

p. 516-517 #1-10, 40, 41, 45

$$\textcircled{1} \log_5 50 + \log_5 62.5$$

$$\log_5 (50 \cdot 62.5)$$

$$\boxed{\log_5 3125 = 5}$$

same base? ✓

$$\textcircled{2} \log 100 + \log 1000$$

$$\log (100 \cdot 1000)$$

$$\boxed{\log 100000 = 5}$$

same base? ✓ (10)

$$\textcircled{3} \log_3 3 + \log_3 27$$

$$\log_3 (3 \cdot 27)$$

$$\boxed{\log_3 81 = 4}$$

same base? ✓

$$\textcircled{4} \log_4 320 - \log_4 5$$

$$\log_4 \frac{320}{5}$$

$$\boxed{\log_4 64 = 3}$$

same base? ✓

$$\textcircled{5} \log 5.4 - \log 0.054$$

$$\log \frac{5.4}{0.054}$$

$$\boxed{\log 100 = 2}$$

same base? ✓ (10)

$$\textcircled{6} \log_6 496.8 - \log_6 2.3$$

$$\log_6 \frac{496.8}{2.3}$$

$$\boxed{\log_6 216 = 3}$$

same base? ✓

$$\textcircled{7} \log_8 8^2 = 2 \log_8 8$$

$$= 2 \cdot 1$$

$$= \boxed{2}$$

$$\begin{aligned} \textcircled{8} \log_3 3^5 &= 5 \log_3 3 \\ &= 5 \cdot 1 \\ &= \boxed{5} \end{aligned}$$

$$\begin{aligned} \textcircled{9} \log_7 49^3 &= 3 \log_7 49 \\ &= 3 \cdot 2 \\ &= \boxed{6} \end{aligned}$$

$$\begin{aligned} \textcircled{10} \log_{\frac{1}{2}} (0.25)^4 &= 4 \log_{\frac{1}{2}} \left(\frac{1}{4}\right) \\ &= 4 \cdot 2 \\ &= \boxed{8} \end{aligned}$$

$$\begin{aligned} \textcircled{40} \log_2 32 - \log_2 128 \\ \log_2 \frac{32}{128} \\ \log_2 \frac{1}{4} = -2 \end{aligned}$$

$$\begin{aligned} \textcircled{41} \log 0.1 + \log 1 + \log 10 \\ \log (0.1 \cdot 1 \cdot 10) \\ \log 1 = 0 \end{aligned}$$

$$\begin{aligned} \textcircled{45} \frac{10 \log 10}{\log 10^{10}} &= \frac{10}{10 \log 10} \\ &= \frac{10}{10 \cdot 1} \\ &= \frac{10}{10} \\ &= \boxed{1} \end{aligned}$$