



Intro to Sets SOLUTIONS



1 Intro

1. (a) $A = \{2, 4, 6, 8, 10\}$
(b) $B = \{1, 3, 5, 7, 9\}$
(c) $C = \{2, 3, 5, 7\}$
2. i. True
ii. True
iii. False
iv. False
v. True
vi. True
vii. False
viii. False
3. (a) $A = \{1, 2, 3, 4, 6, 8, 12, 24\}$
(b) $B = \{4, 8, 12, 16, 20, 24\}$
(c) $C = \{2, 3, 5, 7, 11, 13, 17, 19, 23\}$
(d) $D = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24\}$
 - i. True
 - ii. False
 - iii. True
 - iv. False
 - v. True
 - vi. False
 - vii. True
 - viii. True
 - ix. False
 - x. False





2 Venn Diagrams

1. (a) i. $A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
ii. $A \cap B = \{4, 5, 6\}$
iii. $A \setminus B = \{1, 2, 3\}$
iv. $B \setminus A = \{7, 8, 9, 10\}$
(b) $\#A = 6$
(c) $\#B = 7$
2. i. $A \cup B = \{2, 3, 4, 6, 8, 10, 12, 14, 15, 16, 18\}$
ii. $A \cap B = \{6, 12, 18\}$
iii. $A \setminus B = \{3, 9, 15\}$
iv. $B \setminus A = \{2, 4, 8, 10, 14, 16\}$
(a) $\#A = 6$
(b) $\#B = 9$
(c) $\#(A \cup B) = 12$
(d) $\#(A \cap B) = 3$
3. (b)
i. $A \cup B = \{3, 5, 6, 7, 9, 11, 12, 15\}$
ii. $A \cap B = \{3, 9, 15\}$
iii. $A \setminus B = \{5, 7, 11, 13\}$
iv. $B \setminus A = \{6, 12\}$
4. (a) Venn Diagram
(b) i. $A \cup B = \{1, 2, 4, 6, 8, 10, 12, 16\}$
ii. $A \cap B = \{2, 4, 8\}$
iii. $A \setminus B = \{6, 10, 12\}$
iv. $B \setminus A = \{1, 16\}$
(c) $\#A = 6$
(d) $\#B = 5$
(e) $\#(A \cap B) = 3$
(f) $\#(A \cup B) = 8$
5. (a) Venn Diagram
(b) i. $A \cup B = \{1, 2, 3, 4, 6, 8, 12, 16, 20, 24\}$
ii. $A \cap B = \{4, 8, 12, 24\}$
iii. $A \setminus B = \{1, 2, 3, 6\}$
iv. $B \setminus A = \{16, 20\}$
(c) $\#A = 8$





- (d) $\#(A \cap B) = 4$
(e) $\#(A \cup B) = 10$
(f) $\#(A \setminus B) = 4$
6. (a) Venn Diagram
(b) i. $A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
ii. $A \cap B = \{\}$
iii. $A \setminus B = \{1, 3, 5, 7, 9\}$
iv. $B \setminus A = \{2, 4, 6, 8, 10\}$
(c) $\#(A \cap B) = 0$
(d) $\#(A \cup B) = 10$
(e) $\#(B \setminus A) = 5$

3 Universal Set

1. i. $U = \{2, 3, 4, 6, 8, 9, 10, 12, 14, 15, 16, 18\}$
ii. $(A \cup B) = \{2, 3, 4, 6, 8, 12, 15, 16, 18\}$
iii. $(A \cap B) = \{6, 12, 18\}$
iv. $A' = \{2, 4, 8, 10, 14, 16\}$
v. $B' = \{3, 9, 10, 14, 15\}$
vi. $(A \cup B)' = \{10, 14\}$
2. i. $A = \{2, 4, 8, 10, 14, 16\}$
ii. $A' = \{3, 6, 9, 12, 15, 18\}$
iii. $A \cup B = \{2, 4, 6, 8, 10, 12, 14, 16, 18\}$
iv. $(A \cup B)' = \{3, 9, 15\}$
v. $A \cap B = \{10, 14\}$
vi. $(A \cap B)' = \{2, 3, 4, 6, 8, 9, 12, 15, 16, 18\}$
vii. $A \setminus B = \{2, 4, 8, 16\}$
3. (a) Venn diagram
(b) i. $A \cup B = \{3, 5, 6, 7, 9, 11, 12, 13, 15\}$
ii. $A \cap B = \{3, 9, 15\}$
iii. $A \setminus B = \{5, 7, 11, 13\}$
iv. $B \setminus A = \{6, 12\}$
v. $A' = \{1, 2, 4, 6, 8, 10, 12, 14\}$
vi. $B' = \{1, 2, 4, 5, 7, 8, 10, 11, 13, 14\}$
4. (a) Venn diagram
(b) i. $A \cup B = \{5, 10, 20, 25, 30, 40, 45, 50, 60\}$





- ii. $A \cap B = \{10, 30, 50\}$
 - iii. $A' = \{5, 15, 25, 35, 45, 55\}$
 - iv. $B' = \{15, 20, 35, 40, 55, 60\}$
 - v. $(A \cup B)' = \{15, 35, 55\}$
 - vi. $(A \cap B)' = \{5, 15, 20, 25, 35, 40, 45, 55, 60\}$
- (c) $\#A' = 6$
- (d) $(A \cup B)' = 3$
5. (a) Venn diagram
- (b) i. $A \cup B = \{1, 2, 3, 4, 6, 8, 10, 12\}$
 - ii. $A \cap B = \{2, 4, 6, 12\}$
 - iii. $A' = \{5, 7, 8, 9, 10, 11\}$
 - iv. $B' = \{1, 3, 5, 7, 9, 11\}$
 - v. $(A \cup B)' = \{5, 7, 9, 11\}$
 - vi. $(A \cap B)' = \{1, 3, 5, 7, 8, 9, 10, 11\}$
- (c) $\#B' = 6$
- (d) $\#(A \cap B)' = 8$

4 Problem Solving

1. (a) Venn diagram
- (b) 1
2. (a) Venn diagram
- (b) 11
- (c) 4
3. (a) Venn diagram
- (b) 35
- (c) 30
4. (a) Venn diagram
- (b) 8
- (c) 10
- (d) 2
5. (a) Venn diagram
- (b) 20
- (c) 15
6. (a) Venn diagram
- (b) 17





- (c) 3
7. (a) Venn diagram
(b) 45
(c) 15
8. (a) Venn diagram
(b) 5
9. (a) Venn diagram
(b) 7

Leamy Maths Community

