

Name: _____

MA 3520: Quiz 4

Type all solutions. Your answers should be complete and in proper English.

- (1) For the following relation defined on $\mathbb{Z}$

$$a\mathcal{R}b \iff 5|a-b$$

prove that $\mathcal{R}$ is an equivalence relation.

- (2) Using the equivalence relation above, prove that addition over $\mathcal{R}$ is well defined. That is show

if $a_1\mathcal{R}b_1$ and $a_2\mathcal{R}b_2$ then $a_1 + a_2\mathcal{R}b_1 + b_2$.

- (3) Solve the following problems for x in $\mathbb{Z}_n$ where $x \in \{0, 1, 2, \dots, n-1\}$.

(a) $[x] + [3] = [11]$ in $\mathbb{Z}_3$

(b) $[3][100] = [x]$ in $\mathbb{Z}_7$

(c) $[3][x] = [1]$ in $\mathbb{Z}_7$

(d) $[3][x] = [100]$ in $\mathbb{Z}_7$

(e) $[2][x] = [4]$ in $\mathbb{Z}_8$

(f) $[4][x] = [2]$ in $\mathbb{Z}_8$

- (4) Solve the following from your book 10.1, 10.2, 10.11