

Use your knowledge of Sets and Set Theory to answer each question below.

1. In each problem, indicate set equality by writing = or  $\neq$ .

- a)  $A = \{0, 2, 4, 6, 8, 10, 12\} \neq B = \{t, r, i, a, n, g, l, e\}$   
 b)  $C = \{a, e, i, o, u\} = D = \{\text{vowels}\}$   
 c)  $X = \{\text{whole numbers} \leq 9\} \neq Y = \{8, 4, 5, 7, 2, 0, 6, 3, 1\}$   
 d)  $P = \{\text{fingers}\} = Q = \{\text{thumb, index, middle, ring, little}\}$

2. In each problem, indicate whether one set is a subset of the other by writing the symbols  $\subset$  or  $\not\subset$ .

- a)  $A = \{0, 2, 4, 6, 8, 10, 12\} \not\subset B = \{\text{even numbers between 0 and 20}\}$   
 b)  $M = \{\text{consonants}\} \not\subset N = \{a, b, c, d, e\}$   
 c)  $X = \{\text{whole numbers} < 7\} \subset Y = \{8, 4, 9, 5, 7, 2, 0, 6, 3, 1\}$   
 d)  $C = \{a, e, i, o, u\} \subset D = \{\text{The English alphabet}\}$   
 e)  $R = \{e, a, r\} \not\subset S = \{c, a, r, d\}$   
 f)  $F = \{-4, -3, -2, -1, 0, 1\} \subset G = \{\text{integers} < 7\}$   
 g)  $P = \{\text{Saturday, Sunday}\} \not\subset Q = \{\text{Wednesday, Thursday, Friday, Saturday}\}$

3. Create an example of two sets in which the first set is a subset of the second.

Sample answer 1:  $\{\text{consonants}\} \subset \{\text{The English alphabet}\}$

Sample answer 2:  $\{\} \subset \{\text{integers}\}$

4. Create an example of two sets in which the first set is not a subset of the second.

Sample answer 1:  $\{e, a, r, s\} \not\subset \{l, e, a, r, n\}$

Sample answer 2:  $\{1, 3, 5, 7, 9\} \not\subset \{\text{even whole numbers}\}$

5. How many subsets does each set have? Show your work.

a)  $X = \{0, 2, 4, 6\} \quad n = 4; 2^4 = 2 \cdot 2 \cdot 2 \cdot 2 = 16$

b)  $Q = \{\text{fingers}\} \quad n = 5; 2^5 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$

c)  $P = \{\text{primary colors}\} \quad n = 3; 2^3 = 2 \cdot 2 \cdot 2 = 8$