z}$$

$$3 = \frac{x}{z}^{1/2}$$

$$\begin{array}{l} 3 = \bar{2}^{1.4} \\ \hline x = 6 \end{array}$$

$$\log_4 40 - \log_4 5 \quad (20)$$

$$\log_4 8 = x$$

$$2^x = 2^3$$

$$2^x = 3 \quad x = 1.5$$

10c

$$\log_3 x = \frac{1}{2} \log_3 100 + \frac{3}{4} \log_3 16 \quad (38)$$

$$\log_3 x = \log_3 100^{\frac{1}{2}} + \log_3 16^{\frac{3}{4}}$$

$$\therefore x = 10 + \log_3 8$$

$$\log_3 x = \log_3 10 + \log_3 8$$

$$\underline{\underline{\log 40 + 2\log 10 - \frac{2}{3}\log 8 \quad (45)}}$$

$$x = 80$$

$$2\log 2 + 2\log 5 \quad (39)$$

$$\log 2^2 + \log 5^2$$

$$\log 100 = x$$

$$10^x = 100$$

$$x = 2$$

$$\underline{\underline{\log 40 + 2\log 10 - \frac{2}{3}\log 8 \quad (45)}}$$

$$\log 40 + \log 100 - \log 4$$

$$\log 1000 = x$$
$$10^x = 1000 \quad x = 4$$

$$\frac{\log 8}{\log 2} = 3 \quad (51)$$

$$\log 8 \div \log 2$$

$$\log_2 8 = x$$

$$2^x = 8$$

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

$$\frac{\log 32}{\log 4} \quad (55)$$

$$\log_4 32 = x$$

$$4^x = 32$$

$$2^{2x} = 2^5$$

$$x = 2.5$$

$$\frac{\log 4 - 2\log 6}{\log 3} \quad (58)$$

$$\log_3 4 - \log_3 6^2$$

$$\log_3 \left(\frac{4}{6^2}\right) = x$$

$$3^x = 3^{-2}$$

$$x = -2$$

$$\frac{2\log 2 + 2\log 3}{\log 30 - \log 5} \quad (59)$$

$$\log_6 4 + \log_6 9 =$$

$$6^x = 36$$

$$6^x = 6^2$$

$$x = 2$$