

Equations and Inequalities

Equations and Inequalities

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Summary	Students will work with equations and inequalities, first with simple ones and later with comparisons of two functions. The Wallet Problem, introduced in a previous lesson, will provide the background context.
Goals	1. Have students reason about statements such as: $W = 7.5$ $W > 8$ $W < 2$ $4 < W \leq 7$ $W + 8 = 11$ $W + 8 > 13$ $W + 8 < 7$ $W \times 3 = 6$ $W \times 3 > 14$ $W \times 3 < 4$
Materials	Overheads, Handouts
Keywords	Contextualized Situations Full Class Discussion Inequality Functions Interpretation of Algebraic Expressions Interpretation of Graphs Interpretation of Stories Linear Functions Number Lines Small Group Work
Practical Hints	Three representations are used: (1) graphs, (2) algebraic notation (3) number lines, and (3) verbal explanations that draw upon particular contexts.

Activity Plan:

1. Focusing on the Number Lines [Whole Class]

Use the overheads on pages 1-6 to discuss the relation of the following statements to the graphical space. Sometimes the statement corresponds to a straight line, sometimes to a point, and sometimes to a region. [For example, $w=7.5$ corresponds to a vertical line passing through the point, 7.5 on the x axis. $W=7.5$ for each and every point on that line. On the other hand, $W>8$ corresponds to a region in the plane. The statement is true for every point in that region.]

$$W = 7.5$$

$$W > 8$$

$$W < 2$$

$$4 < W \leq 7$$

$$W + 8 = 11$$

$$W + 8 > 13$$

$$W + 8 < 7$$

$$w > 2 \text{ and } w < 8$$

$$W \times 3 = 6$$

$$W \times 3 > 14$$

$$W \times 3 < 4$$

$$w < 2 \text{ and } w > 8$$

$$W+8 = w \times 3$$

Note that there are two types of overheads and three copies of each of them so that points and regions can be more easily shown on different copies.

2. Representing comparative statements [Group Work]

Ask the students to complete the comparative examples on the handout on page 7. Each example should have a diagram on a number line, an explanation, and a symbolic expression.

3. Discussing children's results [Whole Class]

Go over the children's examples.

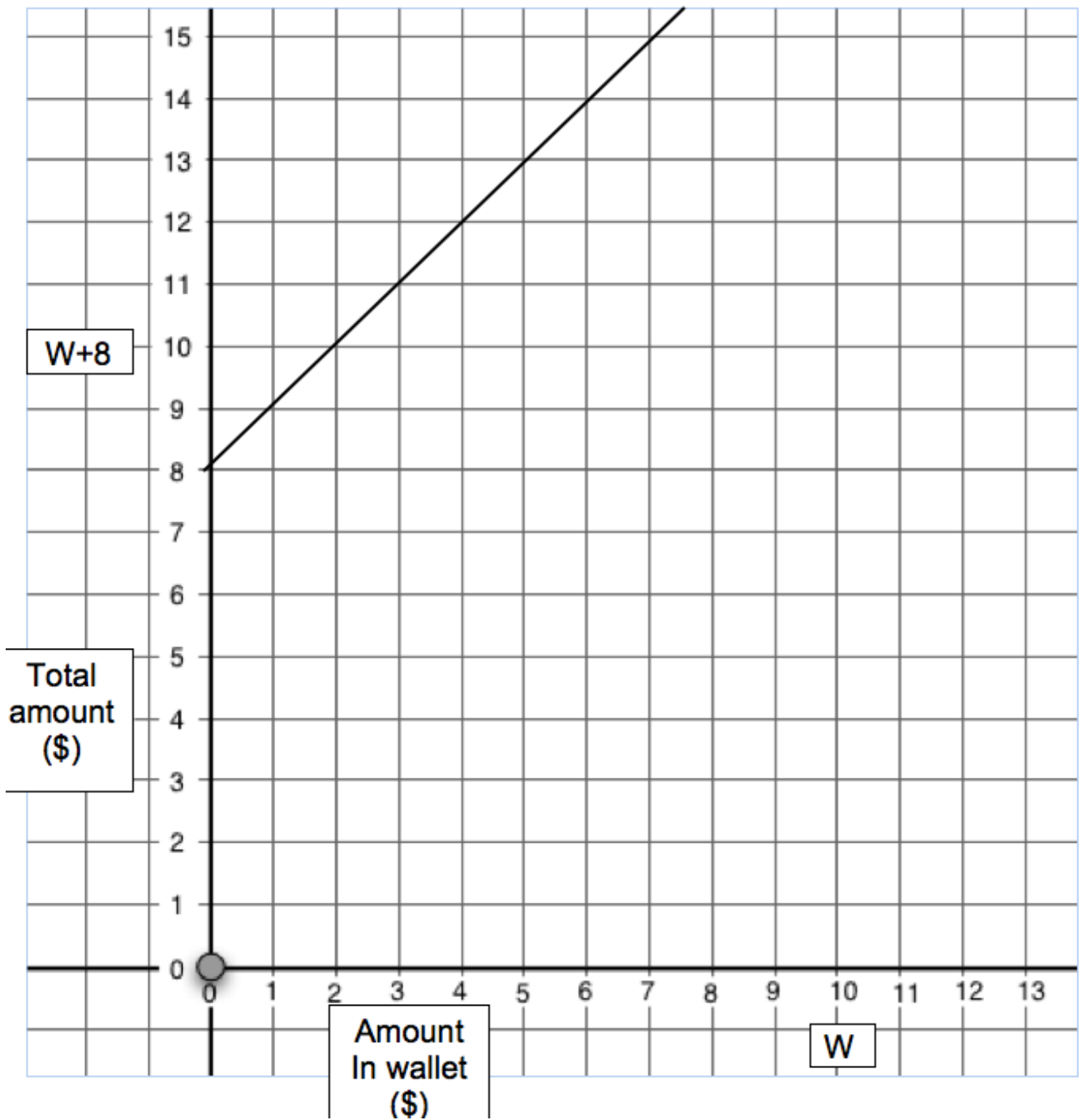
4. Homework (page 8)

Students will work on a similar problem.

Overhead: The Cartesian Space

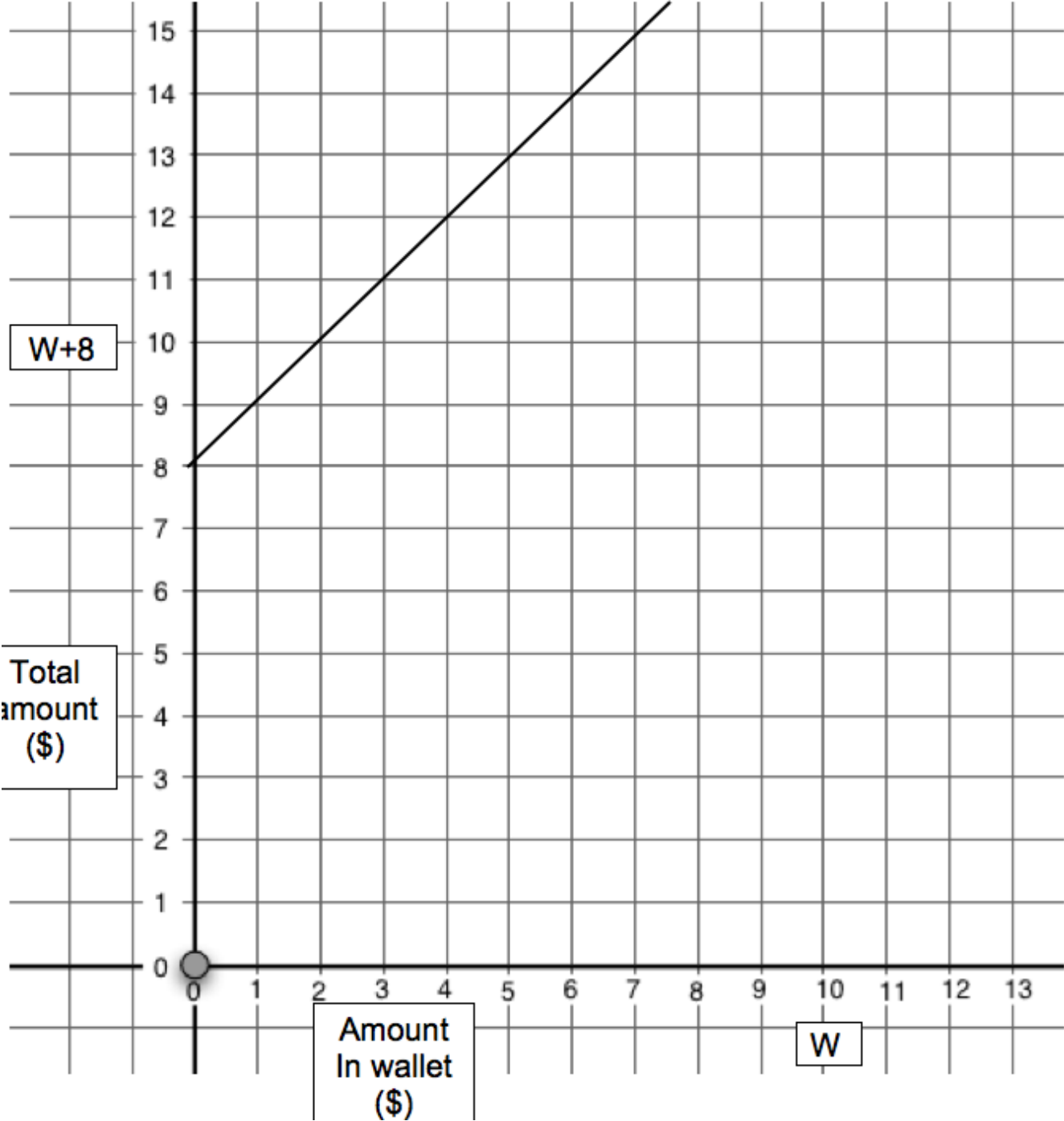
(Page 1)

Mike has \$8 in his hand and the rest of his money is in his wallet.



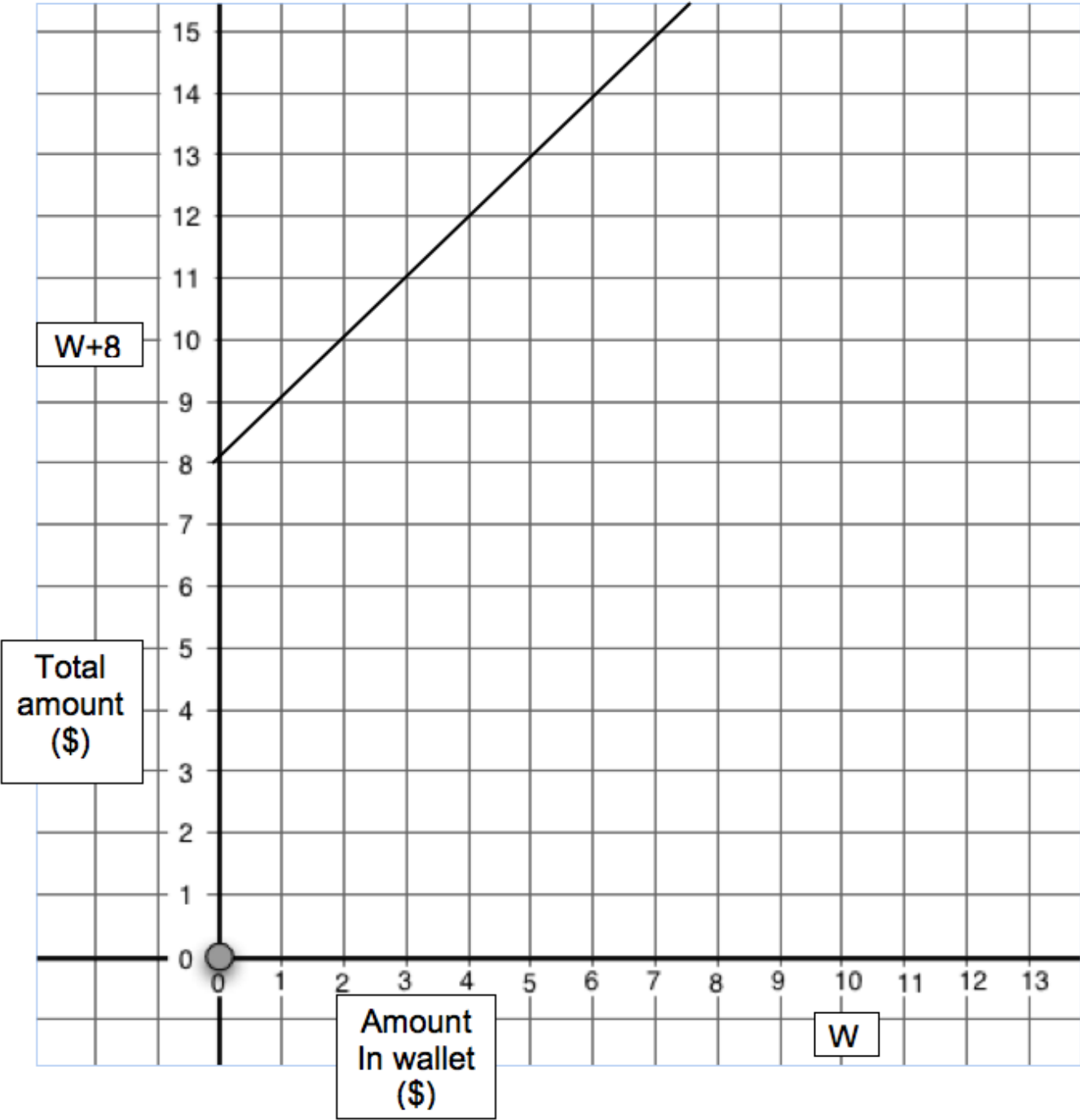
Overhead: The Cartesian Space

Mike has \$8 in his hand and the rest of his money is in his wallet.



Overhead: The Cartesian Space

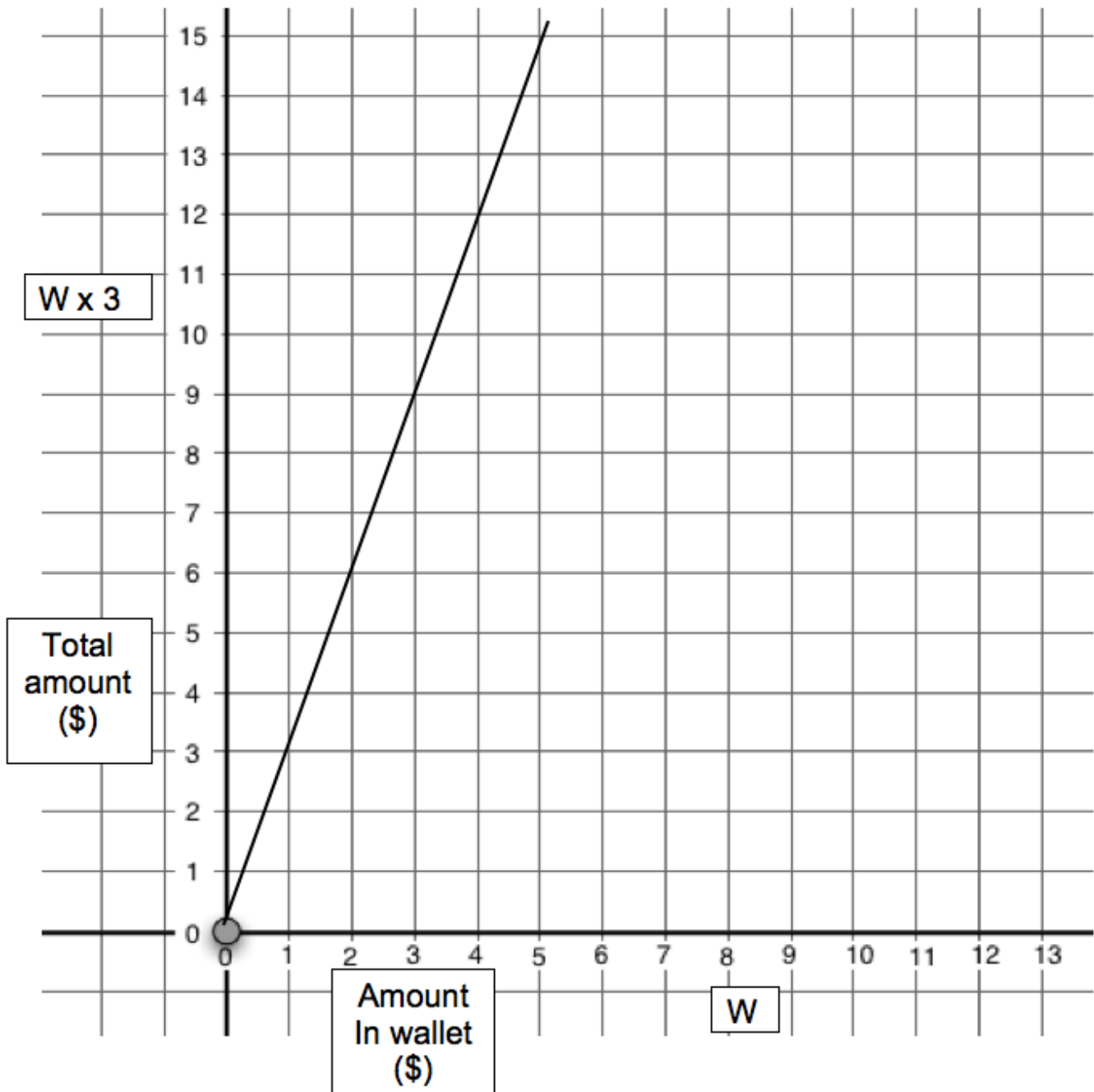
Mike has \$8 in his hand and the rest of his money is in his wallet.



Overhead: The Cartesian Space

(Page 4)

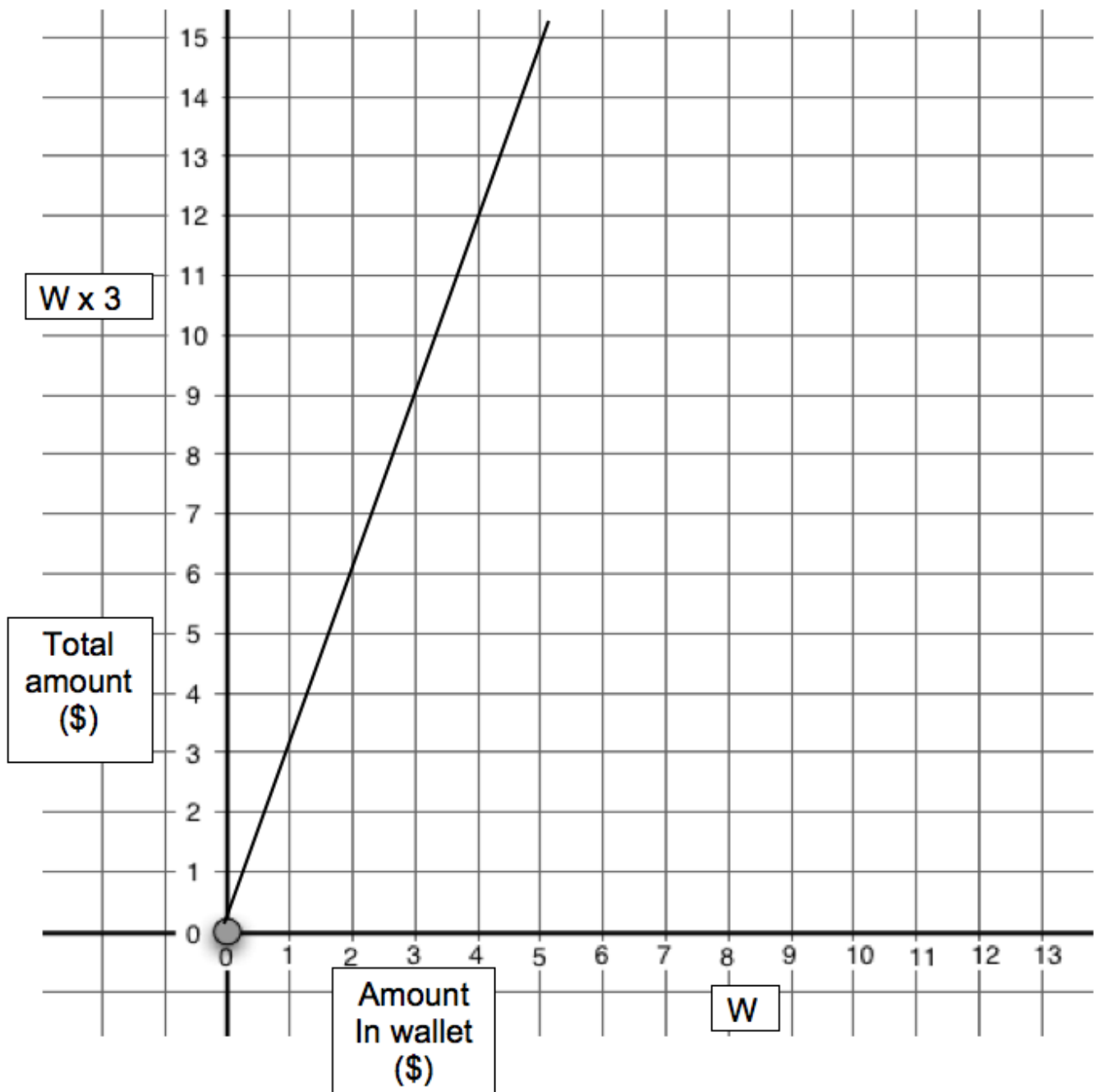
Robin has, altogether, exactly three times as much money as Mike has in his wallet.



Overhead: The Cartesian Space

(Page 5)

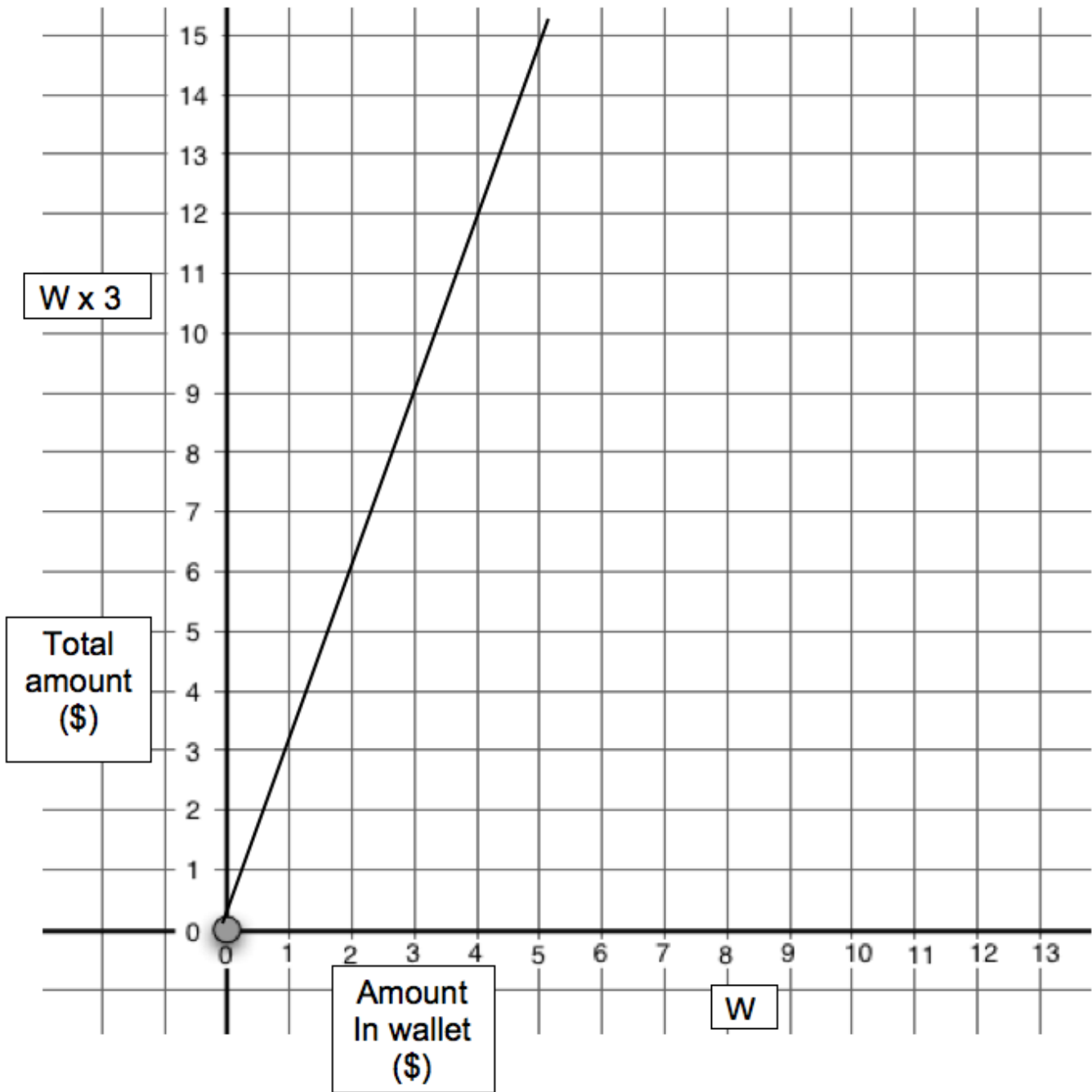
Robin has, altogether, exactly three times as much money as Mike has in his wallet.



Overhead: The Cartesian Space

(Page 6)

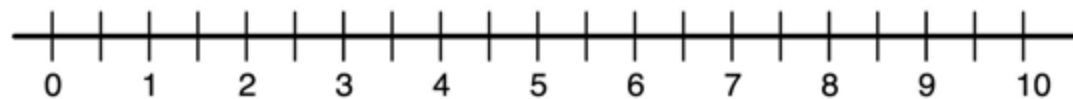
Robin has, altogether, exactly three times as much money as Mike has in his wallet.



Handout: Number Lines, Explanations, and Algebraic Expressions (Page 7)

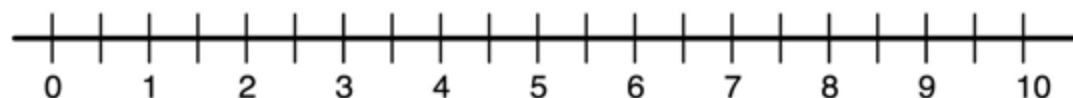
Name: _____ Date: _____

Show on the line and write the explanation or the algebraic expression:



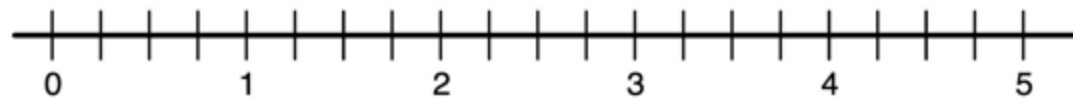
Explanation: There is \$3.00 in the wallet.

Algebraic expression: $w = 3$



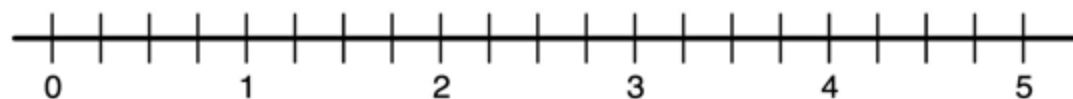
Explanation: There is \$6.50 or more in the wallet.

Algebraic expression: _____



Explanation: There is _____

Algebraic expression: $w < \$3.75$ and $w > \$2.00$



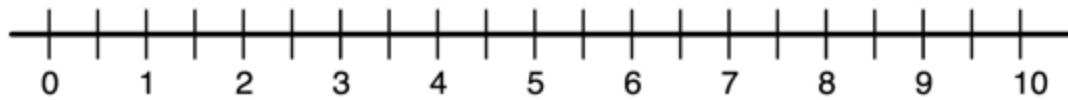
Explanation: There is _____

Algebraic expression: $\$1.25 < w$ and $w < \$4.50$

Homework: Number Lines, Explanations, and Algebraic Expressions (Page 8)

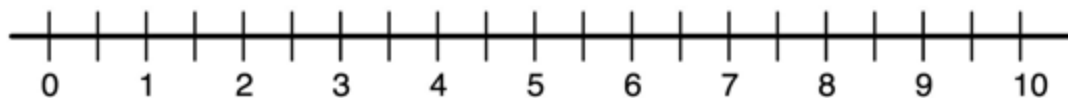
Name: _____ Date: _____

Show on the line and write the explanation or the algebraic expression:



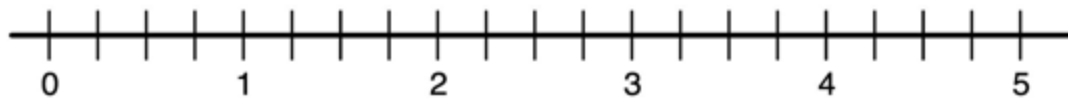
Explanation: There is \$5.00 in the wallet.

Algebraic expression: $w = 5$



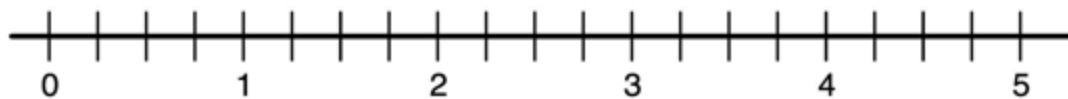
Explanation: There is \$3.50 or more in the wallet.

Algebraic expression: _____



Explanation: There is _____

Algebraic expression: $w < \$4.25$ and $w > \$3.00$



Explanation: There is at least \$0.50 in the wallet and _____

Algebraic expression: $\$ 0.50 < w$ and $w < \$2.75$