

MTH 151 Homework #1 Key

1a. $A = \{R, O, M, E, A, N, D, J, U, L, I, T\}$

b. $B = \{J, U, L, I, S, C, A, E, S, R\}$

c. $A \cup B = \{A, C, D, E, I, J, L, M, N, O, R, S, T, U\}$

d. $A \cap B = \{A, E, I, J, L, R, U\}$

e. $|A| = n(A) = 12$

f. $|A \cap B| = n(A \cap B) = 7$

g. $B' = \{B, D, F, G, H, K, M, N, O, P, Q, T, V, W, X, Y, Z\}$

2.a. $\{-1, 1\}$

b. $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11\}$

c. $\{0, 1, 4, 9, 16, 25, 36, 49, 64, 81\}$

d. \emptyset

3.a. **false**

Q not an element

$$Q = \{2, 4, 6, \dots, 18, 20\}$$

b. **false**

$$R = \{\dots, -6, -4, -2, 0, 2, 4, 6, \dots\}$$

c. **false**

6 not a set

d. **true**

e. **true**

f. **true**

4a. **false**

nothing in empty set

b. **false**

$\{0\}$ not an element

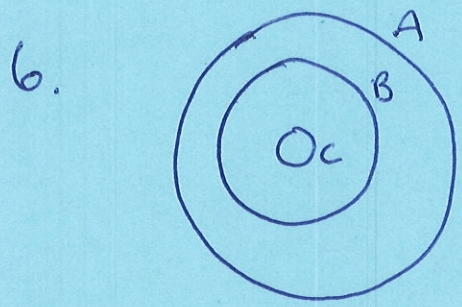
c. **true**

\emptyset subset of every set

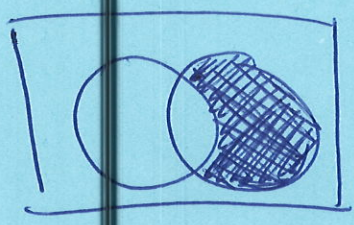
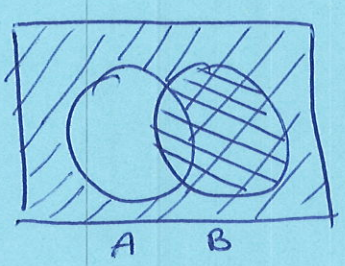
4d. false \emptyset not an element
 e. true every set has \emptyset as a subset

5a. $A \cup B = \{0, 1, 2, 3, 4, 5, 6\}$

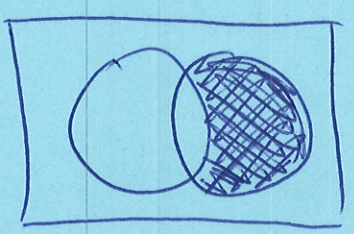
b. $A \cap B = \{3\}$



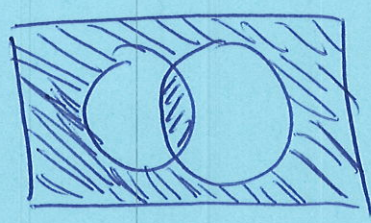
7. a. $A' \cap B$



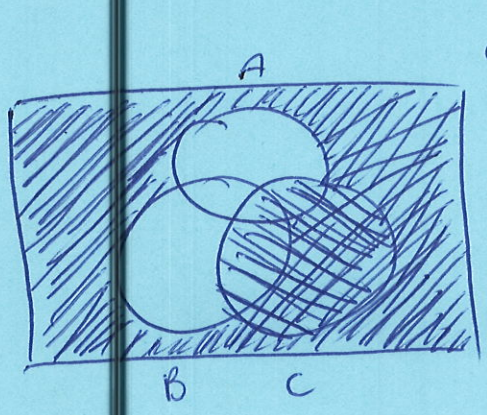
b. $B - A$



c. $(A \cap B) \cup (A \cup B)'$

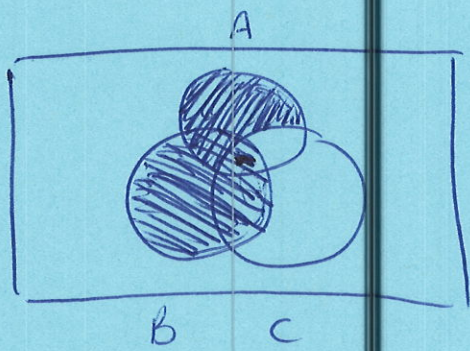


d. $(A' \cap B') \cup C = (A \cup B)' \cup C$



any shading

4. $(A \cap C') \cup B$
 $= (A - C) \cup B$



8a. $C - (B \cup A)$

b. $(S - M) \cup (M \cap P)$

c. $(A \cup B \cup C) - (B \cap C)$

d. $[(A \cup B) - C] \cup (A \cap B)$

9a. $A \times B = \{(a, y), (a, z), (b, y), (b, z), (c, y), (c, z), (d, y), (d, z)\}$

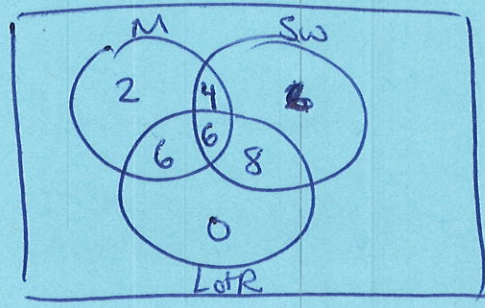
b. $A \times B \times C = \{(a, y, 0), (a, y, 1), (a, z, 0), (a, z, 1), (b, y, 0), (b, y, 1), (b, z, 0), (b, z, 1), (c, y, 0), (c, y, 1), (c, z, 0), (c, z, 1), (d, y, 0), (d, y, 1), (d, z, 0), (d, z, 1)\}$

$n(A \times B) = 8$

$n(A \times B \times C) = 16$

c. $A^2 = A \times A = \{(a, a), (a, b), (a, c), (a, d), (b, a), (b, b), (b, c), (b, d), (c, a), (c, b), (c, c), (c, d), (d, a), (d, b), (d, c), (d, d)\}$

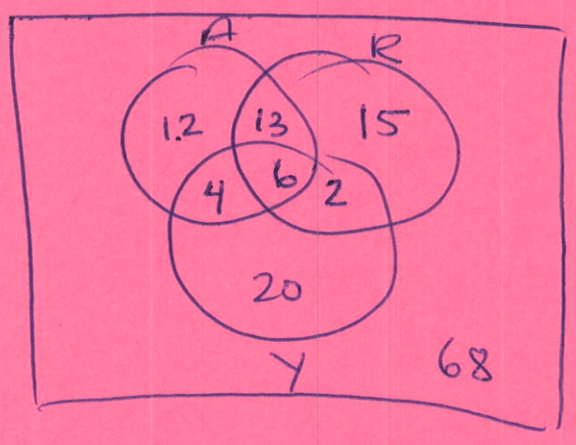
10.



a. $2 + 6 + 0 = 8$

b. 6

11.



a. $16 = 12 + 4$

b. $12 + 15 + 20 = 47$

c. 68