

HW 89: #1, 3, 5e-h, 8abhi, 9, 12

1a.) $\log(10,000) = \log(10^4) = \boxed{4}$

1b.) $\log(0.001) = \log(10^{-3}) = \boxed{-3}$

1c.) $\log(10) = \log(10^1) = \boxed{1}$

1d.) $\log(1) = \log(10^0) = \boxed{0}$

12.) $M = \frac{2}{3} \log\left(\frac{E}{10^{4.8}}\right)$

a.) $M = \frac{2}{3} \log\left(\frac{6.2 \times 10^{13}}{10^{4.8}}\right) \approx \boxed{5.99}$

b.) $5.1 = \frac{2}{3} \log\left(\frac{E}{10^{4.8}}\right)$

$\frac{3(5.1)}{2} = \log\left(\frac{E}{10^{4.8}}\right) \Rightarrow 10^{7.65} = \frac{E}{10^{4.8}}$

3.) a.) $\log 237$ is between 10^2 (100) and 10^3 (1,000).

Therefore, $\log(10^2) < \log(237) < \log(10^3)$
 $2 < \log(237) < 3$

$10^{4.8} \cdot 10^{7.65} = E$
 $\therefore \boxed{E = 2.82 \times 10^{12}}$
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b.) $\log(237) = \boxed{2.37}$

5e.) $\log(0.4) = \boxed{-0.40}$

5f.) $\log(3,247) \approx 3.51$

5g.) $\log(0.008) \approx \boxed{-2.10}$

5h.) $\log(-7) = \boxed{\text{DNE}}$

8a.) $6 \rightarrow \log(6) \approx 0.7782 \therefore \approx \boxed{10^{0.7782}}$

8b.) $60 \rightarrow \log(60) \approx 1.7782 \therefore \approx \boxed{10^{1.7782}}$

8h.) $1.5 \rightarrow \log(1.5) \approx 0.1761 \therefore \approx \boxed{10^{0.1761}}$

8i.) $0.15 \rightarrow \log(0.15) \approx -0.8239 \approx \boxed{10^{-0.8239}}$

9.) $\log(3) = \boxed{0.4771} \neq \log(300) = \boxed{2.4771}$

b.) $\log(300) = \log(3 \times 100) = \log(3 \times 10^2) = \log(3) + \log(10^2)$
 $= \log(3) + 2$