Problem 1

We survey 120 people about their breakfast habits.

- 55 ate eggs at breakfast today.
- 40 drank juice at breakfast today.
- 25 both ate eggs and drank juice at breakfast today.

How many people had neither eggs nor juice this morning?

Answer: 50.
Problem 1

We survey 120 people about their breakfast habits.

- 55 ate eggs at breakfast today.
- 40 drank juice at breakfast today.
- 25 both ate eggs and drank juice at breakfast today.

How many people had neither eggs nor juice this morning?

Answer: 50.
Problem 2

We survey 150 Fargo/Moorhead people about which newspapers they read.

- 83 read the *Fargo Forum*.
- 58 read the *Grand Forks Herald*.
- 36 read neither of those two papers.

How many people read both the *Forum* and the *Herald*?
Problem 2

We survey 150 Fargo/Moorhead people about which newspapers they read.

- 83 read the *Fargo Forum*.
- 58 read the *Grand Forks Herald*.
- 36 read neither of those two papers.

How many people read both the *Forum* and the *Herald*?

Answer: 27.
Tips for Venn Diagram counting problems

- Always start with the most specific information you have (basic regions).
- If you can’t use a piece of information yet, pass over it and try again later.
- When absolutely stymied, you may have to “erase a line.”

As you’re interpreting the information, remember:

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- When absolutely stymied, you may have to “erase a line.”

As you’re interpreting the information, remember:

| and, but  | $\cap$ |
| or       | $\cup$ |
| not      | $'$    |
Tips for Venn Diagram counting problems

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## Problem 3

We survey 50 people about which restaurants they patronize among Qdoba, Dairy Queen, and Grand Junction. We find that

- 15 people eat at Qdoba.
- 30 people eat at Dairy Queen.
- 19 people eat at Grand Junction.
- 8 people eat at Qdoba and Dairy Queen.
- 12 people eat at Qdoba and Grand Junction.
- 7 people eat at Dairy Queen and Grand Junction.
- 5 people eat at Qdoba, Dairy Queen, and Grand Junction.

### The Questions

1. How many people eat only at Qdoba?
2. How many eat at Qdoba and Dairy Queen, but not at Grand Junction?
3. How many people don't eat at any of these three restaurants?
Problem 3
We survey 50 people about which restaurants they patronize among Qdoba, Dairy Queen, and Grand Junction. We find that
- 15 people eat at Qdoba.
- 30 people eat at Dairy Queen.
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- 8 people eat at Qdoba and Dairy Queen.
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- 5 people eat at Qdoba, Dairy Queen, and Grand Junction.

The Questions
1. How many people eat only at Qdoba?
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3. How many people don’t eat at any of these three restaurants?
The Questions

1. How many people eat only at Qdoba?

2. How many eat at Qdoba and Dairy Queen, but not at Grand Junction?

3. How many people don’t eat at any of these three restaurants?
The Questions

1. How many people eat only at Qdoba?  
   **Answer:** 0.

2. How many eat at Qdoba and Dairy Queen, but not at Grand Junction?

3. How many people don’t eat at any of these three restaurants?
The Questions

1. How many people eat only at Qdoba?
   Answer: 0.

2. How many eat at Qdoba and Dairy Queen, but not at Grand Junction?
   Answer: 3.

3. How many people don’t eat at any of these three restaurants?
<table>
<thead>
<tr>
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<th>Answer</th>
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<tbody>
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<td>1 How many people eat only at Qdoba?</td>
<td>0.</td>
</tr>
<tr>
<td><strong>Answer:</strong></td>
<td></td>
</tr>
<tr>
<td>2 How many eat at Qdoba and Dairy Queen, but not at Grand Junction?</td>
<td>3.</td>
</tr>
<tr>
<td><strong>Answer:</strong></td>
<td></td>
</tr>
<tr>
<td>3 How many people don’t eat at any of these three restaurants?</td>
<td>8.</td>
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<tr>
<td><strong>Answer:</strong></td>
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Problem 4

We survey 600 adults about which modes of transportation they have used in the past year. We find that

- 100 traveled by plane but not train
- 150 by train but not by plane
- 120 by bus but not by train or plane
- 100 by both bus and plane
- 40 by all three
- 440 by bus or train

How many of our survey participants did not travel by any of these three modes of transportation?
Problem 4

We survey 600 adults about which modes of transportation they have used in the past year. We find that

- 100 traveled by plane but not train
- 150 by train but not by plane
- 120 by bus but not by train or plane
- 100 by both bus and plane
- 40 by all three
- 440 by bus or train

How many of our survey participants did not travel by any of these three modes of transportation?

Answer: 120.
Problem 5
A survey in a high school shows that of its 4000 students,
- 2000 take French \((F)\)
- 3000 take Spanish \((S)\)
- 500 take Latin \((L)\)
- 1500 take both French and Spanish
- 300 take both French and Latin
- 200 take Spanish and Latin
- 50 take all three languages.
Problem 5

A survey in a high school shows that of its 4000 students,
- 2000 take French ($F$)
- 3000 take Spanish ($S$)
- 500 take Latin ($L$)
- 1500 take both French and Spanish
- 300 take both French and Latin
- 200 take Spanish and Latin
- 50 take all three languages.

The Questions

How many people belong in each of these sets?

1. $L \cap (F \cup S)$
2. $(L \cup F \cup S)'$
3. $L'$
4. $L \cup S \cup F'$
5. $F \cap S' \cap L'$
6. $L \cup (F \cap S')$
The Questions

How many people belong in each of these sets?

1. $L \cap (F \cup S)$
2. $(L \cup F \cup S)'$
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<tbody>
<tr>
<td>How many people belong in each of these sets?</td>
<td></td>
</tr>
<tr>
<td>1 $L \cap (F \cup S)$</td>
<td>450</td>
</tr>
<tr>
<td>2 $(L \cup F \cup S)'$</td>
<td></td>
</tr>
<tr>
<td>3 $L'$</td>
<td></td>
</tr>
<tr>
<td>4 $L \cup S \cup F'$</td>
<td></td>
</tr>
<tr>
<td>5 $F \cap S' \cap L'$</td>
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<tr>
<td>6 $L \cup (F \cap S')$</td>
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</table>
The Questions

How many people belong in each of these sets?

1. \( L \cap (F \cup S) \)  \hspace{1cm} \text{Answer: } 450
2. \( (L \cup F \cup S)' \)  \hspace{1cm} \text{Answer: } 450
3. \( L' \)
4. \( L \cup S \cup F' \)
5. \( F \cap S' \cap L' \)
6. \( L \cup (F \cap S') \)
## The Questions

How many people belong in each of these sets?

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</tr>
<tr>
<td>2</td>
<td>$(L \cup F \cup S)'$</td>
<td>450</td>
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<tr>
<td>3</td>
<td>$L'$</td>
<td>3500</td>
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<tr>
<td>4</td>
<td>$L \cup S \cup F'$</td>
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<tr>
<td>5</td>
<td>$F \cap S' \cap L'$</td>
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<tr>
<td>6</td>
<td>$L \cup (F \cap S')$</td>
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Answer: 450, 450, 3500, , , ,
The Questions

How many people belong in each of these sets?

1. \( L \cap (F \cup S) \) \hspace{1cm} \text{Answer: } 450
2. \( (L \cup F \cup S)' \) \hspace{1cm} \text{Answer: } 450
3. \( L' \) \hspace{1cm} \text{Answer: } 3500
4. \( L \cup S \cup F' \) \hspace{1cm} \text{Answer: } 3750
5. \( F \cap S' \cap L' \)
6. \( L \cup (F \cap S') \)
<table>
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<td>How many people belong in each of these sets?</td>
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<td>450</td>
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</tr>
<tr>
<td>3. ( L' )</td>
<td>3500</td>
</tr>
<tr>
<td>4. ( L \cup S \cup F' )</td>
<td>3750</td>
</tr>
<tr>
<td>5. ( F \cap S' \cap L' )</td>
<td>250</td>
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<tr>
<td>6. ( L \cup (F \cap S') )</td>
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<td>450</td>
</tr>
<tr>
<td>2</td>
<td>$(L \cup F \cup S)'$</td>
<td>450</td>
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<tr>
<td>3</td>
<td>$L'$</td>
<td>3500</td>
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<td>$L \cup S \cup F'$</td>
<td>3750</td>
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<tr>
<td>5</td>
<td>$F \cap S' \cap L'$</td>
<td>250</td>
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<tr>
<td>6</td>
<td>$L \cup (F \cap S')$</td>
<td>750</td>
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