MATH 403 FALL 2021: QUIZ 4 SOLUTION
DATE: SEP 29, 2021

Let $A \in \mathbb{R}^2$ and $r \in \mathbb{R} \setminus \{0\}$.

(a) (3 points) Give the definition of the translation τ_A.

    Solution. $\tau_A(X) = X + A$ for all $X \in \mathbb{R}^2$.

(b) (3 points) Give the definition of the central dilatation δ_r with center O and dilatation factor r.

    Solution. $\delta_r(X) = rX$ for all $X \in \mathbb{R}^2$.

(c) (4 points) For $X \in \mathbb{R}^2$, compute $\delta_r \circ \tau_A \circ (\delta_r)^{-1}(X)$.

    Solution. $\delta_r \circ \tau_A \circ (\delta_r)^{-1}(X) = \delta_r(\tau_A(\frac{1}{r}X)) = \delta_r(A + \frac{1}{r}X) = rA + X$.