

Equivalence Relations

For each of the following relations, determine whether they are reflexive, symmetric, and/or transitive, and indicate if they are equivalence relations. Explain your answers.

Relation	reflexive?	symmetric?	transitive?	equivalence relation?
<i>has the same birthday</i> on the set of people				
<i>similarity</i> on the set of triangles				
\geq on the integers				
For $a, b \in \mathbb{Z}$, $a \sim b$ if a and b share a non-trivial common factor				
For $P_1, P_2 \in \mathbb{R}^2$, $P_1 \sim P_2$ if they have the same image under the function $f(x, y) = x^2 - y^2$				
\neq on the rational numbers				
For $P_1, P_2 \in \mathbb{R}^2$, $P_1 \sim P_2$ if they have the same distance from the origin in \mathbb{R}^2				
For $a, b \in \mathbb{R}$, $a \sim b$ if a and b are approximately equal ($a \approx b$)				

(You'll need your results for the next group work!)