

Actividad 3

$$2. a - \log_8 \left(2 \cdot \sqrt[3]{\frac{1}{2}} \right) = \log_8 2 + \frac{\log_8 \frac{1}{2}}{3} = \frac{1}{3} + \left(-\frac{1}{9} \right) = \boxed{\frac{2}{9}}$$

$$b. \log_3 \frac{\sqrt{3} \cdot \frac{1}{9}}{81} = \log_3 \sqrt{3} \cdot \frac{1}{9} - \log_3 81 = \log_3 \sqrt{3} + \log_3 \frac{1}{9} - \log_3 81 = \frac{\log_3 3}{2} + \log_3 \frac{1}{9} - \log_3 81 = \frac{1}{2} + (-2) - 4 = \frac{1}{2} - 2 - 4 = \boxed{-\frac{11}{2}}$$

$$c. \log_2 \frac{8}{\sqrt{2}} = \log_2 8 - \log_2 \sqrt{2} = \log_2 8 - \frac{\log_2 2}{2} = 3 - \frac{1}{2} = \boxed{\frac{5}{2}}$$

$$d. \log_3 \frac{\sqrt[3]{3} \cdot 27}{81} = (\log_3 \sqrt[3]{3} + \log_3 27) - (\log_3 81) = \left(\frac{\log_3 3}{3} + \log_3 27 \right) - (\log_3 81) = \frac{1}{3} + 3 - 4 = \boxed{-\frac{2}{3}}$$

$$e. \log \left(\frac{0,001}{\sqrt{10}} \right)^3 = 3 \cdot (\log 0,001 - \log \sqrt{10}) = 3 \cdot \left(\log 0,001 - \frac{\log 10}{2} \right) = 3 \cdot \left(-3 - \frac{1}{2} \right) = 3 \cdot \left(-\frac{7}{2} \right) = \boxed{-\frac{21}{2}}$$

$$3. a. \log_7 12 = \log_7 (2 \cdot 2 \cdot 3) = \log_7 2 + \log_7 2 + \log_7 3 = a + a + b.$$

$$b. \log_7 72 = \log_7 (2 \cdot 2 \cdot 2 \cdot 3 \cdot 3) = \log_7 2 + \log_7 2 + \log_7 2 + \log_7 3 + \log_7 3 = a + a + a + b + b$$

$$c. \log_7 \sqrt{6} = \frac{\log_7 2}{2} \cdot \frac{\log_7 3}{2} = a \cdot b$$

$$d. \log_7 \sqrt[3]{9} = \frac{\log_7 3}{3} \cdot \frac{\log_7 3}{3} = b \cdot b$$

$$e. \log_7 (\sqrt{2} \cdot \sqrt{3}) = \frac{\log_7 2}{2} \cdot \frac{\log_7 3}{2} = a \cdot b.$$