

Foundations for Algebra

Tools of Algebra

**Set Theory**

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**Example 1**

Find the union and intersection of each pair of sets.

1.  $A = \{10, 12, 14, 16\}; B = \{9, 10, 11, 12\}$
  
  
  
  
  
  
  
  
  
  
2.  $A$  is the set of positive prime numbers less than 10;  $B$  is the set of whole-number factors of 10.

**Example 2**Find the complement of set  $A$  in universe  $U$ .

3.  $U = \{-5, -4, -3, -2, -1, 0, 1, 2\}; A = \{-1, 0, 1\}$
  
  
  
  
  
  
  
  
  
  
4.  $U$  is the set of whole numbers less than 10;  $A$  is the set of perfect squares less than 10.

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**Example 3**

Determine whether each statement about the sets is true or false. Use a Venn diagram to support your answer.

5.  $A$  is the set of whole-number factors of 9, and  $B$  is the set of whole-number factors of 16. Statement:  $A \cap B = \emptyset$

6.  $A$  is the set of perfect squares, and  $B$  is the set of whole numbers. Statement:  $A \subseteq B$

**Example 4**

7. **Business** The set  $W = \{30, 32, 34, 36, 38, 40, 42\}$  represents the waist sizes in inches of men's jeans sold at a clothing store. The set  $I = \{28, 30, 32\}$  represents the possible inseam lengths in inches of the jeans. Find  $W \times I$  to determine all sizes of jeans sold at the store.