

# Wallet Review Problem

## Wallet Review Problem

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|-----------------|---|
| Summary         | This activity is a review of the Wallet Problem done in fourth grade. It is intended to introduce new students to some of the concepts we have covered and to refresh the memories of our old students. Students compare the amounts of money two students have. The amounts are described relationally but not through specific dollar amounts.  |
| Goals           | 1. To think about contexts for equations. An equation can be thought of as a special condition under which two functions share the same value(s). In order for students to appreciate this notion, they need to think of the amounts themselves as functions. Think of the piggy bank as an input value and the person's total amount as the output value. The amount in the wallet does not vary but acts as a constant. |
| Practical Hints | Allow students to use their own representations for the amounts. Do they leave the amounts open to vary? Or do they fix the amounts? Remember, you want to eventually move to algebraic notation such as $8 + W$ and $3W$ , or $40 + x$ and $5x$ . But these expressions would be a strange place from which to begin.  |
| Materials       | Overheads, Handouts   |
| Keywords        | Contextualized Situations<br>Full Class Discussion<br>Function Representations<br>Interpretation of Graphs<br>Interpretation of Stories<br>Interpretation of Tables<br>Linear Functions<br>Production of Algebraic Expressions  |

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|----------------------|
| Production of Graphs |
| Production of Tables |
| Small Group Work     |

### Activity Plan:

#### 1. The Wallet and Piggy Bank Problem [Individual work]

Show Overhead 1 (Page 1) and distribute the corresponding Handout 1 (Page 1).

Ask the children to show on paper what they know about the following problem:

*Elizabeth and Darin each have some money.  
Elizabeth has \$40 in her wallet and the rest of her money is in her piggy bank.  
Darin has, altogether, exactly five times as much money as Elizabeth has in her piggy bank.*

#### 2. Discussing children's representations [Whole class]

Collect the children's handouts for future research analysis, and ask a few children to show to the class what they did. Discuss their representations.

#### 3. Representing possible values on a table [Small group work]

Show Overheads 2 and 3 (Page 2 & 3) and distribute the corresponding Handouts 2 and 3 (Page 2 & 3).

Ask the children to represent Elizabeth's and Darin's amounts for  $N$  dollars in the piggy bank and to complete the table.

#### 4. Discussing children's work [Whole class]

Ask a few children to read their answers to Handout 3 (Page 3). Discuss the answers.

Discuss whether or not Elizabeth and Darin could have exactly the same amount of money. Overhead 4 (Page 4) can be used as an aid in this discussion.

#### 5. Graph: Elizabeth's and Darin's possible amounts [Whole class]

Show Overhead 5: A graph representing Darin's amounts.

Consider the problem and ask the children to:

- (a) Determine whether it represents Darin's or Elizabeth's money
- (b) Predict where the line for Elizabeth would fall.

#### 6. Graphing Elizabeth's amounts [Small group work]

Distribute Handout 5 (Page 5) and ask the children to plot Elizabeth's amounts.

#### 7. Discussing children's results [Whole class]

Complete the graph in front of the class: plot the points corresponding to the situations where Elizabeth has no money in her piggy bank and where she has \$25, connect the two points, and extend the line beyond the second point.

Ask the children to:

- Judge whether any point in Elizabeth's graph shows that, for any amount in her piggy bank, she would have \$40 more.
- Discuss whether any point in Darin's graph shows that he has five times the amount in Elizabeth's piggy bank.
- Describe what the two lines show and explain why the lines cross.
- Show when/where Darin has more money than Elizabeth.
- Show when/where Elizabeth has more money than Darin.
- Show, on the table and on the graph, the difference between Elizabeth's and Darin's amounts if Elizabeth has 5 dollars in her piggy bank. Repeat for other amounts (\$10, \$15, \$20, \$25, \$30, etc. in the piggy bank).

#### 8. Homework (Page 6 & 7)

Students will work on a similar problem.

**Overhead and Handout: The Wallet and Piggy Bank  
Problem (Page 1)**

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

Elizabeth and Darin each have some money.

Elizabeth has \$40 in her wallet and the rest of her money is in her piggy bank.

Darin has, altogether, exactly five times as much money as Elizabeth has in her piggy bank.

Show how much money Elizabeth has; do the same for Darin.

## Overhead and Handout: The Wallet and Piggy Bank Problem (Page 2)

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

Fill in the table with amounts that could be true. Remember that:

Elizabeth has \$40 in her wallet and the rest of her money is in her piggy bank.

Darin has, altogether, exactly five times as much money as Elizabeth has in her piggy bank.

| In Elizabeth's piggy bank | Elizabeth (in piggy bank and wallet) | Darin    |
|---------------------------|--------------------------------------|----------|
| <i>N</i>                  |                                      |          |
| \$ 5.00                   | \$45.00                              |          |
| \$ 10.00                  |                                      | \$30.00  |
| \$ 20.00                  | \$60.00                              |          |
| \$ 25.00                  |                                      | \$65.00  |
| \$ 50.00                  | \$90.00                              | \$150.00 |

**Overhead and Handout: The Wallet and Piggy Bank Problem** (Page 3)

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

Use your table to answer the following questions:

Do you know how much money Elizabeth and Darin each have?

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Do you know who has more money?

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If you know how much money is in Elizabeth's piggy bank, what do you have to do to find out how much money Darin has?

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Could Elizabeth ever have the same amount of money as Darin? Explain.

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## Overhead: The Wallet and Piggy Bank Problem

(Page 4)

Elizabeth has \$40 in her wallet and the rest of her money is in her piggy bank.

Darin has, altogether, exactly five times as much money as Elizabeth has in her piggy bank.

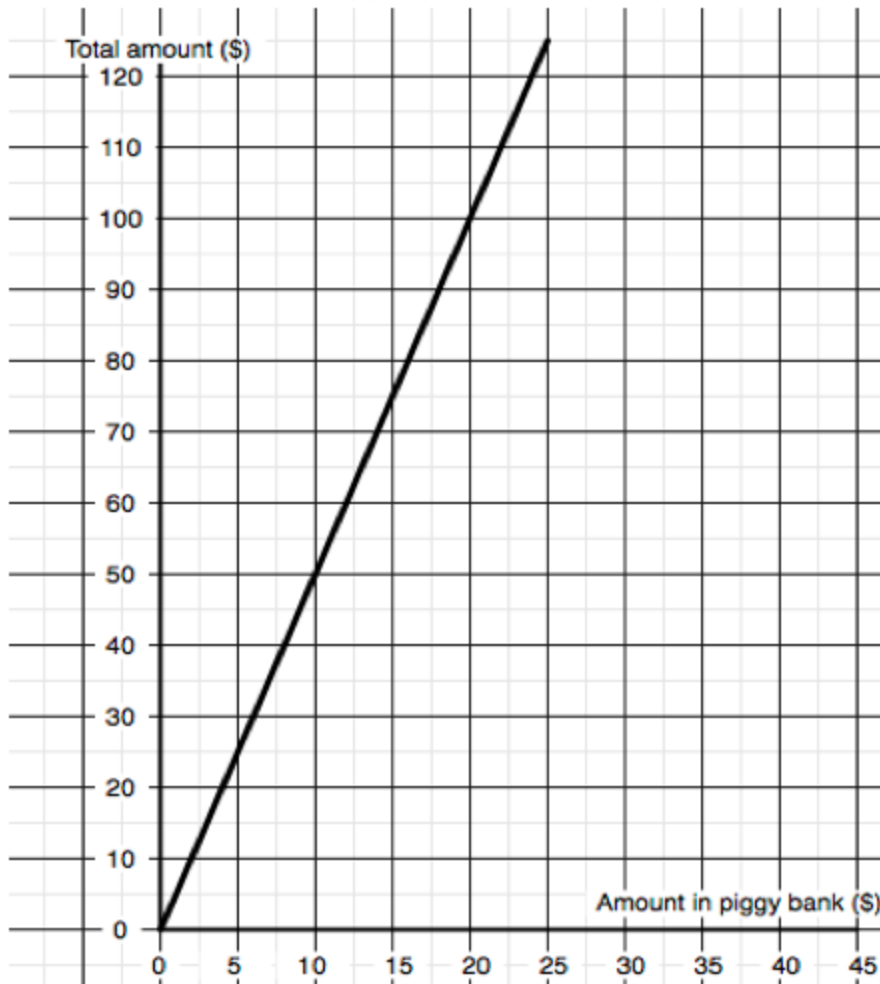
| <b>In Elizabeth's piggy bank</b> | <b>Elizabeth (in piggy bank and wallet)</b> | <b>Darin</b>                   |
|----------------------------------|---|--------------------------------|
| <b><math>N</math></b>            | <b><math>N + 40</math></b>                  | <b><math>N \times 5</math></b> |
| <b>\$ 5.00</b>                   | <b>\$ 45.00</b>                             | <b>\$ 25.00</b>                |
| <b>\$ 10.00</b>                  | <b>\$ 50.00</b>                             | <b>\$ 50.00</b>                |
| <b>\$ 20.00</b>                  | <b>\$ 60.00</b>                             | <b>\$ 100.00</b>               |
| <b>\$ 25.00</b>                  | <b>\$ 65.00</b>                             | <b>\$ 125.00</b>               |
| <b>\$ 50.00</b>                  | <b>\$ 90.00</b>                             | <b>\$ 250.00</b>               |

# Overhead and Handout: The Wallet and Piggy Bank Problem (Page 5)

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

Elizabeth has \$40 in her wallet and the rest of her money is in her piggy bank.

Darin has, altogether, exactly five times as much money as Elizabeth has in her piggy bank.



Does the line above represent Darin's or Elizabeth's money? How do you know? \_\_\_\_\_

Plot the line for the other person's money amounts.



## Homework: The Wallet and Piggy Bank Problem

(Page 6)

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

Roger has \$60 in his hand and the rest of his money is in his wallet.

Marina has, altogether, exactly four times as much money as Roger has in his wallet.

| In Roger's Wallet | Roger<br>(in wallet and hand) | Marina |
|-------------------|-------------------------------|--------|
| <i>N</i>          |                               |        |
| \$ 0              |                               |        |
| \$ 10.00          |                               |        |
| \$ 15.00          |                               |        |
| \$ 20.00          |                               |        |
| \$ 30.00          |                               |        |

Do you know how much money Roger and Marina each have?

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Do you know who has more money?

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If you know how much money is in Roger's wallet, what do you have to do to find out how much money Marina has?

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Could Roger ever have the same amount of money as Marina?

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# Homework: The Wallet and Piggy Bank Problem

(Page 7)

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

Use the data in the table (page 6) to graph Roger's and Marina's total amounts of money.

