Question 1

If $\log_{10} 5 + \log(5x + 1) = 1$, then find x.

Combine the logarithms: $\log_{10}(5) + \log_{10}(5x + 1) = \log_{10}(5(5x + 1))$ Therefore, we have: $\log_{10}(5(5x + 1)) = 1$

Rewrite in exponential form: $5(5x + 1) = 10^1$
Simplifying gives: $5(5x + 1) = 10$

Solve for x: $5x + 1 = 2 \implies 5x = 1 \implies x = \frac{1}{5}$

Answer: $x = \frac{1}{5}$

Question 2

If $a^2 + b^2 = c^2$, then find $\frac{1}{\log_{(c + a)} b} + \frac{1}{\log_{(c - a)} b}$.

Use the change of base formula: [\frac{1}{\log_{(c + a)} b} = \log_b(c + a)] [\frac{1}{\log_{(c - a)} b} = \log_b(c - a)]

Combine the logarithms: [\log_b(c + a) + \log_b(c - a) = \log_b((c + a)(c - a)) = \log_b(c^2 - a^2)]

Substitute (c^2 = a^2 + b^2): [c^2 - a^2 = b^2 \implies \log_b(b^2) = 2]

Answer: (2)