

$$\textcircled{1} \text{ Quotient: } \log_x \frac{a}{b} = \log_x a - \log_x b$$

$$\textcircled{2} \text{ Power: } \log_x a^b = b \log_x a$$

$$\textcircled{3} \text{ Product: } \log_x ab = \log_x a + \log_x b$$

Use the 3 Properties of Logs to:

$$\textcircled{1} \text{ Condense: } 5 \log_4 2 + 7 \log_4 X - 4 \log_4 Y$$

$$\log_4 2^5 + \log_4 X^7 - \log_4 Y^4$$

$$\log_4 (2^5 \cdot X^7) - \log_4 Y^4$$

$$\log_4 \left(\frac{2^5 X^7}{Y^4} \right) \Rightarrow \boxed{\log_4 \frac{32 X^7}{Y^4}}$$

$$\textcircled{2} \text{ Expand: } \log_6 36 X^2$$

$$\log_6 36 + \log_6 X^2$$

$$6^2 = 36$$

$$\boxed{2 + 2 \log_6 X}$$

Evaluate:

$$\textcircled{3} \log_4 48 = \frac{\log 48}{\log 4} \approx \boxed{2.792}$$

$$4^? = 48$$