

$$A = \{1, 3, 7, 8\}$$

Which are true/false?

$$1 \in A \quad \{1\} \in A \quad 2 \in A$$

$$\{1, 3\} \subseteq A \quad \{1, 2\} \subseteq A$$

$$\emptyset \in A \quad \emptyset \subseteq A \quad \{\emptyset\} \subseteq A$$

$$A = \{1, 3, 7, 8\}$$

Which are true/false?

$$1 \in A$$

True

$$\{1\} \in A$$

False

subset, not element

$$2 \in A$$

False

no 2 in A

$$\{1, 3\} \subseteq A$$

True

$$\{1, 2\} \subseteq A$$

False

no 2 in A

$$\emptyset \in A$$

False

not in the set

$$\emptyset \subseteq A$$

True

$$\{\emptyset\} \subseteq A$$

False

not a subset

$n(A)$  = number of elements in set A

Two sets A and B are equivalent if  $n(A) = n(B)$

Which sets are equivalent?

$$A = \{ 1, 5, 6, 8 \}$$

$$B = \{ \text{Alpha, Beta} \}$$

$$C = \{ X, Y, Z \}$$

$$D = \{ x: x \text{ is a letter} \\ \text{in Mississippi} \}$$

$$E = \{ 1, A, \emptyset \}$$

$$F = \{ 3, 6, 9, \dots 27 \}$$

$$G = \{ x: x \text{ is a whole number, } 0 < x < 10 \}$$

$n(A)$  = number of elements in set A

Two sets A and B are equivalent if  $n(A) = n(B)$

Which sets are equivalent?

$A = \{ 1, 5, 6, 8 \}$

$n(A) = 4$

$C = \{ X, Y, Z \}$

$n(C) = 3$

$E = \{ 1, A, \emptyset \}$

$n(E) = 3$

$G = \{ x: x \text{ is a whole number, } 0 < x < 10 \}$

$n(G) = 9$

$B = \{ \text{Alpha, Beta} \}$

$n(B) = 2$

$D = \{ x: x \text{ is a letter}$

$n(D) = 4$  in Mississippi}

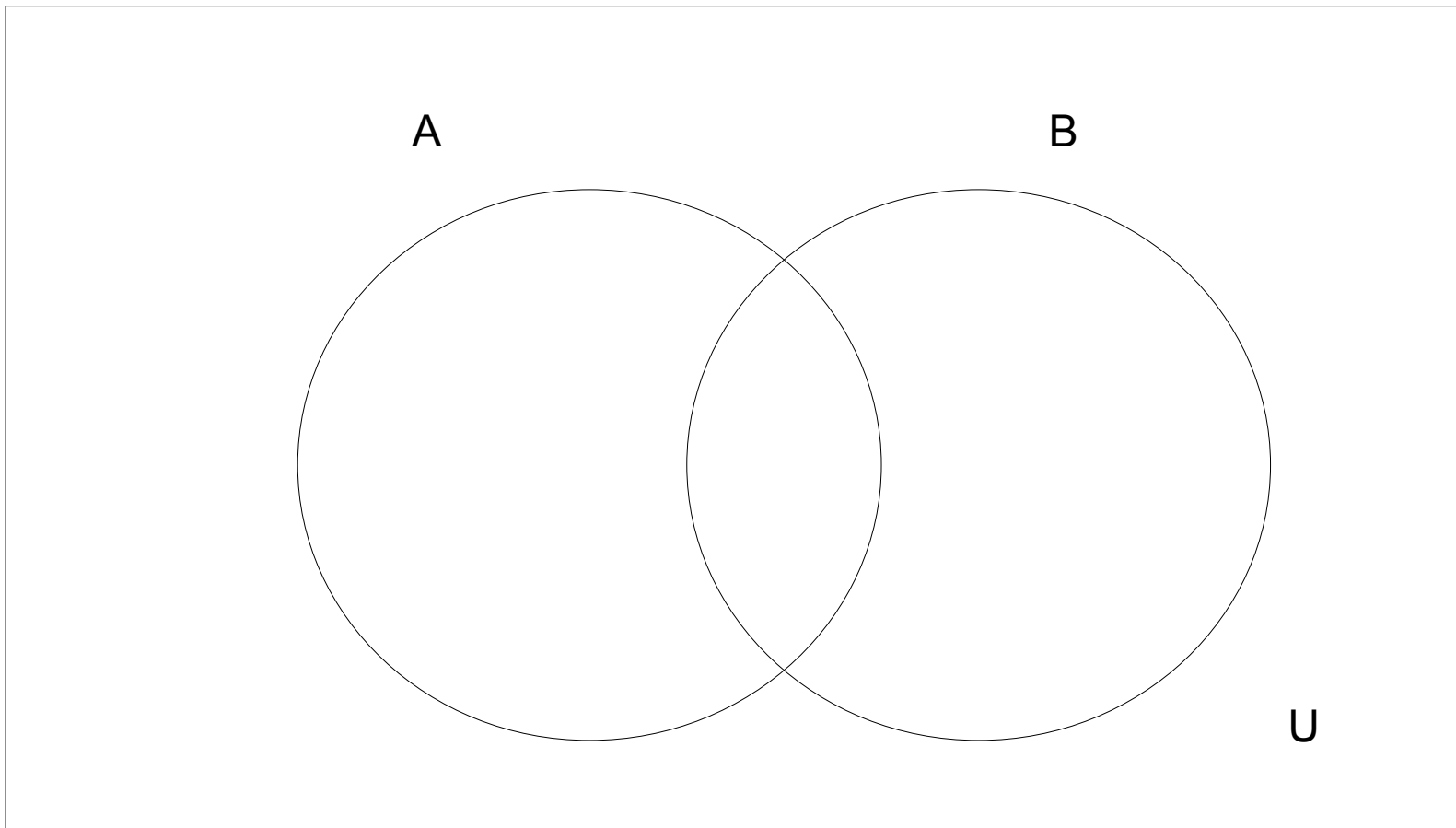
$F = \{ 3, 6, 9, \dots 27 \}$

$n(F) = 9$

C&E, D&G

# Venn Diagrams and Proper Subsets

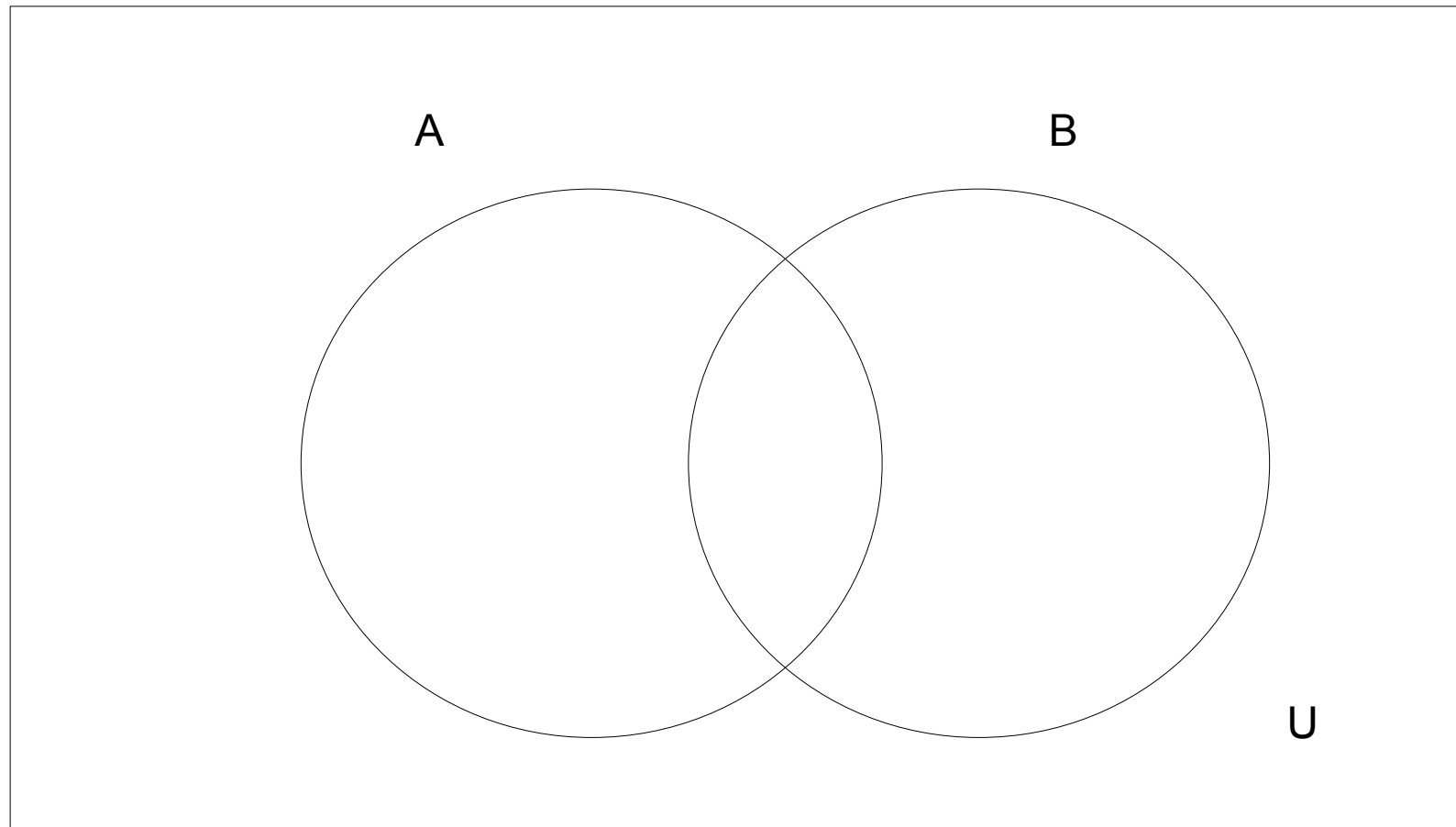
- A *Venn diagram* is used to visualize relationships among sets.



$U = \{ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 \}$

$A = \{ 1, 2, 4, 5, 7, 8, 10 \}$

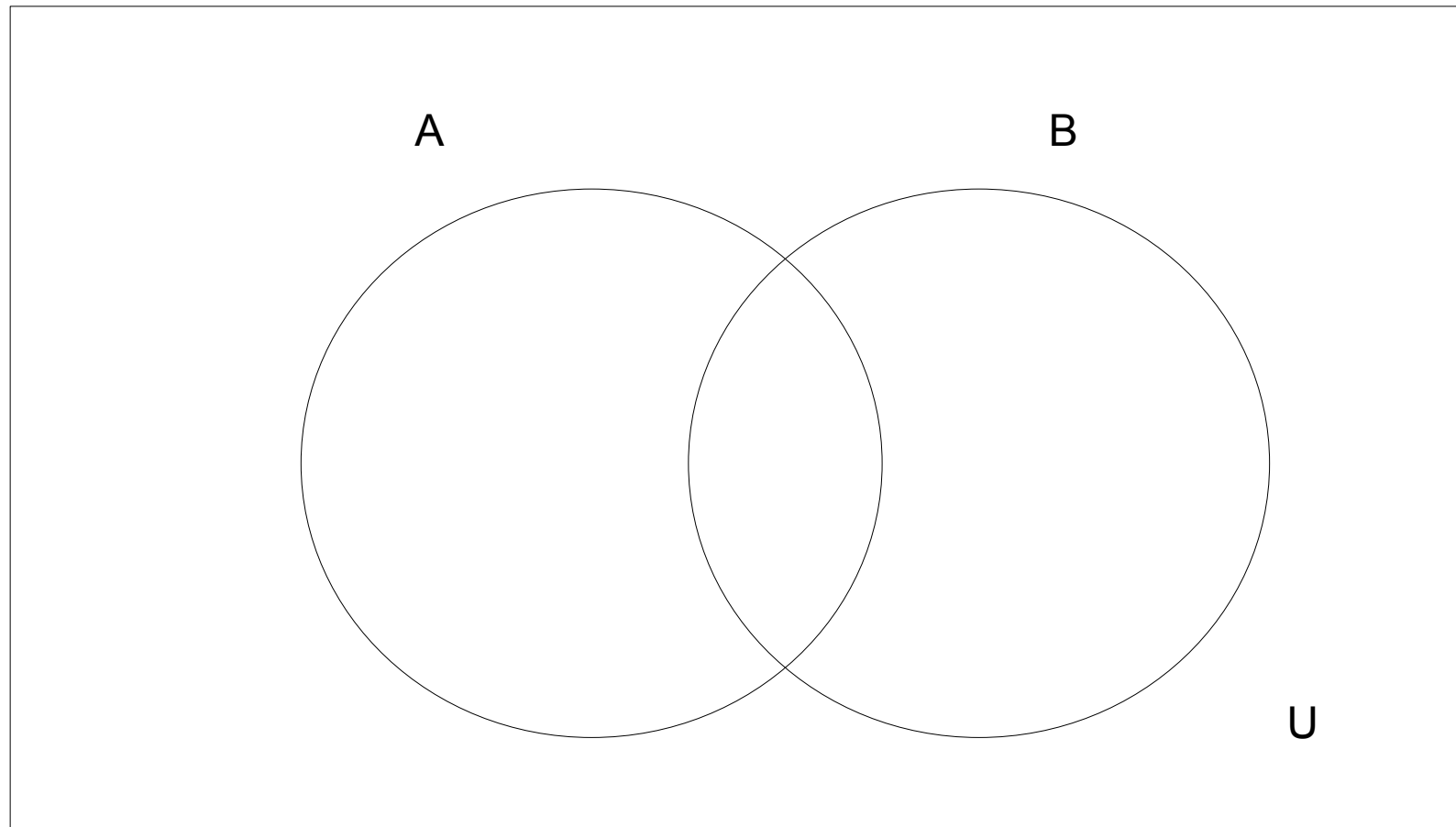
$B = \{ 2, 4, 6, 8, 10 \}$



$$U = \{ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 \}$$

$$A = \{ 3, 4, 5, 6, 7 \}$$

$$B = \{ 1, 3, 4, 6, 8, 9 \}$$



List all proper subsets of  $\{a, b, c\}$



List all proper subsets of  $\{a, b, c\}$

$\{a, b, c\}$

$\{a, b\}$      $\{a, c\}$      $\{b, c\}$

$\{a\}$          $\{b\}$          $\{c\}$

$\{\}$

There are  $2^3 = 8$  of them.