

## The Stock Market

### Goals

- Apply operations with rational numbers to calculate a stock's new value, change in value, or change expressed as a signed percentage of the previous value.
- Compare (orally and in writing) changes in the value of different stocks, including the dollar amount and the percentage of the previous value.
- Interpret (orally) tables that represent the values of different stocks in the stock market.

### Learning Target

I can solve problems about the stock market using rational numbers and percentages.

### Student Learning Goal

Let's learn about the stock market.

### Lesson Narrative

In this lesson, students see how signed numbers can be applied to representing changes in the stock market. This includes representing a decrease (in the price of an individual stock or the value of a stock portfolio) as a negative percentage of the original value.

First, students calculate the original price, new price, change, or percent change for several individual stocks. Then, they calculate how much the value changed for a portfolio of multiple stocks. The company names given in this lesson are generic. The data is based on real stock market data from 2016. The teacher may wish to replace them with up-to-date data from real companies.

The last activity is optional because it provides an opportunity for additional practice applying operations with rational numbers. Students select stocks to create their own portfolio and then calculate whether the value of their portfolio increases or decreases. This activity could be extended to last across multiple weeks if using real data.

### Access for Students with Diverse Abilities

- Action and Expression (Activity 1)
- Engagement (Activity 2)
- Representation (Activity 3)

### Access for Multilingual Learners

- MLR1: Stronger and Clearer Each Time (Activity 3)
- MLR6: Three Reads (Activity 2)

### Instructional Routines

- MLR1: Stronger and Clearer Each Time
- Notice and Wonder

### Required Materials

#### Materials to Gather

- Four-function calculators: Activity 1, Activity 2, Activity 3

### Lesson Timeline

10  
min

Warm-up

10  
min

Activity 1

15  
min

Activity 2

15  
min

Activity 3

## Instructional Routines

## Notice and Wonder

[ilclass.com/r/10694948](https://ilclass.com/r/10694948)

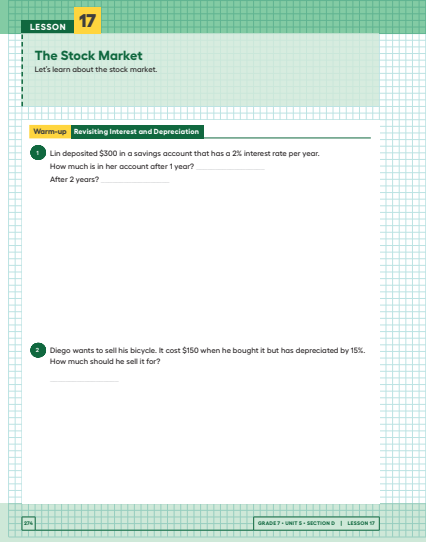
Please log in to the site before using the QR code or URL.



## Building on Student Thinking

If students forget about using an equation to calculate percent increase or decrease, remind them that they can use the equation  $y = kx$  to figure out the answers to the questions.

## Student Workbook



## Warm-up

## Revisiting Interest and Depreciation

10 min

## Activity Narrative

In this *Warm-up*, students recall previous course work solving problems involving percentage increase or decrease. This thinking will be useful when students use percentages to determine the change in stock prices in following activities.

## Launch

Give students 4 minutes of quiet work time, and follow with a whole-class discussion. If necessary, remind students that they can use any strategies from previous courses to answer the percentages questions.

## Student Task Statement

1. Lin deposited \$300 in a savings account that has a 2% interest rate per year. How much is in her account after 1 year? After 2 years?

After one year: \$306, because  $300 \cdot 1.02 = 306$ .

After two years: \$312.12, because  $306 \cdot 1.02 = 312.12$ .

2. Diego wants to sell his bicycle. It cost \$150 when he bought it but has depreciated by 15%. How much should he sell it for?

\$127.50, because  $150 \cdot 0.85 = 127.5$

## Activity Synthesis

The goal of this discussion is to review methods for calculating a percent increase or decrease. Invite students to share their responses and reasoning to each problem. Some strategies students may use include:

- Calculating the magnitude of the change and adding or subtracting it from the initial amount.
- Reasoning that a 2% increase is equivalent to multiplying the initial amount by 1.02 and that a 15% depreciation is equivalent to multiplying the initial amount by 0.85.
- Writing and solving an equation in the form  $A\%$  of  $B = C$ .

## Activity 1

## Gains and Losses

10 min

## Activity Narrative

In this activity, students are introduced to the idea of the stock market and how the values of shares in a stock can change daily. They apply their understanding of negative numbers to percentage changes and money.

Launch

Tell students to close their books or devices (or to keep them closed). Display the table from the *Task Statement* for all to see. Give students 1 minute of quiet think time, and ask them to be prepared to share at least one thing they notice and one thing they wonder. Record and display their responses without editing or commentary for all to see. If possible, record the relevant reasoning on or near the table.

Tell students to open their books or devices, and introduce the concept of shares in a company. Shares have a specific value at a specific time that can change up or down. They represent a measure of the worth of the company. We sometimes express the change as a value in dollars so investors can see how much money they will make or lose. We can also present these as a percentage to compare companies in terms of growth.

Before students begin working on the task, consider asking how they would represent an increase or decrease in value so that it were easily apparent.

To familiarize students with the information in the table, consider asking which companies’ stocks increased in value and which companies’ stocks decreased in value from day 1 to day 2. Ask students to explain their reasoning and come to an agreement before anyone begins doing calculations.

Student Task Statement

1. Here is some information from the stock market in September 2016. Complete the table.

company	value on day 1 (dollars)	value on day 2 (dollars)	change in value (dollars)	change in value as a percentage of day 1 value
mobile tech company	107.95	111.77	3.82	3.54%
electrical appliance company	111.6	114.03	2.43	2.18
oil corporation	26.14	25.14	-1.00	-3.83%
department store company	7.38	7.17	-0.21	-2.85
jewelry company	68.74	70.30	1.56	2.27%

2. Which company’s change in dollars had the largest magnitude?  
the mobile tech company’s change
3. Which company’s change in percentage had the largest magnitude?  
the oil corporation’s change in percentage

Access for Students with Diverse Abilities (Activity 1, Launch)

Action and Expression: Internalize Executive Functions.

Invite students to verbalize their strategy for completing the table before they begin. Students can speak quietly to themselves or share with a partner.

Supports accessibility for: Organization, Conceptual Processing, Language

Building on Student Thinking

Some students may struggle with completing the last row of the table, where the value on day 1 is unknown. Consider asking:

“For this situation, which of these values are known and which are unknown: the original amount, the new amount, and the percentage of the change?”  
“If we know the change was a 2.27% increase, then what percentage of the original amount is the new amount? How can we use this percentage to find the original amount?”

Student Workbook

**1. Gains and Losses**

Here is some information from the stock market in September 2016. Complete the table.

company	value on day 1 (dollars)	value on day 2 (dollars)	change in value (dollars)	change in value as a percentage of day 1 value
mobile tech company	107.95	111.77	3.82	3.54%
electrical appliance company		114.03	2.43	
oil corporation	26.14			-3.83%
department store company	7.38	7.17		
jewelry company		70.30		2.27%

2. Which company’s change in dollars had the largest magnitude?

3. Which company’s change in percentage had the largest magnitude?

Access for Multilingual Learners  
(Activity 2, Launch)

**MLR6: Three Reads.**  
Keep books or devices closed. Display only the first paragraph from the *Task Statement*, without revealing the tables or questions. “We are going to read this paragraph 3 times.”

After the 1st read:

“Tell your partner what this situation is about.”

After the 2nd read:

“List the quantities. What can be counted or measured?”

For the 3rd read: Reveal the first table and read the question. Ask,

“What are some ways we might get started on this?”

*Advances: Reading, Representing*

Access for Students with Diverse Abilities (Activity 2, Launch)

**Engagement: Provide Access by Recruiting Interest.**

Leverage choice around perceived challenge. Invite students to select at least 2 of the 4 rows of each table to complete.

*Supports accessibility for: Organization, Social-Emotional Functioning*

Student Workbook

**2 What Is a Stock Portfolio?**

One way to invest money in the stock market is to create a portfolio, or a collection of different stocks. That way, if one stock decreases in value, the portfolio won't lose all of its value at once.

Here is an example of someone's stock portfolio. Complete the table to show the total value of each investment.

company	price (dollars)	number of shares	total value (dollars)
technology company	107.75	98	
airline company	133.54	27	
film company	95.95	135	
sports clothing company	58.96	100	

Here is the same portfolio the next year. Complete the table to show the new total value of each investment.

company	old price (dollars)	price change	new price (dollars)	number of shares	total value (dollars)
technology company	107.75	+2.43%		98	
airline company	133.54	-7.67%		27	
film company	95.95		87.58	135	
sports clothing company	58.96	-5.56%		100	

Did the entire portfolio increase or decrease in value over the year?

Activity Synthesis

The purpose of this discussion is for students to share their responses and reasoning and to share strategies for calculating percent increase or decrease. Begin by inviting students to share their responses and reasoning for completing the rows for the electrical appliance company and the oil corporation. Poll the class to see which students used or did not use the percentage change to determine the missing value.

Then invite students to share their responses and reasoning for determining the missing values in the last two rows of the table.

Activity 2

What Is a Stock Portfolio?

15 min

Activity Narrative

In this activity, students are introduced to the concept of a stock portfolio. They calculate the value of a given number of shares in a company, the new value of the shares after a change in price, and the total value of a given portfolio. Students see both positive and negative values for both absolute and percent change.

Launch

Introduce the concept of a portfolio of stocks as a collection of shares of stocks in different companies. The portfolio can contain any number of companies and any combination of stocks and values. For example, an investor may choose to create a portfolio with the stocks of 5 different companies. The price per share of stock in each company will vary, and the investor can decide how many shares of stock in each company they want to own.

Give students 10 minutes of quiet work time, and follow with a whole-class discussion.

Student Task Statement

One way to invest money in the stock market is to create a portfolio, or a collection of different stocks. That way, if one stock decreases in value, the portfolio won't lose all of its value at once.

1. Here is an example of someone's stock portfolio. Complete the table to show the total value of each investment.

company	price (dollars)	number of shares	total value (dollars)
technology company	107.75	98	10,559.50
airline company	133.54	27	3605.58
film company	95.95	135	12,953.25
sports clothing company	58.96	100	5,896.00

2. Here is the same portfolio the next year. Complete the table to show the new total value of each investment.

company	old price (dollars)	price change	new price (dollars)	number of shares	total value (dollars)
technology company	107.75	+2.43%	110.37	98	10,816.26
airline company	133.54	-7.67%	123.30	27	3,329.10
film company	95.95	-8.72%	87.58	135	11,823.30
sports clothing company	58.96	-5.56%	55.68	100	5,568.00

3. Did the entire portfolio increase or decrease in value over the year?

The portfolio has decreased in total value from \$33,014.33 to \$31,536.56.

Activity Synthesis

The purpose of this discussion is to continue to build students’ understanding of the context of investing in shares of stocks, in preparation for students to build their own stock portfolio in the next activity. Begin by inviting students to share their responses and reasoning for whether the value of the given portfolio increased or decreased. Record their thinking for all to see. If necessary, consider discussing the following questions:

- “How did you determine the new price of one share of each company’s stock?”  
I multiplied the old price by a factor based on the percent increase or decrease in price.
- “How did you determine the total value of the stock for each company?”  
I multiplied the new price by the number of shares owned.
- “How did you determine whether the portfolio increased or decreased in value?”  
I added up the total values of the stocks for each company and compared the total using the old prices with the total using the new prices.
- “Why did the Sports Clothing Company lose more money than the Airline Company even though the Airline Company had a greater percentage decrease in price?”  
Since the portfolio contained more shares of the Sports Clothing Company, a smaller percent change in price resulted in a greater magnitude of change in dollars.

Student Workbook

2. What is a Stock Portfolio?

One way to invest money in the stock market is to create a portfolio, or a collection of different stocks. That way, if one stock decreases in value, the portfolio won't lose all of its value at once.

1. Here is an example of someone's stock portfolio. Complete the table to show the total value of each investment.

company	price (dollars)	number of shares	total value (dollars)
technology company	107.75	98	
airline company	133.54	27	
film company	95.95	135	
sports clothing company	58.96	100	

2. Here is the same portfolio the next year. Complete the table to show the new total value of each investment.

company	old price (dollars)	price change	new price (dollars)	number of shares	total value (dollars)
technology company	107.75	+2.43%		98	
airline company	133.54	-7.67%		27	
film company	95.95		87.58	135	
sports clothing company	58.96	-5.56%		100	

3. Did the entire portfolio increase or decrease in value over the year? \_\_\_\_\_

**Access for Students with Diverse Abilities (Activity 3, Launch)****Representation: Internalize Comprehension.**

Provide students with a graphic organizer, such as a table, to record which stocks they select, the price, the number of shares, and the total value, both before and after the stock prices change.

*Supports accessibility for: Visual-Spatial Processing, Organization*

**Access for Multilingual Learners (Activity 3, Launch)****MLR1: Stronger and Clearer Each Time.**

Before the whole-class discussion, give students time to meet with 2–3 partners to share and get feedback on their first draft response to the second question asking “Using the new list, how did the total value of your selected stock change? Explain your reasoning.” Invite listeners to ask questions and give feedback that will help their partner clarify and strengthen their ideas and writing. Give students 3–5 minutes to revise their first draft based on the feedback they receive.

*Advances: Writing, Speaking, Listening*

**Activity 3: Optional****Your Own Stock Portfolio****25**  
min**Activity Narrative**

In this activity, students model making an investment in the stock market when they create their own portfolio of stocks from a given list of fictional companies and a budget of \$100. Students are then told the change in each stock’s price after 3 months and determine a new value of their portfolio.

**Launch**

Distribute copies of the page labeled “Stock Prices” from the blackline master. Tell students that they each have \$100 to build their stock portfolio. Give students 7–8 minutes of quiet work time, then pause for a brief whole-class discussion. Invite students to share their portfolio with a partner, explaining which stocks they chose and why. Tell students to check each other’s work.

Then distribute copies of the page labeled “Changes in Stock Prices after 3 Months” from the blackline master. Give students another 7–8 minutes to determine how the value of their portfolio changed, and follow with a whole-class discussion.

**Student Task Statement**

Your teacher will give you a list of stocks. The price shown for each stock is the cost of 1 share.

1. Select a combination of stocks with a total value close to, but no more than, \$100. List the stock, the number of shares, and the total cost.

*Answers vary.*

Pause here for a class discussion.

2. Using the new list, how did the total value of your selected stocks change? Explain your reasoning.

*Answers vary.*

**Activity Synthesis**

The purpose of this discussion is for students to discuss the different ways to think about the change in value of their stocks. If possible, display the list of “Changes in Stock Prices after 3 Months,” and discuss the following questions:

- ☞ “How can you tell if the price of a stock increased or decreased from looking at this list?”

*Positive numbers represent an increase in price, while negative numbers represent a decrease in price.*

- ☞ “Which company’s stock price increased or decreased the most?”

*The Biotechnology company’s stock price increased by \$37.26.*

- ☞ “Without doing any calculations, predict which company’s stock price had the largest increase as a percentage of its starting value.”

*“Without doing any calculations, predict which company’s stock price had the largest decrease as a percentage of its starting value.”*