1.22

ד

ב) $\log_{\frac{1}{a}} x = \frac{\log_a x}{\log_a \left(\frac{1}{a}\right)} = \frac{\log_a x}{\log_a (a)^{-1}} = \frac{\log_a x}{-\log_a a} = -\log_a x$

ג) $\log_{\left(\frac{1}{3}\right)}(3x) - \log_{\frac{1}{9}}(9x) = 6$

צמצום הלוגריתם $x > 0$

$-\log_3(3x) + \log_9(9x) = 6$

$-(\log_3 3 + \log_3 x) + (\log_9 9 + \log_9 x) = 6$

$-1 - \log_3 x + 1 + \log_{3^2} x = 6$

$-\log_3 x + \frac{1}{2}\log_3 x = 6$

$-\frac{1}{2}\log_3 x = 6 \quad / \cdot \left(-\frac{1}{2}\right)$

$\log_3 x = -12$

$\boxed{x = 3^{-12}}$