

$$\log_2 x + \log_4 x + \log_{16} x = \frac{21}{4}$$

$$\log_2 x + \log_{2^2} x + \log_{2^4} x = \frac{21}{4}$$

$$\log_2 x + \frac{1}{2} \log_2 x + \frac{1}{4} \log_2 x = \frac{21}{4}$$

$$\log_2 x \left(1 + \frac{1}{2} + \frac{1}{4} \right) = \frac{21}{4}$$

$$\log_2 x \left(\frac{4}{4} + \frac{2}{4} + \frac{1}{4} \right) = \frac{21}{4}$$

$$\log_2 x \left(\frac{7}{4} \right) = \frac{21}{4}$$

$$\log_a b = c$$

$a^c = b$

$$\log_2 x = \frac{21}{4} \times \frac{4}{7}$$

$$\log_2 x = 3$$

$$x = 2^3$$

$x = 8$