

Lesson 17: Comparing Tape Diagram Solutions to Algebraic Solutions

Classwork

Opening Exercise

For his birthday, Zack and three of his friends went to a movie. They each got a ticket for \$8.00 and the same snack from the concession stand. If Zack's mom paid \$48 for the group's tickets and snacks, how much did each snack cost?

The equation $4(s + 8) = 48$ represents the situation when s represents the cost, in dollars, of one snack.

Exploratory Challenge: Expenses on Your Family Vacation

John and Ag are summarizing some of the expenses of their family vacation for themselves and their three children, Louie, Missy, and Bonnie. Write an algebraic equation, create a model to determine how much each item will cost using all of the given information, and answer the questions that follow.

Expenses:

Car and insurance fees: \$400	Airfare and insurance fees: \$875	Motel and tax: \$400
Baseball game and hats: \$103.83	Movies for one day: \$75	Soda and pizza: \$37.95
	Sandals and T-shirts: \$120	

Your Group's Scenario Solution:

After collaborating with all of the groups, summarize the findings in the table below.

Cost of Evening Movie	
Cost of 1 Slice of Pizza	
Cost of the Admission Ticket to the Baseball Game	
Cost of 1 T-Shirt	
Cost of 1 Airplane Ticket	
Daily Cost for Car Rental	
Nightly Charge for Motel	

Using the results, determine the cost of the following:

1. A slice of pizza, 1 plane ticket, 2 nights in the motel, and 1 evening movie.

2. One T-shirt, 1 ticket to the baseball game, and 1 day of the rental car.

Exercise

The cost of a babysitting service on a cruise is \$10 for the first hour and \$12 for each additional hour. If the total cost of babysitting baby Aaron was \$58, how many hours was Aaron at the sitter?

Lesson Summary

Tape diagrams can be used to model and identify the sequence of operations to find a solution algebraically.

The goal in solving equations algebraically is to isolate the variable.

The process of doing this requires *undoing* addition or subtraction to obtain a 0 and *undoing* multiplication or division to obtain a 1. The additive inverse and multiplicative inverse properties are applied to get the 0 (the additive identity) and 1 (the multiplicative identity).

The addition and multiplication properties of equality are applied because in an equation, $A = B$, when a number is added or multiplied to both sides, the resulting sum or product remains equal.

Problem Set

1. A taxi cab in Myrtle Beach charges \$2 per mile and \$1 for every person. If a taxi cab ride for two people costs \$12, how far did the taxi cab travel?
2. Heather works as a waitress at her family's restaurant. She works 2 hours every morning during the breakfast shift and returns to work each evening for the dinner shift. In the last four days, she worked 28 hours. If Heather works the same number of hours every evening, how many hours did she work during each dinner shift?
3. Jillian exercises 5 times a week. She runs 3 miles each morning and bikes in the evening. If she exercises a total of 30 miles for the week, how many miles does she bike each evening?
4. Marc eats an egg sandwich for breakfast and a big burger for lunch every day. The egg sandwich has 250 calories. If Marc has 5,250 calories for breakfast and lunch for the week in total, how many calories are in one big burger?
5. Jackie won tickets playing the bowling game at the local arcade. The first time, she won 60 tickets. The second time, she won a bonus, which was 4 times the number of tickets of the original second prize. Altogether she won 200 tickets. How many tickets was the original second prize?