

$$3. \quad m \equiv n \iff 3 \mid (m-n)$$

$$m, n \in \mathbb{Z}$$

$$10 \equiv 1 \pmod{3}?$$

$$3 \mid (10-1)?$$

yes ~~no~~

$$1 \equiv 10 \pmod{3}?$$

$$3 \mid (1-10)?$$

✓

$$9 \% 3 = 0$$

$$2 \equiv 2 \pmod{3}?$$

$$3 \mid (2-2)$$

✓

$$0 \% 3 = 0$$

$$8 \equiv 1 \pmod{3}?$$

$$3 \mid (8-1)$$

no

$$0 = n_1 \equiv 0$$

$$3 = n_2 \equiv 0$$

$$-3 = n_3 \equiv 0$$

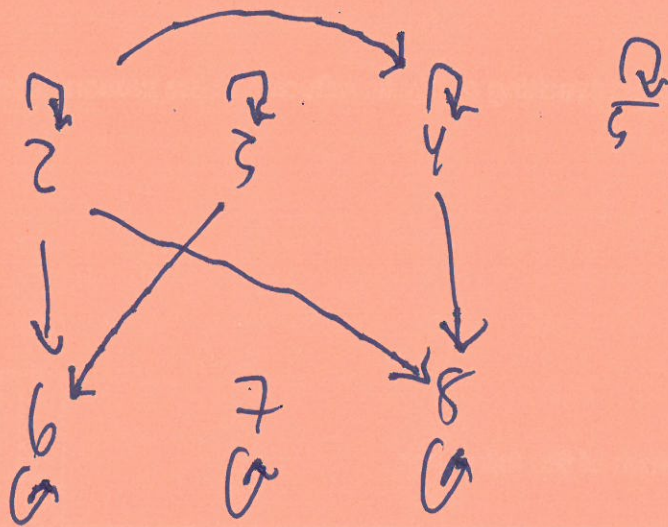
$$11. \quad A = \{3, 4, 5\} \quad B = \{4, 5, 6\}$$

$$x \in A \iff x \in B$$

$$S = \{(3, 6), (4, 4), (5, 5)\}$$

$$S^{-1} = \{(6, 3), (4, 4), (5, 5)\}$$

15.



$$19. \quad A = \{2, 4\} \quad B = \{6, 8, 10\}$$

$$A \times B = \{(2, 6), (2, 8), (2, 10), (4, 6), (4, 8), (4, 10)\}$$

$$R = \{(2, 6), (2, 8), (2, 10), (4, 8)\}$$

$$S = \{(2, 6), (4, 8)\}$$

$$A \cup S = \{(2, 6), (2, 8), (2, 10), (4, 8)\}$$

$$A \cap S = \{(2, 6), (4, 8)\}$$