



**Grade Level:**  
**4-5**

### Materials

- River Travel 'Rithmetic math worksheets (attached)
- River Travel 'Rithmetic math answer keys (attached)

### Technology

- Calculator
- Research resource for Extended Thinking activity

## River Travel Math

**Length**  
1-2 Days

**Concepts/Objectives**  
Students will apply math concepts to math word problems generated from information found in the book, *Legendary Lady: The Story of the Belle of Louisville*, Jewell, A. with Mullen, K (1999).

**Activities**  
Students will complete multi-step math problems which feature history-based information.

**Belle Resource**  
Students will benefit by viewing all the video to gain understanding about the sections and operations of the *Belle of Louisville*.

## Instructional Strategies and Activities

Before the lesson:

Teacher prepares copies of math worksheets. Paper saving idea: place copies of the worksheet in clear protector sheets and supply fine tipped dry erase markers for students to use OR encourage students to work out the problems on their own paper.

Teacher prepares answer keys for the math worksheets.

## Open Response Assessment

Any of the questions from the River Travel 'Rithmetic worksheet can be used as a math open response question.

## Multiple Choice Questions

1. The mathematic operations usually used to calculate an "average" (or mean) are
  - a. addition and subtraction
  - b. subtraction and division
  - c. multiplication and subtraction
  - d. addition and division

2. The mathematic operations most likely used to calculate the amount of money generated by people who attend a lunch cruise on the *Belle of Louisville* are
  - a. addition and multiplication
  - b. division and subtraction
  - c. addition and subtraction
  - d. division and multiplication
  
3. When the *Avalon* was sold in 1962, the owners owed money to 149 creditors. The term used to refer to the money that is owed to another person is
  - a. asset
  - b. debit
  - c. credit
  - d. debt
  
4. The mathematic operation most likely used to calculate the difference between ticket prices today for a cruise aboard the *Belle of Louisville* and the ticket prices of 1920 for a cruise aboard the *Idlewild* is
  - a. addition
  - b. subtraction
  - c. multiplication
  - d. division
  
5. When rounding to the nearest whole number, a person would expect to read:
  - a. one digit to the right of the decimal point
  - b. no digits to the right of the decimal point
  - c. three digits to the right of the decimal point
  - d. two digits to the right of the decimal point

## Handouts/Worksheets/Graphic Organizers

See River Travel Arithmetic worksheet and answer sheet.

## Kentucky Academic Content

### Core Content

MA-05-5.3.1  
MA-04-5.3.1

## Adaptations for Diverse Learners/ Lesson Extensions

See Extended Thinking activity on page 3 of the worksheet.

## Answer Key for Multiple Choice Questions

1. d
2. a
3. d
4. b
5. b

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# RIVER TRAVEL 'RITHMETIC

(from information found in *Legendary Lady: The Story of the Belle of Louisville*)

1. The population for the city of Louisville in 1830 was approximately 10,341 people. By 1856, the population had grown to approximately 80,000.
  - A. Calculate the number of years between 1830 and 1856.
  - B. Calculate the difference between the population of 1830 and that of 1856.
  - C. Calculate the average increase per year, rounding to the nearest whole number.
  
2. The steamboat *Idlewild* carried 684,478 passengers between the years of 1934 and 1939.

Calculate the average number of passengers carried by the *Idlewild* between 1934 and 1939, rounding to the nearest tenth.
  
3. In January 1962 the owners of the *Avalon* reported the following information about the boat: there was \$90,287 in debts, \$39,872 in assets, and 149 creditors to whom money was owed. Round to the nearest dollar.
  - A. Determine the total debt of the owners of the *Avalon* after asset value is deducted from the debt.
  - B. Using the answer from part a, calculate the average amount owed to each creditor.

4. In the space below, create a list of the adults and children who live in your house on a regular basis.

Use this information to complete the following activities:

On May 17, 1884, round trip ticket prices for an excursion on the steamer *Maggie Harper* from Carrolton to Louisville were 75 cents for adults and 25 cents for children.

If the people who live in your house on a regular basis had taken this cruise in 1884, calculate the total cost of the tickets for the cruise.

Extension for #4:

- A. Imagine that the year is 1884 and your parents will allow you to have your birthday party during an excursion aboard the steamer *Maggie Harper* on May 17, 1884. Create a word problem describing the number of adults and children who will be invited to attend the party.
- B. Calculate the total cost of tickets for the group that will join you on the *Maggie Harper* for your birthday party.

**Extended Thinking (requires additional resources):**

During the heyday of steamboat river travel the seamboat called the *City of Louisville* set a speed record for travel between Louisville and Cincinnati, completing the trip in nine hours and 42 minutes.

Problem to solve: What was the average speed of the boat in miles per hour (mph)?

- A. Describe how you would solve this problem.
  
- B. Explain the type(s) of information needed so that you can solve the problem. Where would you look to find this information?
  
- C. Locate the information; calculate to solve the problem.

# RIVER TRAVEL 'RITHMETIC ANSWER KEY

(from information found in *Legendary Lady: The Story of the Belle of Louisville*)

1. The population for the city of Louisville in 1830 was approximately 10,341 people. By 1856, the population had grown to approximately 80,000.

- A. Calculate the number of years between 1830 and 1856.
- B. Calculate the difference between the population of 1830 and that of 1856.
- C. Calculate the average increase per year, rounding to the nearest whole number.

**A.  $1856-1830=26$**

**B.  $80,000-10,341=69,659$**

**C.  $69,659$  divided by  $26 = 2679$  people growth in population per year (rounded to the nearest whole number)**

2. The steamboat *Idlewild* carried 684,478 passengers between the years of 1934 and 1939.

Calculate the average number of passengers carried by the *Idlewild* between 1934 and 1939, rounding to the nearest tenth.

**$1939-1934 = 5$**

**$684,478$  divided by  $5 = 13,689.6$  passengers, rounded the nearest tenth**

3. In January 1962 the owners of the *Avalon* reported the following information about the boat: there was \$90,287 in debts, \$39,872 in assets, and 149 creditors to whom money was owed. Round to the nearest dollar.

- A. Determine the total debt of the owners of the *Avalon* after asset value is deducted from the debt.
- B. Using the answer from part a, calculate the average amount owed to each creditor.

**A.  $\$90,287-\$39,872 = \$50,415$  net indebtedness**

**B.  $\$50,415$  divided by  $149 = \$338.00$  owed to each creditor (rounded to nearest whole dollar)**

4. In the space below, create a list of the adults and children who live in your house on a regular basis.

**Answer will vary based on student household size.**

Use this information to complete the following activities:

On May 17, 1884, round trip ticket prices for an excursion on the steamer *Maggie Harper* from Carrolton to Louisville were 75 cents for adults and 25 cents for children.

If the people who live in your house on a regular basis had taken this cruise in 1884, calculate the total cost of the tickets for the cruise.

**Answer will vary based on student household size.**

**Example:**

**Two adults, two children**

$$$.75 \times 2 = 1.50$$

$$$.25 \times 2 = .50$$

$$\$1.50 + \$.50 = \$2.00 \text{ total for the family to take the cruise, round trip.}$$

Extension for #4:

- A. Imagine that the year is 1884 and your parents will allow you to have your birthday party during an excursion aboard the steamer *Maggie Harper* on May 17, 1884. Create a word problem describing the number of adults and children who will be invited to attend the party.
- B. Calculate the total cost of tickets for the group that will join you on the *Maggie Harper* for your birthday party.

**Answer will vary depending on the word problem created by the student.**

**Example:**

- A. **My mother and father told me that I may have my birthday party on the *Maggie Harper* and that I may bring five friends along with us for the trip. The friends I asked to come on the trip are: Jane, Joe, John, Jeffrey, and Jennifer. Both of Joe and Jennifer's parents are also going on the trip.**
- B. **Ticket costs for my birthday cruise: Six adults (\$.75 each):  $$.75 \times 6 = \$3.00$   
Six children (\$.50 each):  $$.50 \times 6 = \$3.00$   
 $\$3.00 + \$3.00 = \$6.00$  total cost for tickets for my birthday cruise**

### Extended Thinking (requires additional resources):

During the heyday of steamboat river travel the seamboat called the *City of Louisville* set a speed record for travel between Louisville and Cincinnati, completing the trip in nine hours and 42 minutes.

Problem to solve: What was the average speed of the boat in miles per hour (mph)?

- A. Describe how you would solve this problem.
- B. Explain the type(s) of information needed so that you can solve the problem. Where would you look to find this information?
- C. Locate the information; calculate to solve the problem.

**A. Students will need to describe that they would need to locate more information about the total miles between Louisville and Cincinnati and would need to research. The description should then explain that in order to calculate the average, they would have to convert the hours and minutes to minutes  $(9 \times 60) + 42 = \underline{\hspace{2cm}}$ . Next step is to calculate the total miles (one way) by the number of minutes. Basic math for this part involves setting up a ratio: if the time needed for the boat to travel 134 miles is 582 minutes, how many miles would the boat travel in 60 minutes (one hour)? At this point, some assumption might be made that the quotient will need to be rounded to a whole number for miles per hour.**

**B. Type of information needed:**  
a. Number of miles from Louisville to Cincinnati  
b. Number of minutes in an hour  
c. The number of miles from Louisville to Cincinnati can be found in reference materials or the internet.

**C. Calculations:**  
a. number of miles from Louisville to Cincinnati: 134 miles  
b. number of minutes in an hour: 60 minutes  
c. total minutes in nine hours 42 minutes:  $540 + 42 = 582$  minutes.  
d. Based on ratio of proportion needed:  $134/582 = x/60$ .  
e.  $134 \times 60 = 8040$ ;  $8040$  divided by  $582 = 13.8$ ; rounded to nearest whole number: 13 miles per hour.