(1) Let $L_\alpha$ be the line in $\mathbb{R}^2$ gotten by rotating the $x$-axis counterclockwise by the angle $\alpha$, and define $L_\beta$ similarly. Let $\text{Ref}_\alpha$ and $\text{Ref}_\beta$ be the reflections of $\mathbb{R}^2$ across $L_\alpha$ and $L_\beta$, respectively.
(a) In the case where $\alpha = \pi/4$ and $\beta = -\pi/6$, draw a picture that illustrates the compositions $\text{Ref}_\beta \circ \text{Ref}_\alpha$ and $\text{Ref}_\alpha \circ \text{Ref}_\beta$. Are the results the same?
(b) Based on your answer in (a), you should notice that $\text{Ref}_\beta \circ \text{Ref}_\alpha$ is rotation by some angle. What angle?
(c) Prove your answer to (b) using matrix multiplication.
(d) Check that your answer to (b) makes sense in the special case where $\alpha = \beta$.

(2) Also do the following problems:
3.1: 6, 8, 14, 16
3.2: 6, 14, 16, 50