

Name: Key

Section (Circle One): 8:00 - 8:50 10:00 - 10:50

Math 110 Supplemental Instruction Worksheet 1

1. Let $U = \{0, 1, 2, 3, \dots, 7\}$, $A = \{1, 2, 4, 7\}$, $B = \{3, 5, 6, 7\}$ and $C = \{1, 3, 7\}$.

(a) How many subsets does A have?

$$2^4 = 16$$

(b) Find the set $(A \cup B) \cap C'$.

$$A \cup B = \{1, 2, 3, 4, 5, 6, 7\}$$

$$C' = \{0, 2, 4, 5, 6\}$$

$$(A \cup B) \cap C' = \{2, 4, 5, 6\}$$

2. Shade the set $A' \cap (B' \cup C)$.



$$A' = \{I, IV, V, VIII\}$$

$$B' = \{I, II, VII, VIII\}$$

$$C = \{V, VI, VII, VIII\}$$

$$A' \cap (B' \cup C) = \{I, VI, VII, VIII\}$$

3. Insert the proper notation \in , \notin , \subseteq or $\not\subseteq$

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

$$\{6, 7\} \not\subseteq \{0, 2, 4, 6, \dots\}$$

$$0 \in \emptyset$$

4. In a company of 15 people, some employees are chosen for a special project.

(a) How many different subsets of the employees are possible?

$$2^{15} = 32768$$

(b) An employee should not work on the project by themselves. How many subsets of the students consist of at least two employees. (Hint: think about which ones you want to not count).

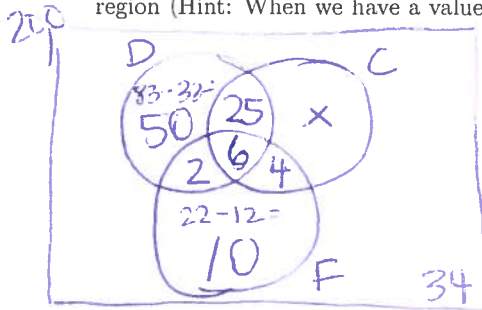
Not size 0 or 1:

$$\# \text{ size } 0 = 1$$

$$\# \text{ size } 1 = 15$$

$$32768 - 16 = \boxed{32752}$$

5. A pet store keeps track of the purchases of 200 customers over a four-hour period. The store manager classifies purchases as containing a dog product, a cat product, or a fish product. She found that
- 83 purchased a dog product
 - 22 purchased a fish product
 - 31 purchased a dog product and a cat product
 - 8 purchased a dog product and a fish product
 - 10 purchased a cat and a fish product
 - 6 purchased a dog, cat and fish product
 - 34 did not purchase a dog, cat or fish product
- (a) Use the given information to construct a Venn diagram labeling the number of customers in each region (Hint: When we have a value we don't know, we usually call it x !)



$$50 + 25 + x + 2 + 6 + 4 + 10 + 34 = 200$$

$$x + 131 = 200$$

$$x = 69$$

- (b) How many customers purchased a cat product but not a dog product or a fish product?

$$69$$

- (c) How many customers purchased a dog product or a fish product?

$$50 + 25 + 2 + 6 + 10 = 93$$

- (d) How many customers purchased a product for a single animal type?

$$50 + 69 + 10 = 129$$