1. (a) Sets A and B are equal to each other.
   (b) $|A| = |B| = 3$, $|C| = 3$, $|D| = 3$, $|E| = 3$, $|F| = 3$
   (c) i. True
      ii. False
      iii. True
      iv. True
      v. True

2. (a) $V = \{-2, -1, 0, 1, 2, 3, 4, 5, 6\}$, $|V| = 9$
   (b) $V = \{t \in \mathbb{Z} | t < -3\} \cup \{t \in \mathbb{Z} | t > 7\}$, $|V| = \infty$
   (c) $B \times A = \{(x, p), (x, q), (x, r), (y, p), (y, q), (y, r)\}$, $|B \times A| = 6$

3. (a) $A \times B = \{(m, g), (m, h), (n, g), (n, h), (o, g), (o, h), (p, g), (p, h)\}$, $|A \times B| = 8$
   (b) $B \times A = \{(g, m), (g, n), (g, o), (g, p), (h, m), (h, n), (h, o), (h, p)\}$, $|B \times A| = 8$
   (c) $A \times A = \{(m, m), (m, n), (m, o), (m, p), (n, m), (n, n), (n, o), (n, p), (o, m), (o, n), (o, o), (o, p), (p, m$
   $|A \times A| = 16$
   (d) $B \times B = \{(g, g), (g, h), (h, g), (h, h)\}$, $|B \times B| = 4$

4. (a) $A \times B = \{(10, 2), (10, 3), (10, 4), (11, 2), (11, 3), (11, 4), (12, 2), (12, 3), (12, 4)\}$
   (b) i. No
      ii. Yes
   (c) $R = \{(10, 2), (11, 3), (12, 4)\}$
   (d) Domain of R is A and co-domain of R is B.
   (e) R is a function because every element in A is related to exactly one element in B.

5. (a) i. $p \wedge q$
      ii. $r \vee \neg q$
      iii. $\neg(p \wedge r)$
      iv. $\neg r \wedge \neg q$
   (b) i. False
      ii. True
      iii. False
      iv. True
      v. False
      vi. True

6. (a)

p	q	r	$p \vee (\neg q \wedge r)$
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	T
F	T	T	F
F	T	F	F
F	F	T	T
F	F	F	F

(b)

p	q	r	$(p \vee q) \wedge (\neg p \vee (q \wedge \neg r))$
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	F
F	T	T	T
F	T	F	T
F	F	T	F
F	F	F	F

(c) $p \wedge (p \vee q)$ is equivalent to p because $p \wedge (p \vee q) = p \wedge \top = p$

7. $(p \oplus q) \wedge r = (p \wedge \neg q \vee \neg p \wedge q) \wedge r$ because the definition of Exclusive OR is $p \oplus q = p \wedge \neg q \vee \neg p \wedge q$