MATH 250 HANDOUT 14 - EQUIVALENCE RELATIONS

Which of the following are equivalence relations? (Which are reflexive, symmetric, or transitive?)

(1) Let x and y be real numbers and define $x \sim y$ if $x - y \in \mathbf{Q}$.

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(2) Let x and y be rational numbers and define $x \sim y$ if $x - y \in \mathbf{Q}_{\geq 0}$.

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(3) Let x and y be integers and define $x \sim y$ if $x - y \in d\mathbf{Z}$.

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(4) Let S be the collection of all sets and say that $A \sim B$ if there is a bijection from A to B.

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(5) Let S be the collection of all sets and say that $A \sim B$ if there is a surjection from A to B.

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(6) Let S be the collection of all sets and say that $A \sim B$ if there is an injection from A to B.

R S T

(7) Let x and y be real numbers and define $x \sim y$ if $x = 1$ or $y = 1$.

R S T

(8) Let x and y be real numbers and define $x \sim y$ if $x = 1$ or $y = -1$.

R S T

(9) Let $\mathbf{Q}[x]$ be the set of polynomials with rational coefficients. Say that $f \sim g$ if their derivatives are equal.

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