1.4 Using the Walkathon Money

Recognizing Linear Relationships

In previous Problems, you noticed that, as the independent variable changes by a constant amount, there is a pattern of change in the dependent variable. You can use this pattern of change to identify other linear relationships.

Ms. Chang's class decides to use their money from the walkathon to provide books for the children's ward at the hospital. The class puts the money in the school safe and withdraws a fixed amount each week to buy new books. To keep track of the money, Isabella makes a table of the amount of money in the account at the end of each week.

Week	Amount of Money at the End of Each Week
0	$144
1	$132
2	$120
3	$108
4	$96
5	$84

- What do you think the graph of this data would look like?
- Does this table represent a linear relationship? How did you decide?

Week	Amount of Money at the End of Each Week
0	$144
1	$132
2	$120
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Focus Question: *How can you determine if a linear relationship is increasing or decreasing?*

Problem 1.4

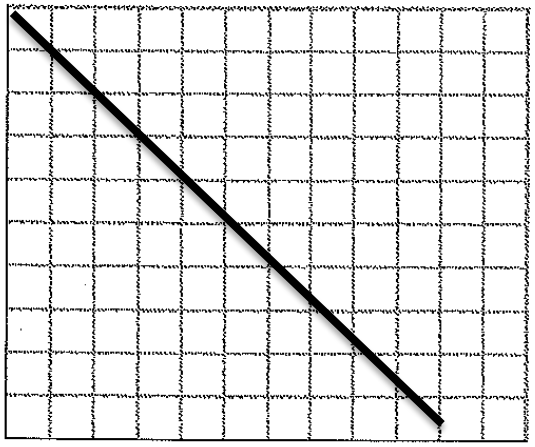
A 1. How much money is in the account at the start of the project? Explain.

$144, (0, 144)

2. How much money is withdrawn from the account each week? **$12**

3. Suppose the students continue withdrawing the same amount of money each week. Sketch a graph of this relationship.

$144



weeks

Problem 1.4

4. Write an equation that represents the relationship. Explain what information each number and variable represents.

y = -12x + 144

x = # of weeks

y = amount of money at end of week

-12 = $12 withdrawn each week (coefficient or slope)

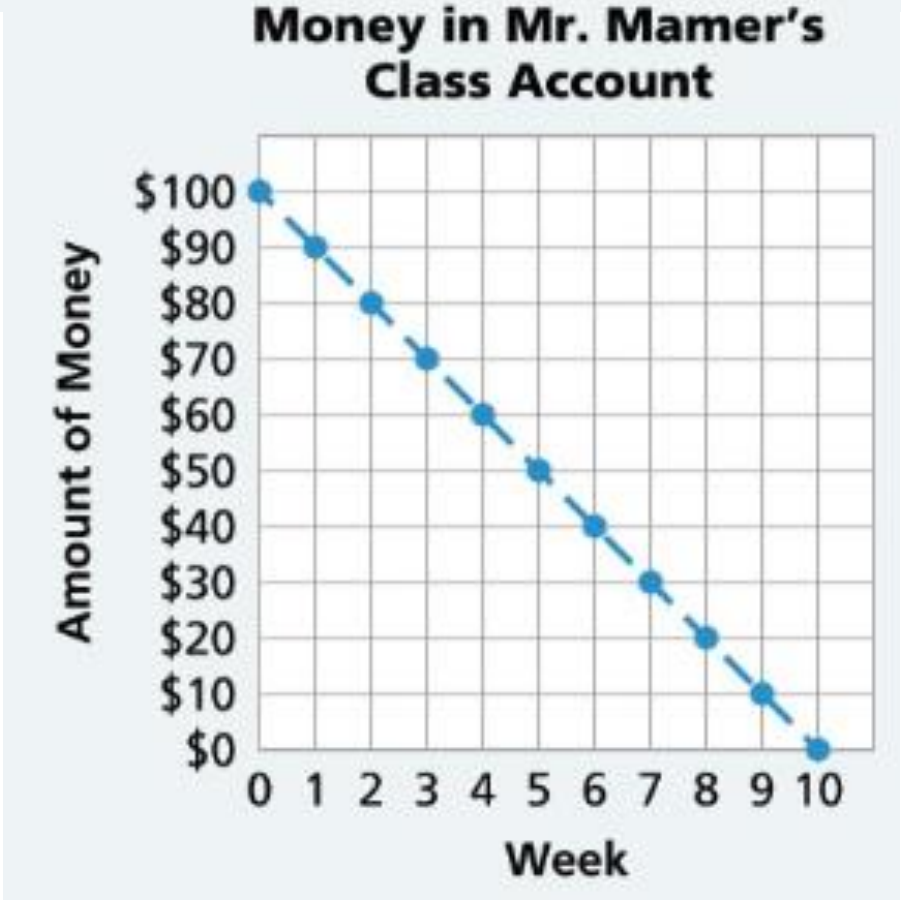
144 = amount of money at start (y-intercept)

5. Is the relationship between the number of weeks and the amount of money left in the account linear? Explain.

Yes, because the **amount of money is decreasing by a constant amount ($12), and it is a straight line.**

Problem 1.4

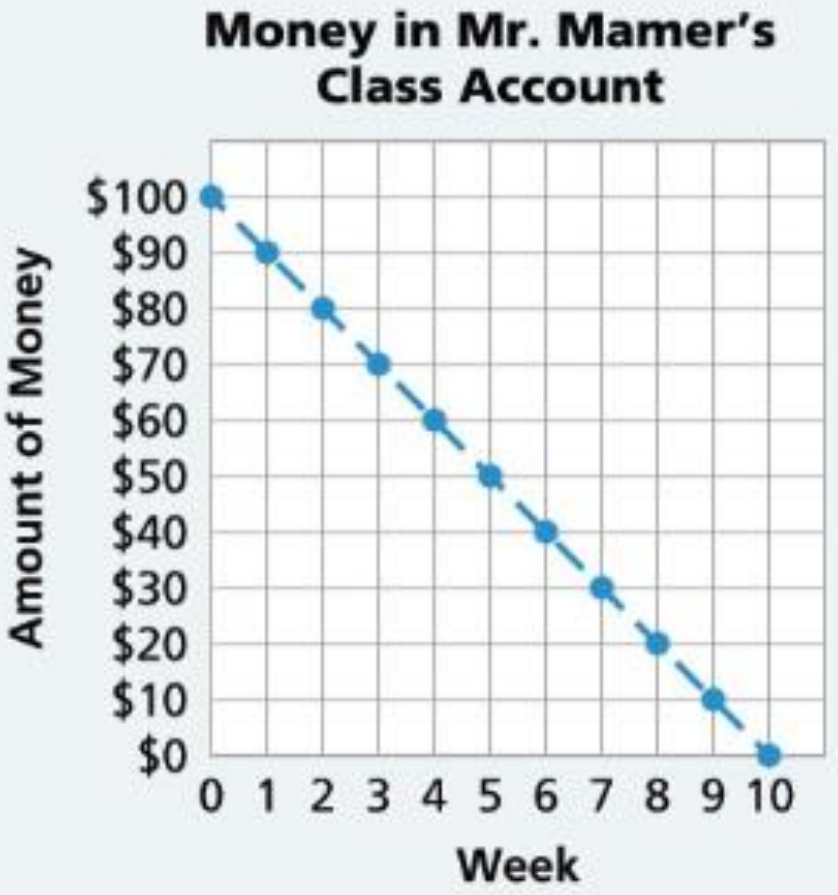
B Mr. Mamer's class also raised money from the walkathon. They use the money to buy games and puzzles for the children's ward. Keenan uses a graph to keep track of the amount of money in the account at the end of each week.



Problem 1.4

1. What information does the graph represent about the money in Mr. Mamer's class account?

- The class started with $100.
- They withdrew $10 per week.
- After 10 weeks the account is out of money.



Problem 1.4

2. Make a table of data for the first 10 weeks. Explain why this table represents a linear relationship.

Money in Mr. Mamer's Class Account

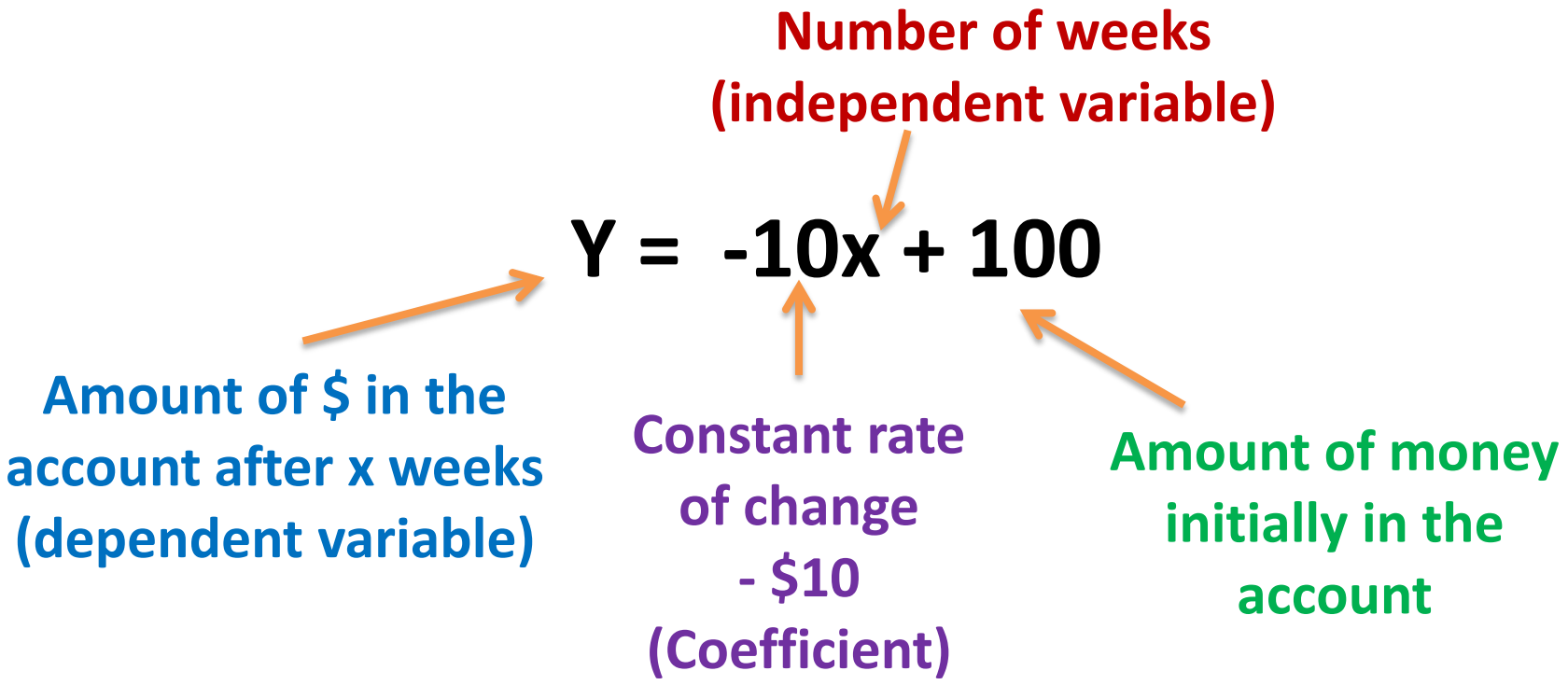
Week	Amount of Money at the End of Each Week
0	$100
1	$90
2	$80
3	$70
4	$60
5	$50
6	$40
7	$30
8	$20
9	$10
10	$0

This is a linear relationship because the amount of money decreases by $10 every week. (constant rate of change)

As x increases by 1, y increases or decreases by a constant amount.

Problem 1.4

3. Write the equation that models the linear relationship. Explain what information each number and variable represents.



Problem 1.4

C **1.** How can you determine whether a relationship is linear from a graph, a table, or an equation?

Graph – it will be a **straight line**

Table – as x increases by a **constant amount**, y increases or decreases by a constant amount

Equation – follows the form:

$$y = mx + b$$

Even if … **m = 0, or b = 0**

(y = x)

Problem 1.4

2. Compare the patterns of change for the linear relationships in this Problem to those in previous Problems in this Investigation.

Both of the relationships in this problem have ***decreasing*** **rates of change**.

As the independent variable **(x) increases**, the dependent variable **(y) decreases**.

These relationships have **negative coefficients**, so the graph of the line decreases from left to right.

HW: p19-20: 11 - 13