Question 1: There are one-sided inverses:

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{pmatrix}, \qquad B = \begin{pmatrix} \frac{-17}{18} & \frac{8}{18} \\[4pt] \frac{-2}{18} & \frac{2}{18} \\[4pt] \frac{13}{18} & \frac{-4}{18} \end{pmatrix}$$

These satisfy: $A \cdot B = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ but $B \cdot A \neq \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$.

Question 2: $\log_b(x^n) = n \cdot \log_b(x)$ is equivalent to $(e^x)^n = e^{x \cdot n}$.

If we know that $(e^x)^n = e^{x \cdot n}$, then:

$$n \cdot \log_b(x) = \log_b\left(b^{n \cdot \log_b(x)}\right) = \log_b\left(\left(b^{\log_b(x)}\right)^n\right) = \log_b(x^n).$$

Question 3: $f(x) = \dfrac{3x+2}{5x-1}$ has inverse $g(x) = \dfrac{x+2}{5x-3}$.

$$f(g(x)) = \frac{3 \cdot \left(\frac{x+2}{5x-3}\right) + 2}{5 \cdot \left(\frac{x+2}{5x-3}\right) - 1} = \frac{\frac{3x \cancel{+6}}{\cancel{5x-3}} + \frac{10x \cancel{-6}}{\cancel{5x-3}}}{\frac{\cancel{5x}+10}{\cancel{5x-3}} - \frac{\cancel{5x}-3}{\cancel{5x-3}}} = \frac{13x}{13} = x$$

$$g(f(x)) = \frac{\frac{3x+2}{5x-1} + 2}{5 \cdot \left(\frac{3x+2}{5x-1}\right) - 3} = \frac{\frac{3x \cancel{+2}}{\cancel{5x-1}} + \frac{10x \cancel{-2}}{\cancel{5x-1}}}{\frac{\cancel{15x}+10}{\cancel{5x-1}} - \frac{\cancel{15x}-3}{\cancel{5x-1}}} = \frac{13x}{13} = x$$