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**Lesson 7 Problem Set**

1. You have a coupon for an additional 25% off the price of any sale item at a store. The store has put a robotics kit on sale for 15% off the original price of \$40. What is the price of the robotics kit after both discounts?
  
2. A sign says that the price marked on all music equipment is 30% off the original price. You buy an electric guitar for the sale price of \$315.
  - a. What is the original price?
  - b. How much money did you save off the original price of the guitar?
  - c. What percent of the original price is the sale price?
  
3. The cost of a New York Yankees baseball cap is \$24.00. The local sporting goods store sells it for \$30.00. Find the markup rate.



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7. An item that costs \$50 is marked 20% off. Sales tax for the item is 8%. What is the final price, including tax?
  - a. Solve the problem with the discount applied before the sales tax.
  - b. Solve the problem with discount applied after the sales tax.
  - c. Compare your answers in parts (a) and (b). Explain.
8. The sale price for a bicycle is \$315 dollars. The original price was first discounted by 50% and then discounted an additional 10%. Find the original price of the bicycle.
9. A ski shop has a markup rate of 50%. Find the selling price of skis that cost the storeowner \$300.
10. A tennis supply store pays a wholesaler \$90 for a tennis racquet and sells it for \$144. What is the markup rate?
11. A shoe store is selling a pair of shoes for \$60 that has been discounted by 25%. What was the original selling price?
12. A shoe store has a markup rate of 75% and is selling a pair of shoes for \$133. Find the price the store paid for the shoes.
13. Write  $5\frac{1}{4}\%$  as a simple fraction.
14. Write  $\frac{3}{8}$  as a percent.
15. If 20% of the 70 faculty members at John F. Kennedy Middle School are male, what is the number of male faculty members?
16. If a bag contains 400 coins, and  $33\frac{1}{2}\%$  are nickels, how many nickels are there? What percent of the coins are not nickels?

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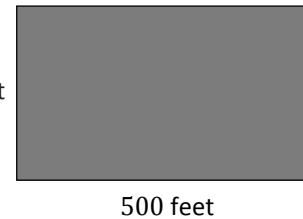
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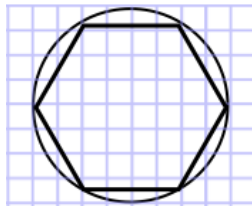
**Lesson 8 Problem Set**

- The odometer in Mr. Washington’s car does not work correctly. The odometer recorded 13.2 miles for his last trip to the hardware store, but he knows the distance traveled is 15 miles. What is the percent error? Use a calculator and the percent error formula to help find the answer. Show your steps.
- The actual length of a soccer field is 500 feet. A measuring instrument shows the length to be 493 feet. The actual width of the field is 250 feet, but the recorded width is 246.5 feet. Answer the following questions based on this information. Round all decimals to the nearest tenth.

- Find the percent error for the length of the soccer field.
- Find the percent error of the area of the soccer field.
- Explain why the values from parts (a) and (b) are different.



- Kayla’s class went on a field trip to an aquarium. One tank had 30 clown fish. She miscounted the total number of clown fish in the tank and recorded it as 24 fish. What is Kayla’s percent error?
- Sid used geometry software to draw a circle of radius 4 units on a grid. He estimated the area of the circle by counting the squares that were mostly inside the circle and got an answer of



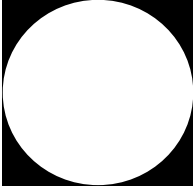
52 square units.

- Is his estimate too large or too small?
  - Find the percent error in Sid's estimation to the nearest hundredth using the  $\pi$  key on your calculator.
- The exact value for the density of aluminum is  $2.699 \text{ g/cm}^3$ . Working in the science lab at school, Joseph finds the density of a piece of aluminum to be  $2.75 \text{ g/cm}^3$ . What is Joseph's percent error? (Round to the nearest hundredths.)

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6. The world's largest marathon, The New York City Marathon, is held on the first Sunday in November each year. It is estimated that anywhere between 2 million and 2.5 million spectators will line the streets to cheer on Marathon runners. At most, what is the percent error?
7. A circle is inscribed inside a square, which has a side length of 12.6 cm. Jared estimates the area of the circle to be about 80% of the area of the square and comes up with an estimate of  $127 \text{ cm}^2$ .
- 
- 12.6 cm
- Find the absolute error from Jared's estimate to two decimal places.
  - Find the percent error of Jared's estimate to two decimal places.
  - Do you think Jared's estimate was reasonable?
  - Would this method of computing the area of a circle always be too large?
8. In a school library, 52% of the books are paperback. If there are 2,658 books in the library, how many of them are not paperback to the nearest whole number?
9. Shaniqua has 25% less money than her older sister Jennifer. If Shaniqua has \$180, how much money does Jennifer have?
10. An item that was selling for \$1,102 is reduced to \$806. To the nearest whole, what is the percent decrease?
11. If 60 calories from fat is 75% of the total number of calories in a bag of chips, find the total number of calories in the bag of chips.

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**Lesson 9 Problem Set**

- Solve each problem using an equation.
  - What is 150% of 625?
  - 90 is 40% of what number?
  - What percent of 520 is 40? Round to the nearest hundredth of a percent.
- The actual length of a machine is 12.25 cm. The measured length is 12.2 cm. Round to the nearest hundredth of a percent.
  - Find the absolute error.
  - Find the percent error.
- A rowing club has 600 members. 60% of them are women. After 200 new members joined the club, the percentage of women was reduced to 50%. How many of the new members are women?
- 40% of the marbles in a bag are yellow. The rest are orange and green. The ratio of the number of orange to the number of green is 4:5. If there are 30 green marbles, how many yellow marbles are there? Use a visual model to show your answer.
- Susan has 50% more books than Michael. Michael has 40 books. If Michael buys 8 more books, will Susan have more or less books? What percent more or less will Susan's books be? Use any method to solve the problem.
- Harry's money is 75% of Kayla's money. After Harry earned \$30 and Kayla earned 25% more of her money, Harry's money is 80% of Kayla's money. How much money did each have at the beginning? Use a visual model to solve the problem.

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**Lesson 10 Problem Set**

1. Enrique takes out a student loan to pay for his college tuition this year. Find the interest on the loan if he borrowed \$2,500 at an annual interest rate of 6% for 15 years.
2. Your family plans to start a small business in your neighborhood. Your father borrows \$10,000 from the bank at an annual interest rate of 8% rate for 36 months. What is the amount of interest he will pay on this loan?
3. Mr. Rodriguez invests \$2,000 in a savings plan. The savings account pays an annual interest rate of 5.75% on the amount he put in at the end of each year.
  - a. How much will Mr. Rodriguez earn if he leaves his money in the savings plan for 10 years?
  - b. How much money will be in his savings plan at the end of 10 years?
  - c. Create (and label) a graph in the coordinate plane to show the relationship between time and the amount of interest earned for 10 years. Is the relationship proportional? Why or why not? If so, what is the constant of proportionality?
  - d. Explain what the points  $(0, 0)$  and  $(1, 115)$  mean on the graph.
  - e. Using the graph, find the balance of the savings plan at the end of seven years.
  - f. After how many years will Mr. Rodriguez have increased his original investment by more than 50%? Show your work to support your answer.
4. Use a table to prove that the relationship between time and the balance is or is not proportional. Explain your reasoning.
5. Without actually graphing, describe the graph of the relationship between the time and the balance.

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**Challenge Problem**

6. **George went on a game show and won \$60,000. He wanted to invest it and found two funds that he liked. Fund 250 earns 15% interest annually, and Fund 100 earns 8% interest annually. George does not want to earn more than \$7,500 in interest income this year.** He made the table below to show how he could invest the money.

	<i>I</i>	<i>P</i>	<i>r</i>	<i>t</i>
Fund 100		$x$	0.08	1
Fund 250		$60,000 - x$	0.15	1
Total	7,500	60,000		

- Explain what value  $x$  is in this situation.
- Explain what the expression  $60,000 - x$  represents in this situation.
- Using the simple interest formula, complete the table for the amount of interest earned.
- Write an equation to show the total amount of interest earned from both funds.
- Use algebraic properties to solve the equation for  $x$  and the principal, in dollars, George could invest in Fund 100. Show your work.
- Use your answer from part (e) to determine how much George could invest in Fund 250.
- Using your answers to parts (e) and (f), how much interest would George earn from each fund?



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**Lesson 11 Problem Set**

1. A school district’s property tax rate rises from 2.5% to 2.7% to cover a \$300,000 budget deficit (shortage of money). What is the value of the property in the school district to the nearest dollar? (Note: Property is assessed at 100% of its value.)
  
2. Jake’s older brother Sam has a choice of two summer jobs. He can either work at an electronics store or at the school’s bus garage. The electronics store would pay him to work 15 hours per week. He would make \$8 per hour plus a 2% commission on his electronics sales. Sam could earn \$300 per week working 15 hours cleaning buses. Sam wants to take the job that pays him the most. How much in electronics would Sam have to sell for the job at the electronics store to be the better choice for his summer job?
  
3. Sarah lost her science book. Her school charges a lost book fee equal to 75% of the cost of the book. Sarah received a notice stating she owed the school \$60 for the lost book.
  - a. Write an equation to represent the proportional relationship between the school’s cost for the book and the amount a student must pay for a lost book.
  - b. What is the constant or proportionality? What does it mean in the context of this situation?
  - c. How much did the school pay for the book?
  
4. In the month of May, a certain middle school has an average daily absentee rate of 8% each school day. The absentee rate is the percent of students who are absent from school each day.
  - a. Write an equation that shows the proportional relationship between the number of students enrolled in the middle school and the average number of students absent each day. Let  $s$  represent the number of
  - b. Use your equation to complete the table. List **5** possible values for  $s$  and  $a$ .

$s$	$a$

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- c. Identify the constant of proportionality, and explain what it means in the context of this situation.
- d. Based on the absentee rate, determine the number of students absent on average from school if there are **350** students enrolled in the middle school.
5. The equation shown in the box below could relate to many different percent problems. Put an “X” next to each problem that could be represented by this equation. For any problem that does not match this equation, explain why it does not.  $Quantity = 1.05 \cdot Whole$

\_\_\_\_\_ Find the amount of an investment after 1 year with 0.5% interest paid annually.

\_\_\_\_\_ Write an equation to show the amount paid for an item including tax, if the tax rate is 5%.

\_\_\_\_\_ A proportional relationship has a constant of proportionality equal to 105%.

Whole	0	100	200	300	400	500
Quantity	0	105	210	315	420	525

\_\_\_\_\_ Mr. Hendrickson sells cars and earns a 5% commission on every car he sells. Write an equation to show the relationship between the price of a car Mr. Hendrickson sold and the amount of commission he earns.