Name _Solutions_____ Discrete I, Quiz 8

1) Let R be the relation on $\mathbb{Z}$ defined by xRy if and only if $5|x-y$. It is known that R is an equivalence relation (You don't need to prove this, I just told you it's true). What elements are in the equivalence class $[3]$?

Note that this relation is merely "mod 5". Do you see why? Hence:

$$[3] = \{-2, 3, 8, 13, 18, 23, \dots\}$$

2) Compute $4 \cdot 5$ mod 7.

$$4 \cdot 5 \equiv 20 \equiv 6 \pmod 7$$

3) Solve $2x + 5 = 8$ mod 17.

Note that $2^{-1} \equiv_{17} 9$ because $2 \cdot 9 \equiv_{17} 18 \equiv_{17} 1$.

$$\begin{aligned} 2x + 5 &\equiv_{17} 8 \\ 2x &\equiv_{17} 3 \\ 9 \cdot 2x &\equiv_{17} 9 \cdot 3 \\ 1x &\equiv_{17} 27 \\ x &\equiv 1_{17} 10 \end{aligned}$$