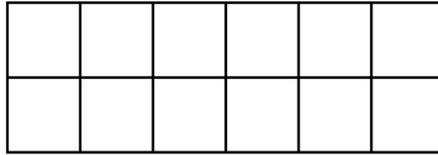


1. Consider the figure shown on the picture below.

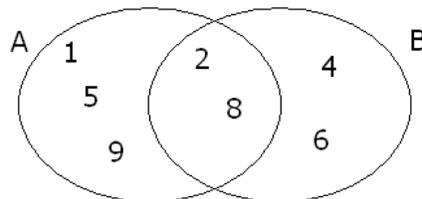


- (a) How many squares are there on the picture? **17**
 (b) How many rectangles are there on the picture? **63**

For problems 2-5, let $A = \{1, 2, 5, 8, 9\}$ and $B = \{2, 4, 6, 8\}$.

2. Draw a Venn diagram depicting these sets.

Solution:



3. Find each of the following.

- (a) $A \cap B = \{2, 8\}$
 (b) $A \cup B = \{1, 2, 4, 5, 6, 8, 9\}$
 (c) $B \cup (A \cap B) = \{2, 4, 6, 8\}$

4. Label each of the following statements as true or false.

- (a) $A \subseteq A \cap B$ **false**
 (b) $B \subseteq A \cup B$ **true**
 (c) $A \cap B \subseteq A \cup B$ **true**

5. Subsets.

- (a) List all two-element subsets of A .

$\{1, 2\}, \{1, 5\}, \{1, 8\}, \{1, 9\}$
 $\{2, 5\}, \{2, 8\}, \{2, 9\}$
 $\{5, 8\}, \{5, 9\}$
 $\{8, 9\}$

(b) List all subsets of B .

\emptyset

$\{2\}, \{4\}, \{6\}, \{8\}$

$\{2, 4\}, \{2, 6\}, \{2, 8\}, \{4, 6\}, \{4, 8\}, \{6, 8\}$

$\{2, 4, 6\}, \{2, 4, 8\}, \{2, 6, 8\}, \{4, 6, 8\}$

$\{2, 4, 6, 8\}$

6. We walk into a restaurant. The menu lists 2 different choices for appetizers, 3 different choices for the main entry, and 5 different choices for desserts. How many different 3–entry meals can a guest possibly select? (Assume that a 3–entry meal consists of 1 appetizer, 1 main entry, and 1 dessert.) **30**
7. How many different four digit numbers can be formed using the digits 1, 2, 3, and 4, if repetition is allowed (for example, 1424 is allowed)? **$4^4 = 256$**
8. How many different four digit numbers can be formed using the digits 1, 2, 3, and 4, if repetition is not allowed (for example, 1424 is not allowed)? **24**