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Quiz 4

1.) $f(n) = 4n + 1$

i.) It is one to one, since every integer goes into the linear function and comes out with a unique value. ($4 \cdot n$

ii.) It isn't onto since output of 0 can't be reached

iii.) Range: $\{y \in Y \mid \exists x \in X, f(x) = y\}$

$\rightarrow \{\ldots -7, -3, 1, 5, 9 \ldots\}$

$g(n) = 2n^2 - 1$

i.) Not one-to-one; $n = -1, 1$ produce same result of 1.
ii.) Not onto: $g(n) \geq -1$. The lowest possible value is -1 when 0 is inputted. So the whole set of $\mathbb{Z}$ can't be reached

iii.) Range: $\{y \in Y \mid \exists x \in X, f(x) = y\}$

$\rightarrow \{-1, 1, 7, 17, 31 \ldots\}$

2.) Reflexive: $((a,b),(a,b)) \in R$ is true
since $ab = ab$

Symmetric; since $ad = cb$ then
$cb = ad$

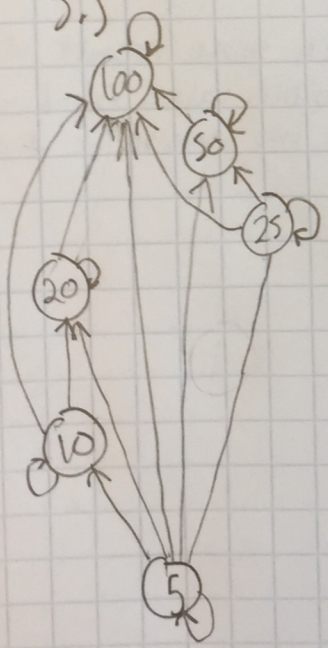
so $((a,b),(c,d)) \in R$
$\rightarrow ((c,d),(a,b)) \in R$

Transitive: If $ad = cb$ & $cf = ed$

then $adcf = cbed \rightarrow af = be$

so $((a,b),(c,d)) \in R \wedge ((c,d),(e,f)) \in R$
$\rightarrow ((a,b),(e,f)) \in R$

3.)



Reflexive: All divide themselves
ie $5/5 = 1$

Antisymmetric; No bidirectionals in graph
ie 25 can divide 50 but not
the otherway.

Transitive; All arrows create a triagle.
in a set of 3.
If 5 can divide 25, and 25 can
divide 50, then 5 can divide 50.