Applying Rules of Logarithms

In problems 1-4, write each expression in terms of a single logarithm with a coefficient of 1.

Example: $\log_b u^2 - \log_b v = \log_b\left(\dfrac{u^2}{v}\right)$

1. $\log_b m - \dfrac{1}{2}\log_b n$

2. $\log_b w + \log_b x - \log_b y$

3. $3\log_b x + 2\log_b y - \dfrac{1}{4}\log_b z$

4. $\dfrac{1}{3}\log_b w - 3\log_b x - 5\log_b y$

In problems 5-8, write each expression in terms of logarithms of first-degree polynomials.

Example: $\log_b \dfrac{(2x+1)^3}{(3x-5)^4} = 3\log_b(2x+1) - 4\log_b(3x-5)$

5. $\log_b\left((5x-4)^3(3x-5)^4\right)$

6. $\log_b \dfrac{(x-3)^5}{(5+x)^3}$

7. $\log_b \dfrac{x^2}{\sqrt{x+1}}$

8. $\log_b\left(x^4 + x^3 - 20x\right)$