Seventh Grade

ELA & Mathematics

Week 2 Packet

First & Last Name: _____

Teacher: _____

Grade: _____

School: _____

Reading

Read the passage. Then answer the questions that follow.

The Aqua-Lung—Bringing Ocean Exploration to New Depths

by Jess Therell

1 Jacques Cousteau was an adventurer and an explorer with a passion for the ocean. He wanted not only to observe what was beneath the ocean's surface, but also to protect it by making the public aware of its importance. For this reason, many people also view him as an environmentalist.

2 Cousteau accomplished many things during his distinguished career. He helped author dozens of books about the ocean. He made a number of films, and he led several expeditions aboard his ship, *Calypso*. The explorer even created an underwater camera. Along with an engineer by the name of Emile Gagnan, Cousteau also invented the Aqua-Lung. This was a device that could be used to breathe underwater. Perhaps the most important outcome of the creation of the Aqua-Lung was that it made it possible for more people to explore the ocean's depths.

The Aqua-Lung—An Overview of Its Invention

3 The inspiration for the most important part of the Aqua-Lung was a regulator designed by Emile Gagnan. It was first used for car engines. Its chief feature was that it helped supply the exact amount of fuel needed for an engine to run, reducing unnecessary usage and minimizing waste.

4 Cousteau adapted Gagnan's invention to create the "demand regulator," the defining component of the Aqua-Lung system. The regulator is the piece that fits into the diver's mouth. The other essential parts were tanks containing air that were strapped to the diver's back, as well as a hose to carry air from the tank to the regulator.

5 The design of the Aqua-Lung was completed in the early 1940s. It was available for purchase in France a short time later. Within a decade, the system was being sold in several countries throughout the world.

What Made the Aqua-Lung Different?

6 The Aqua-Lung differed from most underwater devices that existed at the time in two main ways. First, it allowed divers to stay underwater for a much longer period of time. Before the invention of the Aqua-Lung, divers could only remain underwater for a matter of minutes before their air ran out. With the Aqua-Lung, that time could be extended to an hour or even more.

7 Second, it addressed the issue of air pressure. Pressure rapidly increases as water depth increases. In order to breathe without risk of harm in deep water, any inhaled air must have the same pressure as the surrounding water. The Aqua-Lung regulator automatically adjusted the pressure of the air in the tank to equalize air and water pressure, which made diving safer.

Go On

Do Cousteau and Gagnan Deserve All the Credit?

8 While Cousteau and Gagnan's self-contained underwater breathing apparatus (SCUBA) known as the Aqua-Lung was an important new creation, it may not have been the revolutionary advancement many people seem to think. Cousteau and Gagnan built on the work of those who came before by modifying existing technologies and devices. This practice is common among inventors and scientists.

9 Support for the above claim can be found by looking at the history of ocean exploration and the devices that preceded the "invention" of the Aqua-Lung. First, it is important to note that people have always been intrigued by the ocean. Hundreds of years ago, people were already searching for ways to "breathe" underwater so they could stay beneath the surface longer and go deeper. They used hollow reeds as snorkels and wooden barrels as crude air tanks. Although these devices have little in common with the Aqua-Lung and other equipment currently on the market, they show that many people had aspirations and ideas that were similar to Cousteau's.

10 Second, the Aqua-Lung emerged after very similar devices had already been invented. By far the most notable one was the apparatus that was developed by Captain Yves Le Prieur in 1925. The main difference between it and the Aqua-Lung was air flow. Le Prieur's SCUBA released air constantly. The Cousteau/Gagnan device released it "on demand"—when the diver inhaled. Certainly, the world-famous Cousteau owed much of the credit for the creation of the Aqua-Lung to the comparatively unknown Le Prieur.

The Impact of the Aqua-Lung

11 Although Cousteau and Gagnan built on earlier technology, their invention did open the world of diving to more people. The Aqua-Lung made SCUBA diving simpler, safer, and accessible to the public. In the decades after the device became available, countless individuals adopted underwater diving as a hobby. Aqua-Lung is still a brand name that appears on many types of diving equipment, from regulators to masks to fins.

12 Cousteau's greatest legacy as a conservationist may have been giving ordinary people the tools needed to view the wonders of the ocean firsthand. Movies and books can certainly show people the beauty of marine life and explain why it needs protection. However, seeing the splendor of the ocean and some of its marvels in person is likely to be much more convincing than anything that appears on a screen or in print.

1 The following question has two parts. First, answer part A. Then, answer part B.

Part A

What does the word "regulator" mean as it is used in the passage?

A a device used to control the pressure of air

B a device used to control the flow of liquids

C a mechanism in a watch or clock by which its speed is adjusted

D a person who makes sure laws or rules are followed

Part B

Which of the phrases from the passage **best** helps the reader understand the meaning of "regulator"?

A "supply the exact amount of fuel needed for an engine to run"

B "the piece that fits into the divers mouth"

C "automatically adjusted the pressure of the air in the tank"

D "the system was being sold in several countries throughout the world"

2 Select **two** central ideas of the passage.

A Jacques Cousteau promoted the conservation of our oceans.

B Over the centuries, many people have invented devices similar to the Aqua-Lung to assist divers.

C The Aqua-Lung differs from Le Prieur's SCUBA in one important way.

D The Aqua-Lung allowed longer, safer dives.

E Cousteau and Gagnan might not deserve all the credit for inventing the Aqua-Lung.

F Aqua-Lung is still a brand of equipment sold today.

G Cousteau and Gagnan built upon previous technologies when creating their Aqua-Lung.

Go On

3 What is the author's main purpose in writing this passage?

A to give facts about a valuable invention and its impact on diving

B to make readers question Cousteau's contribution to the world of diving

C to explain the differences between the Aqua-Lung and Le Prieur's invention

D to describe how diving has changed and improved over the years

4 Read this sentence from the passage.

> Cousteau's greatest legacy as a conservationist may have been giving ordinary people the tools needed to view the wonders of the ocean firsthand.

What connotation does the phrase "ordinary people" have in this sentence?

A uneducated people

B dull and tiresome people

C people who do not know how to swim

D people who are neither explorers nor scientists

5 Below are three claims that one could make based on the passage "The Aqua-Lung—Bringing Ocean Exploration to New Depths."

Claims	Jacques Cousteau was committed to helping people learn more about the world around them.
	The Aqua-Lung was superior to other devices that were available at the time.
	Cousteau made many contributions in a variety of areas.

Circle one of the claims, and then write down **two** sentences from the passage that support the claim.

First sentence: _____

_____

_____

Second sentence: _____

_____

_____

Go On

Read the passage. Then answer the questions that follow.

Did Franklin Really Collect Electric Fire from the Sky?

by Neve Reed

1 The story of Benjamin Franklin and his kite experiment is one that captivates people of all ages. It begins when a thunderstorm is on its way. Most of the sensible people in the area are indoors seeking shelter. But not Benjamin Franklin! He's flying a kite with a piece of metal attached to the top. His goal: to prove that lightning is a form of electricity. The story goes that a bolt of lightning soon struck his kite, traveling down the string and charging a metal key near the end. Franklin touched the key, and the "very evident electric spark" he felt proved his theory correct.

2 This experiment is much more exciting than the idea of a scientist writing a paper at a desk or working in the laboratory. However, it's also quite likely that it didn't happen, at least not in the way people imagine. Evidence for this statement comes from numerous sources, including current knowledge and correspondence written by Franklin himself.

Priestley's Account of Franklin's Experiment

3 Joseph Priestley was the man who recounted the story of Franklin's experiment conducted in 1752. June 15th is often cited as the date. An entire chapter of Priestley's book, *The History and Present State of Electricity with Original Experiments*, is devoted to Franklin's work on the similarities between electricity and lightning. He explains how Franklin planned to use a kite to draw "lightning from the clouds," and gives an account of the actual experiment.

4 There are a few points that should be made about Priestley's account. The first is that it's not clear exactly where his information comes from. Priestley says it was obtained from the "best authority," but then goes on to say that Franklin's son was the only witness present during the experiment. If the information came from Franklin himself, why didn't Priestley say so?

5 The second is that a close reading of the section that describes the actual experiment does not explicitly state that the kite was struck by *a bolt of lightning*. He does mention thunderstorms and drawing lightning from the clouds. But is it possible that "lightning" is being used interchangeably with "electrical charges" here, an assertion that is supported by the thoughts of some modern scientists? Wouldn't the actual dramatic lightning strike have been a focus of Priestley's story? If, that is, it actually took place.

Franklin's Letter

6 One of the best pieces of evidence we have comes from Franklin himself. In 1752, he wrote a letter to a friend. In it, he describes how he performed the experiment.

7 However, some believe Franklin was merely describing how he would *theoretically* use a kite to prove that electricity and lightning were one in the same. There are several details about the setup that would make actually performing the experiment impractical. These include flying the kite from inside a building, keeping the silk ribbon dry, and not allowing the twine to touch any portion of the door or window.

Go On

8 Furthermore, the letter is far from a formal description of Franklin's hypothesis, procedure, results, and conclusions. It would seem likely that Franklin would have presented his findings to the scientific community in an official report, but there is no indication that one exists.

The Danger Factor

9 One of the strongest pieces of evidence against the commonly held belief that Franklin's kite was struck by lightning is that he most likely wouldn't have survived. This was proven through an investigation conducted on a popular television program. The analysis showed that the massive amount of electricity in a bolt of lightning could have traveled down a wet piece of twine and charged a metal key at the end. However, the chances that Franklin could have touched the metal and lived to tell others about it are slim to none. Additionally, it's likely the scientist himself would have known the dangers of touching something that had been struck by lightning based on his previous work with electricity.

What Current Scientists Believe

10 Some believe that the experiment never actually took place at all. A more likely explanation based on the information available, though, is that Franklin *did* fly a kite a short time *before* a thunderstorm. The storm clouds would have contained the same static electricity found in lightning, although in much smaller amounts. These charged clouds could have produced the results described by Priestley in his well-known account. The investigation still probably wasn't the wisest idea on Franklin's part, but it is entirely possible that the scientist could have completed this version of the experiment and escaped unharmed.

12 This question has two parts. First, answer part A. Then, answer part B.

Part A

Which inference can you draw from "Did Franklin Really Collect Electric Fire from the Sky?"

A The smaller amounts of static electricity in clouds before a storm actually endangered Franklin just as much as real lightning would have.

B The idea of a death-defying experiment is thrilling, but the reality is that Franklin likely would not have risked his life for science.

C Because he focused neither on the difficulties nor dangers of flying a kite indoors, Priestley's account is weakened.

D Franklin was probably more interested in making an exciting scientific story than in harnessing the true power of electricity.

Part B

Which of the following sentences from the passage **best** supports your answer to part A?

A "The analysis showed that the massive amount of electricity in a bolt of lightning could have traveled down a wet piece of twine and charged a metal key at the end."

B "Additionally, It's likely the scientist himself would have known the dangers of touching something that had been struck by lightening based on his previous work with electricity."

C "The storm clouds would have contained the same static electricity found In lightening, although In much smaller amounts."

D "A more likely explanation based on the Information available, though, is that Franklin did fly a kite a short time before a thunderstorm."

Go On

13 Based on the information in the passage, how did Priestley's account influence some modern scientists?

A It led them to look for an alternate meaning for a term used to describe the experiment.

B It inspired them to seek the truth by watching the experiment on a television show.

C It drove them to question, in general, the way that experiments are set up.

D It convinced them that there was, in fact, no witness at all to the experiment.

14 How do the four sections with headings support the main ideas in the passage?

A Each section offers a problem with the lightning story and an alternative solution for what might have happened.

B Two of the sections focus on different causes for the writer's doubt, while the other two show how it might have happened.

C Three sections describe why the experiment probably did not occur, while the other offers a possible alternative.

D Each section compares and contrasts different accounts of the experiment, including those of people in the past and present.

15 The author states that it is quite unlikely that Franklin's kite experiment happened as we think. Which **two** sentences from the passage provide evidence for the author's belief?

A "The story of Benjamin Franklin and his kite experiment is one that captivates people of all ages."

B "However, the chances that Franklin could have touched the metal and lived to tell others about it are slim to none."

C "Some believe that the experiment never actually took place at all."

D "There are several details about the setup that would make actually performing the experiment impractical."

E "These charged clouds could have produced the results described by Priestley in his well-known account."

16 This question has two parts. First, answer part A. Then, answer part B.

Below are three claims that one might make based on the passage.

	Claims
	The story of Franklin's experiment has interested people since Franklin first described it.
	Records of the lightning experiment are not reliable.
	Franklin was a scientist who knew lightning strikes were dangerous.

Part A

Draw an X by the claim that is supported by the most relevant and sufficient evidence within "Did Franklin Really Collect Electric Fire from the Sky?"

Part B

Write down **two** sentences from the passage that **best** provide evidence to support the claim selected in part A.

First sentence: _____

_____

_____

Second sentence: _____

_____

_____

Go On

Writing Rational Numbers as Repeating Decimals

➤ **Write each number as a repeating decimal.**

1. $\frac{1}{9}$

2. $-\frac{2}{11}$

3. $\frac{7}{11}$

4. $\frac{1}{3}$

5. $2\frac{4}{9}$

6. $-\frac{13}{6}$

7. $-1\frac{5}{6}$

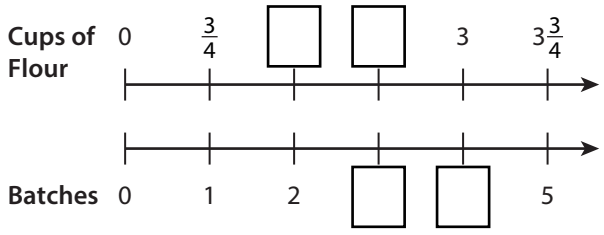
8. $\frac{13}{99}$

9. When the denominator of a proper fraction is 99, what do you notice about the repeating digit(s) in its decimal form?

Understanding Proportional Relationships

➤ **Read and solve the problems. Show your work.**

1. Josie is making pizza dough. Complete the double number line by filling in the missing values. Then write an equation that models the relationship between the total cups of flour, *c*, and number of batches, *n*. Show your work.



2. Lilli bought each of her friends a pair of colorful socks that cost $5.50. Complete the table to show how much Lilli paid to buy different numbers of socks. Then write an equation that shows the total cost, *c*, for *p* pairs of socks.

Cost		$11.00			
Pairs of socks	1	2	3		

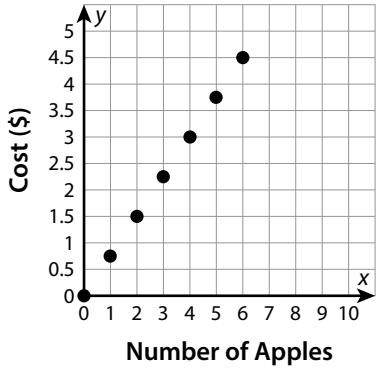
3. Explain how using a table is similar to using a double number line and how it is different.

4. Mrs. Lopez types at a constant rate. The constant of proportionality for the relationship between the number of words she types, *w*, and the number of minutes she types, *m*, is 38. Write an equation to show this relationship.

Interpreting Graphs of Proportional Relationships

➤ **The graph shows the cost of apples at a local market. Use the graph to answer problems 1–3.**

1 What is the cost of 1 apple and of 3 apples? How do you know?

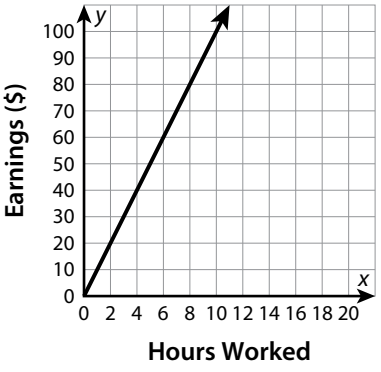


2 What does the point (0, 0) represent in this context?

3 What does the point (2, 1.5) represent in this context?

➤ **The graph shows Manuela's earnings for the number of hours she spends tutoring. Use the graph to answer problems 4 and 5.**

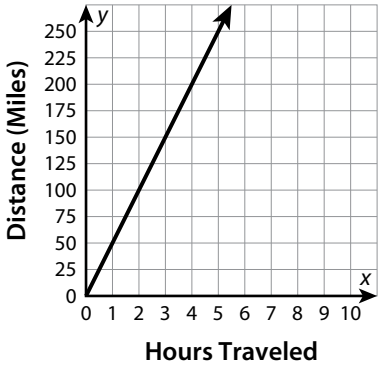
4 How much does Manuela earn for each hour of tutoring? Explain.



5 Write an equation that shows the relationship between Manuela's earnings, *y*, and hours, *x*.

Interpreting Graphs of Proportional Relationships *continued*

➤ **The graph shows the distance Jason's family traveled on a recent road trip. Use the graph to answer problems 6–8.**

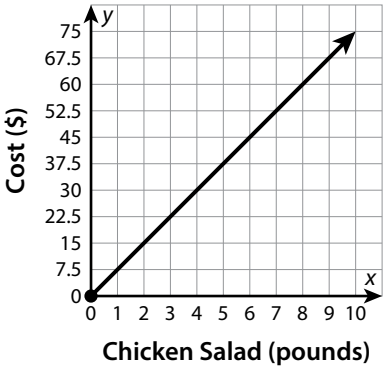


6 What is the constant of proportionality? Explain how you know.

7 Identify and interpret one other point on the graph.

8 Write an equation that models the distance, d, traveled in t hours.

➤ **The graph shows the cost per pound of chicken salad. Use the graph to answer problems 9 and 10.**



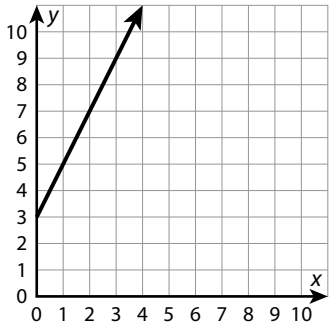
9 Randy claims that he can purchase 3.5 pounds of chicken salad for $23.50. Is he correct? Explain.

10 Explain how you can determine how much chicken salad may be purchased for $52.50.

Recognizing Graphs of Proportional Relationships

➤ **Circle all the problems with graphs that do NOT represent a proportional relationship. For the problems that are circled, explain why the graphs do not represent a proportional relationship.**

1



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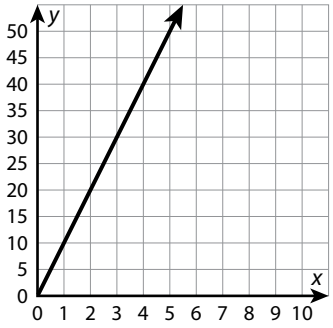

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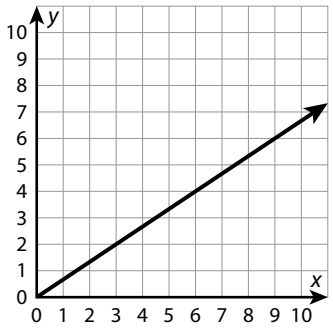

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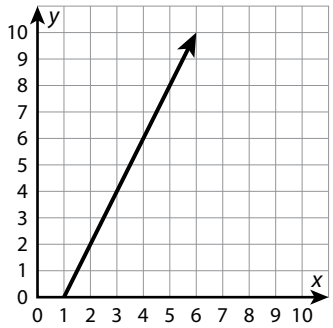

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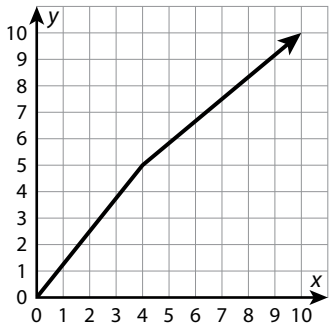

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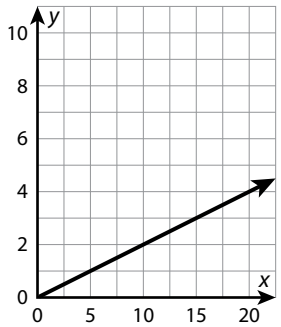

Recognizing Graphs of Proportional Relationships *continued*

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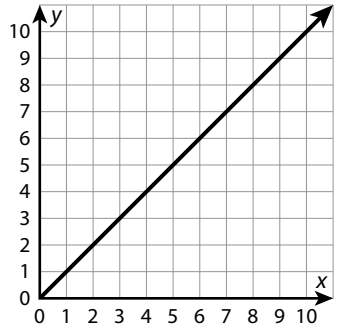

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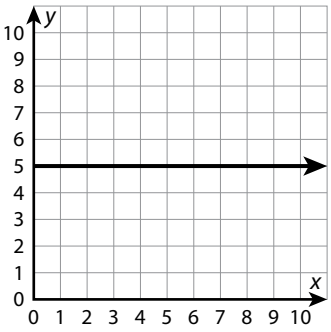

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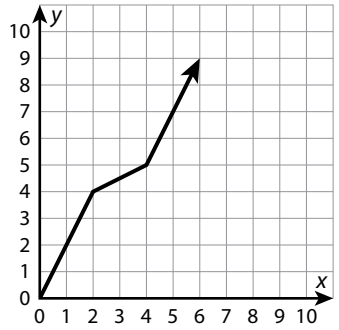

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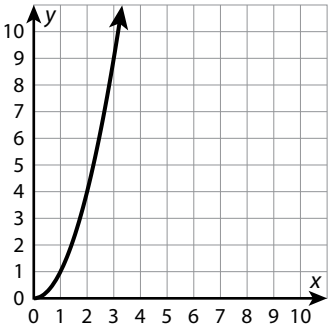

11 Without analyzing specific points on a graph, explain how you know whether a graph shows a proportional relationship.

Solving Multi-Step Ratio Problems

➤ **Solve each problem.**

1. At The Green House of Salad, you get a $1 coupon for every 3 salads you buy. What is the least number of salads you could buy to get $10 in coupons?

2. Kim orders catering from Midtown Diner for $35. She spends $5 on a large order of potato salad and the rest on turkey sandwiches. Each sandwich is $2.50. How many sandwiches does Kim buy?

3. Molly and Liza are exercising. Molly does 10 push-ups at the same time as Liza does 15 push-ups. When Molly does 40 push-ups, how many push-ups does Liza do?

4. A shark swims at a speed of 25 miles per hour. The shark rests after 40 miles. How long, in minutes, does the shark swim before resting?

5. Ali and Janet are selling gifts at a local craft show. For every bar of soap that Ali sells, she earns $5. For every mug that Janet sells, she earns twice as much as Ali. Ali sells 5 bars of soap, and Janet sells 7 mugs. How much money did they make altogether?

6. Ted is making trail mix for a party. He mixes $1\frac{1}{2}$ cups of nuts, $\frac{1}{4}$ cup of raisins, and $\frac{1}{4}$ cup of pretzels. How many cups of pretzels does Ted need to make 15 cups of trail mix?

7. The ratio of chaperones to students on a field trip is 2 : 7. There are 14 chaperones on the field trip. In all, how many chaperones and students are there?

8. Dayren is driving to visit family. She drives at an average of 65 miles per hour. She drives 227.5 miles before lunch and then 97.5 miles after lunch. How many hours did she spend driving?

Solving Problems Involving Multiple Percents

➤ **Solve each problem.**

1. A chair's regular price is $349. It is on clearance for 30% off, and a customer uses a 15% off coupon after that. What is the final cost of the chair before sales tax?

2. A calculator is listed for $110 and is on clearance for 35% off. Sales tax is 7%. What is the cost of the calculator?

3. Cara started working for $9 per hour. She earns a 4% raise every year. What is her hourly wage after three years?

4. A factory manufactures a metal piece in 32 minutes. New technology allowed the factory to cut that time by 8%. Then another improvement cut the time by 5%. How long does it take to manufacture the piece now? Round your answer to the nearest minute.

5. An apartment costs $875 per month to rent. The owner raises the price by 20% and then gives a discount of 8% to renters who sign an 18-month lease. How much less do renters who sign an 18-month lease pay per month to rent the apartment?

Solving Problems Involving Multiple Percents *continued*

6 Damon buys lumber worth $562. He gets a 20% contractor's discount. The sales tax is 6%. His credit card gives him 2% off. How much does he pay?

7 Cindy is shopping for a television. The original price is $612. Store A has the television on clearance for 30% off. Store B has it on clearance for 25% off, and Cindy has a 10% off coupon to use at Store B. At which store will she pay less? How much less?

8 John goes to a restaurant and has a bill of $32.57. He uses a 10% off coupon on the cost of the meal. The tax is 8%. He leaves a tip of 18% on the amount before the coupon or tax is applied. How much does he spend?

9 Explain which situation will give you the best price: a discount of 15% and then 10% off that amount, a discount of 10% and then 15% off that amount, or a discount of 25%.

Solving Problems Involving Percent Change

➤ **Find the percent change and tell whether it is a percent increase or a percent decrease.**

1. Original amount: 20
   End amount: 15

2. Original amount: 30
   End amount: 45

3. Original amount: 625
   End amount: 550

4. Original amount: 320
   End amount: 112

5. Original amount: 165
   End amount: 222.75

6. Original amount: 326
   End amount: 423.80

7. Original amount: 27
   End amount: 38.61

8. Original amount: 60
   End amount: 70.02

9. How do you know when a situation involves a percent increase or a percent decrease?