Lesson 15: Multiplication and Division of Rational Numbers

Classwork

Exercise 1

a. In the space below, create a word problem that involves integer multiplication. Write an equation to model the situation.

b. Now change the word problem by replacing the integers with non-integer rational numbers (fractions or decimals), and write the new equation.

c. Was the process used to solve the second problem different from the process used to solve the first? Explain.

d. The Rules for Multiplying Rational Numbers are the same as the Rules for Multiplying Integers:

1. _____

2. _____

3. _____

Exercise 2

a. In one year, Melinda's parents spend $2,640.90 on cable and internet service. If they spend the same amount each month, what is the resulting monthly change in the family's income?

b. The Rules for Dividing Rational Numbers are the same as the Rules for Dividing Integers:

1. _____

2. _____

3. _____

Exercise 3

Use the fundraiser chart to help answer the questions that follow.

Grimes Middle School Flower Fundraiser

Customer	Plant Type	Number of Plants	Price per Plant	Total	Paid? Yes or No
Tamara Jones	tulip	2	$4.25		No
Mrs. Wolff	daisy	1	$3.75	$ 3.75	Yes
Mr. Clark	geranium	5	$2.25		Yes
Susie (Jeremy's sister)	violet	1	$2.50	$ 2.50	Yes
Nana and Pop (Jeremy's grandparents)	daisy	4	$3.75	$15.00	No

Jeremy is selling plants for the school's fundraiser, and listed above is a chart from his fundraiser order form. Use the information in the chart to answer the following questions. Show your work, and represent the answer as a rational number; then, explain your answer in the context of the situation.

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a. If Tamara Jones writes a check to pay for the plants, what is the resulting change in her checking account balance?

Numerical Answer:

Explanation:

b. Mr. Clark wants to pay for his order with a $20 bill, but Jeremy does not have change. Jeremy tells Mr. Clark he will give him the change later. How will this affect the total amount of money Jeremy collects? Explain. What rational number represents the change that must be made to the money Jeremy collects?

Numerical Answer:

Explanation:

c. Jeremy's sister, Susie, borrowed the money from their mom to pay for her order. Their mother has agreed to deduct an equal amount of money from Susie's allowance each week for the next five weeks to repay the loan. What is the weekly change in Susie's allowance?

Numerical Answer:

Explanation:

d. Jeremy's grandparents want to change their order. They want to order three daisies and one geranium, instead of four daisies. How does this change affect the amount of their order? Explain how you arrived at your answer.

e. Jeremy approaches three people who do not want to buy any plants; however, they wish to donate some money for the fundraiser when Jeremy delivers the plants one week later. If the people promise to donate a total of $14.40, what will be the average cash donation?

f. Jeremy spends one week collecting orders. If 22 people purchase plants totaling $270, what is the average amount of Jeremy's sale?

Lesson Summary

The rules that apply for multiplying and dividing integers apply to rational numbers. We can use the products and quotients of rational numbers to describe real-world situations.

Problem Set

1. At lunch time, Benjamin often borrows money from his friends to buy snacks in the school cafeteria. Benjamin borrowed $0.75 from his friend Clyde five days last week to buy ice cream bars. Represent the amount Benjamin borrowed as the product of two rational numbers; then, determine how much Benjamin owed his friend last week.

2. Monica regularly records her favorite television show. Each episode of the show requires 3.5% of the total capacity of her video recorder. Her recorder currently has 62% of its total memory free. If Monica records all five episodes this week, how much space will be left on her video recorder?

For Problems 3–5, find at least two possible sets of values that will work for each problem.

3. Fill in the blanks with two rational numbers (other than 1 and -1). $\underline{\hspace{1cm}} \times \left(-\frac{1}{2}\right) \times \underline{\hspace{1cm}} = -20$
   What must be true about the relationship between the two numbers you chose?

4. Fill in the blanks with two rational numbers (other than 1 and -1). $-5.6 \times 100 \div 80 \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = 700$
   What must be true about the relationship between the two numbers you chose?

5. Fill in the blanks with two rational numbers. $\underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = -0.75$
   What must be true about the relationship between the two numbers you chose?

For Problems 6–8, create word problems that can be represented by each expression, and then represent each product or quotient as a single rational number.

6. $8 \times (-0.25)$

7. $-6 \div \left(1\frac{1}{3}\right)$

8. $-\frac{1}{2} \times 12$