

# Overdue Fines: Basic Operations

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Name \_\_\_\_\_  
Date \_\_\_\_\_

## Overdue Fines: Basic Operations



**Focus:** Use basic operations to determine the cost of overdue library book fines in different cities.

**The Problem:** How much would overdue fines be in different cities?

What if a librarian really charged the narrator of the poem for his overdue book?  
How much would the fine be?

### The Facts

- Overdue book fines start the day after a book is due.
- Fines are different from library to library.
- The amount of time a book can be kept also changes from library to library.
- Some libraries have a maximum fine that can be charged for an overdue book.
- The following chart lists some facts about overdue fines at different libraries.

| Library                                    | Length of Checkout | Overdue Fines  | Maximum Fine (per item)                             |
|--|--------------------|--|---|
| Boston Public Library<br>Massachusetts, US | 3 weeks            | \$0.05 per day for adults<br>\$0.05 per day for children and teens | \$5 per for adults<br>\$2.50 for children and teens |
| Boulder Public Library<br>Colorado, US     | 3 weeks            | \$0.05 per day   | \$5   |

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|  |         |   |                                    |
|--|---------|---|------------------------------------|
| Calgary Public Library<br>Alberta, Canada  | 3 weeks | \$0.25 per day  | \$10                               |
| Pelham Public Library<br>New Hampshire, US | 3 weeks | \$0.25 per day for adult books<br>\$0.10 per day for children's books | \$5 for adults<br>\$5 for children |
| Seattle Public Library<br>Washington, US   | 3 weeks | \$0.25 per day  | \$8                                |
| Your library                               | ???     | ???   | ???                                |

### The Task

1. Your team will create a poster showing the following information:
  - The number of days the book was overdue
  - A chart showing the information from each of the libraries, including your own
  - A graph showing the amount of overdue fines at each of the libraries on the chart
2. Each person on the team will write an explanation of the team's solution. This explanation will answer these questions:
  - *How did your group calculate the number of days the book is overdue? How do you know the answer is accurate?*
  - *Were the fines at the libraries the same or different? Why do you suppose that is true?*

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- *What kind of graph did your team create? Could another graph have been used? How do you know?*

### Things to Consider

#### Understanding the Problem

Read the *Overdue Fines* problem page, and then answer these questions.

- *How many days are there in a year? How many days in a leap year? How often do leap years occur?*
  
- *When a fine is listed as "per day" does that include the days the library is closed? Why do you think so?*
  
- *What is a "maximum fine"?*

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### Making a Plan

Before you make your plan, answer these questions.

- *Could two different libraries charge the same fine for Uncle Henry's book? Why do you think so?*
- *How does a librarian calculate an overdue fine?*
- *How many days will it take to reach the "maximum fine" at those libraries that have it?*

### Carrying Out the Plan

Before you begin planning your presentation, answer these questions.

- *What does your presentation have to include? Do you have all of the necessary information? What other calculations do you need to make?*
- *How will you make your graph? What kinds of graphs would help show the answer to the question? What information will the graph show?*
- *What other information needs to be displayed?*

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### Evaluating the Solution

- *Did you answer the question? How do you know?*
- *Does your answer make sense? If the library does not have a maximum fine, will the fine be more or less than at a library with a maximum fine?*
- *If two libraries charge different fines per day, will the total fine be different?*
- *Did everyone on the team write an explanation?*

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## Using the Calculator

### Basic Operations

Use the TI-15 calculator to solve the following problems:

- 1** Bill, Roland, and Refugio all collect baseball cards. Bill has 73 cards, Roland has 125 cards, and Refugio has 209 cards. How many cards do they have together?

| Press                             | The display shows: |
|-----------------------------------|--------------------|
| 73 $+$ 125 $+$ 209 $\text{Enter}$ |                    |

How do you know your answer is correct?

- 2** Alicia has 182 baseball cards. She gives 39 cards to Refugio. How many cards does she have now?

| Press                     | The display shows: |
|---------------------------|--------------------|
| 182 $-$ 39 $\text{Enter}$ |                    |

How do you know your answer is correct?

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- 3** Danyel's Explorer troop is going on a camp out. They are taking 17 tents. Each tent needs 9 stakes. How many stakes should Danyel pack?

| Press                        | The display shows: |
|------------------------------|--------------------|
| 17 $\times$ 9 $\text{Enter}$ |                    |

How do you know your answer is correct?

- 4** Tommy is packing teddy bears for the Handy Dandy Toy Company. He has 235 teddy bears to pack. Each box holds 8 teddy bears. How many full boxes will he have when he is finished packing? Will he have any teddy bears left over? How do you know?

| Press                                  | The display shows: |
|--|--------------------|
| 235 $\text{Int} \div$ 8 $\text{Enter}$ |                    |

How many full boxes does that make? What happens to the remainder?

| Press                       | The display shows: |
|-----------------------------|--------------------|
| 235 $\div$ 8 $\text{Enter}$ |                    |

How is this different from using the  $\text{Int} \div$  key? What happens to the remainder?