Comparing Bits and Pieces: Homework Examples from ACE

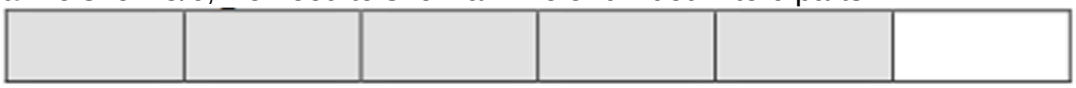
Investigation 1: *Making Comparisons,* ACE #27
Investigation 2: *Connecting Ratios and Rates,* ACE #4, #5
Investigation 3: *Extending the Number Line,* ACE #23, #92
Investigation 4: *Working with Percents,* ACE #21, #23

Investigation 1: *The Families of Functions*
ACE #27

For parts a – c, sketch the gauge and tell whether the container is almost empty, about half-full, or almost full.

a. five-sixths of a full dispenser.
b. three-twelfths of a full dispenser.
c. five-eighths of a full dispenser.

a. To show 5/6, we need to show a "whole" divided into 6 parts.



This is almost full.

b. To show 3/12 we need to show a "whole" divided into 12 parts.

This is almost empty.

c. To show 5/8, we need to show a "whole" divided into eight parts.

This is about half-full.

Investigation 2: *Connecting Ratios and Rates*
ACE #4

Cheryl, Rita, and four of their friends go to a movie and share a 48-ounce bag of popcorn equally and three 48-inch licorice laces equally. Write a ratio comparing the number of ounces of popcorn to the number of friends. Then, write a unit rate comparing the length of licorice lace for each person.

Students can write the original ratio of popcorn as 48 oz : 6 people. Dividing both parts of the ratio by 6 shows us that this is equivalent to 8 oz : 1 person.

As for the licorice, there are 3 x 48 = 144 inches of licorice lace total. So the ratio is 144 in : 6 people. As a unit rate, we divide both parts of the ratio by 6, which gives us 24 inches of licorice lace per person.

Investigation 2: *Connecting Ratios and Rates*
ACE #5

The Lappans buy three large sandwiches to serve at a picnic. Nine people come to the picnic. Show three different ways to cut the sandwiches so that each person gets an equal share.

There are many possible ways to cut the sandwiches appropriately: Each sandwich can be cut into three pieces, giving a total of 9 pieces, or one piece per person. Each sandwich could be cut into 6 pieces, giving a total of 18 pieces, or 2 pieces per person. Each sandwich could be cut into 3 pieces, giving 27 pieces total, or 3 pieces per person. This last solution might be appropriate if all three sandwiches were of a different variety, and each person wanted to taste a little of all three.

Investigation 3: *Extending the Number Line*
ACE #23

Franklin Middle School is having an end-of-the-year carnival with different games. One of the games is a bean-bag toss. The object is to get zero, or as close to zero as possible on the toss. Joseph's bag lands on an area labeled -3. Jeremiah's bag lands on an area labeled 2.

Joseph says, "I win because - 3 < 2."

Jeremiah says, "No, we have to decide whose score is closer to zero. Since |-3|□= 3 and |2|□= 2, my score is closer to zero. I win."

Who is correct? Explain.

Joseph begins by claiming that -3 is less than 2, which is certainly a true statement. But the rules of the game state that the winner is the person whose score is *closest to zero*. "Negative 3" is three units to the left of zero on the number line, whereas "positive 2" is only two units to the right of zero. Therefore, Jeremiah is correct when he says that his score is closer to zero. Absolute value is the distance a number is from zero.

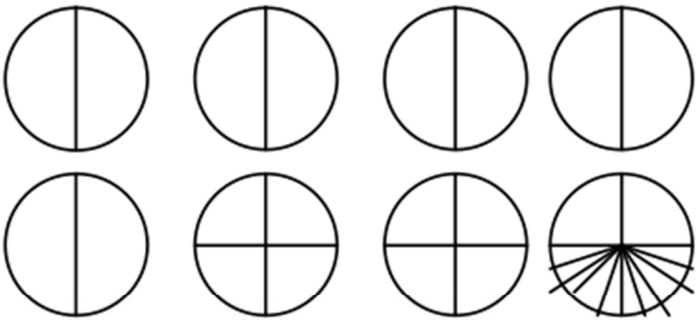
Investigation 3: *Extending the Number Line*
ACE #92

Ten students went to a pizza parlor together. They ordered eight small pizzas.

a. How much pizza will each student get if they share the pizzas equally? Express your answer as a fraction and as a decimal.
b. Explain how you thought about the problem. Draw a picture that would convince someone that your answer is correct.

a. 8/10 or 4/5 or 0.8 of a pizza.

b. Students might draw 8 pizzas divided into halves, which would give each person a half. This leaves 3 pizzas left over, which can then be subdivided into quarters, giving each person a quarter. This leaves a half pizza leftover, which will have to be divided into 10 slices, each 1/20 of a pizza. So each person gets 1/2 + 1/4 + 1/20 of a pizza. Renaming this in terms of 20ths, each share is 10/20 + 5/20 + 1/20 of a pizza, or 16/20 of a pizza.



Each person's share:

Or, each pizza might be divided into 10 pieces and each person gets 8 of these small pieces, or 8/10 of a pizza.

Or, tudents might do a long division 8.0 ÷ 10 = 0.8 of a pizza.

Investigation 4: *Working with Percents*
ACE #21

In Problem 4.1, you found free-throw percentages for Angela, Emily, and Christina. Write each girl's free-throw success as a ratio of percent made : percent missed.

Angela made 12 out of 15 free throws
Emily made 15 out of 20 free throws
Christina made 13 out of 16 free throws

Angela made 12/15 or 80% of her free throws. This means that Angela missed 20% of her free throws. Angela's ratio of percent made to percent missed is 80%:20%.

Emily made 15/20 or 75% of her free throws. This means she missed 25% of her free throws. Her ratio of percent made to percent missed is 75:25. Cristina made 13/16 or about 81% of her free throws. This means she missed about 19% of her free throws. Cristina's ratio of percent made to percent missed is 81:19.

Investigation 4: *Working with Percents*
ACE #23

In some cars, the rear seat folds down to add more space in the trunk. Often, there is a 60 : 40 split in the rear seat instead of 50 : 50. If a rear seat is 60 inches wide with a 60 : 40 split, how wide are the two parts?

The rear seat has a total width of 60 inches. To solve the problem, student must consider how to divide the 60 inches into two parts, whose ratio is 60:40. This ratio tells us that the larger portion of the rear seat makes up 60% of the total width, while the smaller portion makes up 40% of the total width. 60% of the total width is 60% of 60 inches. Therefore the wide part of the rear seat must be 36 inches. This leaves 24 inches for the small part of the rear seat. The wide part is 36 inches; the narrow part is 24 inches.