HOMEWORK HELP

Prime Time

Investigation 1, ACE Exercise 10

a. Find two numbers that have 2, 3, and 5 as factors. What other factors do the two numbers have in common?

b. Find three numbers that have 2, 4, and 8 as factors. What do these numbers have in common?

HINT:

1. What is the least number that is divisible by 2, 3, and 5? What other factors does this number have?

2. What other number is divisible by 2, 3, and 5? What other factors does this number have?

3. Compare the factors of these two numbers. Remember, every number is divisible by 1 and itself.
Prime Time

Investigation 2, ACE Exercise 27

a. Mr. Mendoza and his 23 students are planning to have hot dogs at their class picnic. He can buy hot dogs in packages of 12 and hot dog buns in packages of 8.

Mr. Mendoza wants everyone to get the same number of hot dogs and buns with no leftovers. What is the least number of packages of hot dogs and the least number of packages of buns Mr. Mendoza can buy? How many hot dogs and buns will each person get?

b. Suppose that the class invites the principal, the secretary, the bus driver, and three parents to help out at the picnic. Mr. Mendoza still wants everyone to get the same number of hot dogs and buns with no leftovers. How many packages of hot dogs and buns will he need to buy now? How many hot dogs and buns will each person get?

HINT:

1. For part (a), what is the total number of people that will be at the picnic?

2. List the first four multiples of 8. List the first four multiples of 12. List multiples of the number of people at the picnic. Compare the lists.

3. For part (b), what is the total number of people that will be at the picnic?
Prime Time

Investigation 3, ACE Exercise 19
Find all of the numbers less than 100 that are the product of exactly three different prime numbers.

HINT:
1. List all of the prime numbers less than 20.
2. Use these prime numbers as factors. Find different combinations of three prime factors that have a product less than 100.
3. Are there any prime numbers greater than 20 that could be multiplied by two other prime numbers to give a product less than 100?
4. What is the greatest prime number that can be multiplied by two other prime numbers to give a product less than 100?

Investigation 3, ACE Exercise 41
Ivan said that if a number ends in 0, both 2 and 5 are factors of the number. Is he correct? Why or why not?

HINT:
1. Is every number that ends in 0 divisible by 2? Why or why not?
2. Is every number that ends in 0 divisible by 5? Why or why not?
3. How are numbers that end in 0 related to the factors 2 and 5?
Prime Time

Investigation 4, ACE Exercise 6

How can you determine whether the sum of several numbers, such as 13 + 45 + 24 + 17, is even or odd without actually calculating the sum?

HINT:

1. Is the sum 13 + 45 even or odd? How do you know without actually calculating the sum?

2. Is that sum (13 + 45) plus 24 even or odd? How do you know?

3. Is that sum (13 + 45 + 24) plus 17 even or odd? How do you know?

4. Is the sum of two odd numbers even or odd? Three odd numbers? Four odd numbers? Five odd numbers?

5. Is the sum of two even numbers even or odd? Three even numbers? Four even numbers? Five even numbers?
Comparing Bits and Pieces

Investigation 1, ACE Exercises 16 and 17

For Exercises 16 and 17, use fraction strips to make marks on a number line to show that the two fractions are equivalent.

16. \(\frac{2}{5}\) and \(\frac{6}{15}\)

17. \(\frac{1}{9}\) and \(\frac{2}{18}\)

HINT:

1. What information do the denominators of the two fractions give you? How can you use this information to make your marks on a number line?

2. What information do the numerators of the two fractions give you? How can you use this information to make your marks on a number line?

3. How do you know that the fractions are equivalent?

Investigation 1, ACE Exercise 82

In Problem 1.5, the eighth-grade thermometer is smaller than the sixth- and seventh-grade thermometers. Redraw the eighth-grade thermometer so that it is the same size as the sixth- and seventh-grade thermometers, but still shows the correct fraction for Day 10.

HINT:

1. What fraction of the eighth-grade goal does the shaded portion of the thermometer represent?

2. What information does the denominator of this fraction give you? What information does the numerator of this fraction give you?

3. How does knowing this fraction help you draw the shaded portion of your new thermometer?
Comparing Bits and Pieces

Investigation 2, ACE Exercise 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.

HINT:

1. How many ounces of popcorn do the friends share? How many friends share the popcorn?

2. Write a ratio comparing these totals.

3. How many inches of licorice lace do the friends share?

4. Write a ratio comparing the total length of the licorice lace to the number of friends sharing the licorice lace.

5. How can you rewrite this ratio as a unit rate?
Comparing Bits and Pieces

Investigation 3, ACE Exercises 83 and 84

For Exercises 83 and 84, rewrite the numbers in order from least to greatest.

83. 0.33, –0.12, –0.127, 0.2, \( \frac{45}{10} \)

84. \( \frac{-45}{10} \), \( \frac{3}{1,000} \), –0.005, 0.34

HINT:

1. Rewrite each fraction as an equivalent decimal.
2. How do the denominators of the fractions help you rewrite the fractions as equivalent decimals?
3. How does thinking about place value help you compare the decimal numbers?
Comparing Bits and Pieces

Investigation 4, ACE Exercise 4

Multiple Choice  What is the correct percent for a quiz score of 14 points out of 20?

A. 43%  B. 53%  C. 70%  D. 75%

HINT:

1. Write a ratio that compares the number of points for correct answers to the total number of points on the quiz.
2. Rewrite the ratio as an equivalent fraction.
3. Use this fraction to find an equivalent percent.
Let’s Be Rational

Investigation 1, ACE Exercise 16

Four students were asked the following question: "Can you find two fractions with a sum greater than \( \frac{3}{4} \)?" Explain whether or not each answer below is correct.

a. \( \frac{1}{8} + \frac{2}{4} \)  

b. \( \frac{3}{6} + \frac{2}{4} \)  

c. \( \frac{5}{12} + \frac{5}{6} \)  

d. \( \frac{5}{10} + \frac{3}{8} \)

HINT:

1. Find a benchmark fraction that is close to or equivalent to each fraction.
2. For each sum, find the sum of the benchmark fractions.
3. Compare the estimated sum to \( \frac{3}{4} \).

Investigation 1, ACE Exercise 51

Tony works at a pizza shop. He cuts two pizzas into eight equal sections each. Customers then eat \( \frac{7}{8} \) of each pizza. Tony says that \( \frac{7}{8} + \frac{7}{8} = \frac{14}{16} \), so \( \frac{14}{16} \) of all the pizza was eaten. Is Tony’s addition correct? Explain.

HINT:

1. Use benchmarks to estimate the sum of \( \frac{7}{8} \) and \( \frac{7}{8} \).
2. Use a benchmark to estimate \( \frac{14}{16} \) of the pizza.
3. Compare the two estimates. Do you think that \( \frac{7}{8} + \frac{7}{8} = \frac{14}{16} \)?
4. Explain how Tony added \( \frac{7}{8} \) and \( \frac{7}{8} \). Is he correct or incorrect? Explain.
Let’s Be Rational

Investigation 2, ACE Exercises 6–9

For Exercises 6–9, write a number sentence. Use a fraction that is both positive and less than 1.

6. a fraction and a whole number with a whole number product
7. a fraction and a whole number with a product less than 1
8. a fraction and a whole number with a product greater than 1
9. a fraction and a whole number with a product between $\frac{1}{2}$ and 1

HINT:

1. Draw a picture of a whole number of pizzas. What fraction of those pizzas could you take that would result in a whole number of pizzas?
2. What fraction of the original pizzas could you take that would result in less than one whole pizza?
3. What fraction of the original pizzas could you take that would result in more than one whole pizza?
4. What fraction of the original pizzas could you take that would be between one half of a pizza and one whole pizza?
Let’s Be Rational

Investigation 3, ACE Exercise 2

Write a story problem that can be solved using $1\frac{3}{4} \div \frac{1}{2}$. Explain how the calculation matches your story.

**HINT:**

1. What part of your story does the number $1\frac{3}{4}$ represent?

2. What action in your story shows "dividing by $\frac{1}{2}$"?

3. Find the quotient $1\frac{3}{4} \div \frac{1}{2}$.

4. Draw a picture to prove that the quotient $1\frac{3}{4} \div \frac{1}{2}$ makes sense in your story.
Let’s Be Rational

Investigation 4, ACE Exercise 27

Monday through Friday a grocery store buys \( \frac{2}{3} \) bushel of apples per day from a local grower.

Saturday the grocer buys \( 1 \frac{1}{3} \) bushels of apples.

If the grocer buys apples for four weeks, how many bushels of apples does he buy?

**HINT:**

1. For how many days of the week does the grocery store buy \( \frac{2}{3} \) bushel of apples? How many bushels of apples does the grocery store buy Monday through Friday?

2. On Saturdays, the grocer buys \( 1 \frac{1}{3} \) bushels of apples. How many bushels of apples does the grocery store buy in one week?

3. How many bushels of apples does the grocery store buy in four weeks?
Covering and Surrounding

Investigation 1, ACE Exercise 21

Karl and his dad are building a playhouse for Karl’s younger sister. The floor of the playhouse will be a rectangle that is 6 feet by $8 \frac{1}{2}$ feet.

a. How much carpeting do Karl and Karl’s dad need to cover the floor?

b. How much molding do they need around the edges of the ceiling?

c. The walls are rectangles with a height of 6 feet. A pint of paint covers about 50 square feet. How much paint do they need to paint the inside walls? Explain.

d. Make your own plan for a playhouse. Figure out how much carpeting, paint, and molding you would need to build the playhouse.

HINT:

1. Sketch a rectangle to represent the floor of the playhouse. Label the length and width of the floor.

2. Does perimeter or area tell you how much carpeting is needed to cover the floor?

3. Does perimeter or area tell you how much molding is needed around the edges of the ceiling?

4. Sketch a rectangle to represent a wall of the playhouse. Label the length and width of the wall.

5. Does perimeter or area tell you how much of the wall needs to be painted?
Covering and Surrounding

Investigation 2, ACE Exercises 24–26

For each description in Exercises 24–26, draw two triangles that are not congruent. If you cannot draw more than one triangle, explain why. Make your drawings on centimeter grid paper.

24. Each of the triangles has a base of 8 centimeters and a height of 5 centimeters. Do the triangles have the same area?

25. Each of the triangles has an area of 18 square centimeters. Do the triangles have the same perimeter?

26. Each of the triangles has sides 6 centimeters, 8 centimeters, and 10 centimeters long. Do the triangles have the same area?

HINT:

1. How can you find the area of a triangle? What are the areas of the two triangles you drew in Exercise 24? How do these areas compare?

2. How can you draw a triangle that has an area of 18 square centimeters? How can you find the perimeter of that triangle? What are the perimeters of the two triangles you drew in Exercise 25? How do these perimeters compare?

3. For each triangle you drew in Exercise 26, find the base and the height. What are the areas of the two triangles you drew? How do these areas compare?
Covering and Surrounding

Investigation 3, ACE Exercise 29

The Akland Middle School plans to construct a flowerbed in front of the Administration Building. The plan involves one main parallelogram surrounded by four small parallelograms, as shown.

a. Find the area of one of the small parallelograms.

b. Find the area of the main parallelogram.

**HINT:**

1. For the small parallelograms, what is the length of the base? What is the height? How can you use this information to find the area of each small parallelogram?

2. The main parallelogram is made up of four smaller sections. What is the shape of each of these sections? How can you use these smaller sections to find the area of the main parallelogram?
Covering and Surrounding

Investigation 4, ACE Exercises 10–13

For Exercises 10–13, use each box’s description.

- Make a sketch of the box and label the dimensions.
- Draw a net for the box on grid paper.
- Find the area of each face.
- Find the total area of all the faces.

10. a rectangular box with dimensions $2 \text{ cm} \times 3 \text{ cm} \times 5 \text{ cm}$

11. a rectangular box with dimensions $2 \frac{1}{2} \text{ cm} \times 2 \text{ cm} \times 1 \text{ cm}$

12. a cubic box with side lengths of $3 \frac{2}{3} \text{ in.}$

13. a cubic box that holds 125 unit cubes

HINT:

1. For each Exercise, look at the sketch you made. What are the dimensions of the bottom of the box? Label the bottom face of the net with those dimensions.

2. What other face will have the same dimensions as the bottom face? Label this face on the net with those dimensions.

3. What are the dimensions of the front of the box? What other face will have the same dimensions as the front face? Label the corresponding faces of the net with those dimensions.

4. What are the dimensions of the side of the box? What other face will have the same dimensions as the side face? Label the corresponding faces of the net with those dimensions.

5. How can you use your net to find the area of each face of the box? The total area of all the faces?
Covering and Surrounding

Investigation 4, ACE Exercise 18

Keira has 750 square inches of wrapping paper. Her package is in the shape of a right rectangular prism that is 15 inches long, 12 inches wide, and 8 inches high. Does she have enough paper to cover her package? Explain your reasoning.

**HINT:**

1. Does surface area or volume tell you how much wrapping paper is needed to cover the package?

2. How can you find the amount of wrapping paper needed to cover Keira’s package?

3. Is this number greater than or less than 750 square inches?
Decimal Ops

Investigation 1, ACE Exercise 32

Multiple Choice Which of these numbers is greatest? Explain how you know.

A. 81.9  B. 81.90  C. 81.900  D. 81.91

HINT:

1. Write the decimal numbers as equivalent fractions with denominators of 10, 100, or 1,000.
2. Compare the fractions you wrote.
3. Which of these numbers is greatest? How do you know?
4. How can you use your knowledge about place value to determine which number, in decimal form, is greatest?
Decimal Ops

Investigation 2, ACE Exercises 1–4

For Exercises 1–4, find the sum of each pair of cards without using a calculator. Show your work and explain how an estimation strategy suggests that your answer is probably correct.

1. 3.42  5.8
2. 5.012  0.93
3. 10.437  4.0034
4. 0.403  0.07

HINT:

1. How can you use your knowledge of place value to add these decimal numbers? How can you use your knowledge of equivalent fractions?

2. Use estimation to check your work. How might you round the number on the first card in the pair? How might you round the second number?

3. What is the sum of the two rounded numbers?

4. Is the exact sum you found close to your estimate? How certain are you that the exact sum you found is correct?
Decimal Ops

Investigation 3, ACE Exercises 56–59

For Exercises 56–59, find the area of each shape.

56.  

57. 

58.  

59. 

HINT:

1. What is the formula for the area of a rectangle? The area of a triangle? The area of a parallelogram?

2. Use the area formulas to estimate the area of each shape.

3. Find the exact area of each shape. Use your estimates to help you determine where the decimal point belongs.

4. Write a rule to describe how you can use the number of decimal places in the factors to determine where to place the decimal point in the product.
Decimal Ops

Investigation 3, ACE Exercise 61

Multiple Choice Which quotient is greater than 1?

A. \( \frac{1}{4} \div \frac{3}{8} \)  
B. \( \frac{19}{5} \div 5 \)  
C. \( \frac{1}{3} \div \frac{2}{9} \)  
D. \( 3 \div \frac{19}{7} \)

HINT:

1. Compare the dividend and the divisor. Which fraction is greater?
2. Will the quotient be greater than 1 or less than 1 when the dividend is greater than the divisor?
3. Will the quotient be greater than 1 or less than 1 when the dividend is less than the divisor?
4. Rewrite each pair of fractions as equivalent fractions with common denominators. Find each quotient to justify your answer.
Decimal Ops

Investigation 4, ACE Exercise 16

If $2.4 \div 0.2 = 12$, is $2.4 \div 0.5$ greater than or less than 12? Explain.

**HINT:**

1. Compare the two divisors. Which divisor is greater?
2. When the dividend remains the same but the divisor increases, does the quotient increase or decrease?
3. When the dividend remains the same but the divisor decreases, does the quotient increase or decrease?
Variables and Patterns

Investigation 1, ACE Exercise 2

When Ming and Jamil studied growth in the population of their city, they found these data:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (1000’s)</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
</tr>
</tbody>
</table>

a. Ming made the graph below.

She said, “The graph shows population growing faster in the period from 1995 to 2010 than earlier.” Is Ming’s claim accurate? Why or why not?
Variables and Patterns

Investigation 1, ACE Exercise 2 (continued)

Jamil made a different graph. It is shown below.

Jamil said, “The graph shows population growing at a steady rate.” Is his claim accurate? Why or why not?

**HINT:**

1. Are the x- and y-values in the table properly plotted on the graphs?
2. What do you notice about the x- and y-axes of Ming’s graph? Of Jamil’s graph?
3. Is Ming’s claim accurate? Is Jamil’s claim accurate? Why or why not?
Variables and Patterns

Investigation 2, ACE Exercise 18

The perimeter of any rectangle is the sum of its side lengths.

a. Make a table of all possible whole-number pairs of length and width values for a rectangle with a perimeter of 18 meters.

b. Make a coordinate graph of the \((\text{length}, \text{width})\) data from part (a).

c. Connect the points on your graph if it makes sense to do so. Explain your decision.

d. Describe the relationship between length and width for rectangles of perimeter 18 meters. Explain how that relationship is shown in the table and graph.

HINT:

1. How can you find a whole-number pair of length and width values for a rectangle with a perimeter of 18 meters?

2. Which variable, length or width, will you put on the \(x\)-axis? Why?

3. Does it make sense to connect the points on the graph? What is happening to the \(x\)- and \(y\)-values within the intervals?

4. For a rectangle with a fixed perimeter of 18 meters, what happens to the width of the rectangle as the length increases?
Variables and Patterns

Investigation 3, ACE Exercises 17–19

For Exercises 17–19, describe the relationship between the variables in words and with an equation.

17.  

<table>
<thead>
<tr>
<th>$x$</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>5</th>
<th>10</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y$</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>20</td>
<td>40</td>
<td>80</td>
</tr>
</tbody>
</table>

HINT:

1. For Exercise 17, describe the pattern you see in the $x$-values of the table.
2. Describe the pattern you see in the $y$-values of the table.
3. Describe the relationship you see between each $x$-value and its corresponding $y$-value.
4. Use the patterns you described to write an equation that represents the relationship between $x$ and $y$.
5. Test your equation with each pair of values in the table.
6. Follow the same steps to help you answer Exercises 18 and 19.
Variables and Patterns

Investigation 4, ACE Exercise 52

Most states add a sales tax to the cost of nonfood purchases. Let $p$ stand for the price of a purchase, $t$ stand for the sales tax, and $c$ for the total cost.

a. What equation relates $c$, $p$, and $t$?

For parts (b)–(d), suppose a state has a sales tax of 8%.

b. What equation relates $t$ and $p$?

c. What equation relates $c$ and $p$?

d. Use the Distributive Property to write the equation relating $c$ and $p$ in a simpler equivalent form.

**HINT:**

1. Write a sentence to describe the relationship among price, sales tax, and total cost.

2. Write a sentence to describe the relationship between price and sales tax.

3. Use the sentences you wrote to help you write equations that represent the relationships.

4. Use the sentences and equations you wrote for parts (a) and (b). Write a sentence to describe the relationship between price and total cost.

5. Use the sentence you wrote to help you write an equation that represents the relationship between price and total cost.
Data About Us

Investigation 1, ACE Exercise 5

Recall the name length tables from Problems 1.1 and 1.2 and the names from Exercises 1–4. Below are four dot plots representing each set of names. There are no titles to show which graph represents which set of data.

a. Write a correct title for each graph, such as *Graph A: Name Lengths from __?__. Explain your reasoning.*

b. Write four statements that compare the name lengths from the different classes.
Data About Us

Investigation 1, ACE Exercise 5 (continued)

c. Jasmine says that the graphs show a lot of empty space. She thinks the graphs work better if they look like the dot plots below. How are these graphs different from the dot plots displayed in part (b)? Do you agree with Jasmine? Explain your reasoning.
**Data About Us**

**Investigation 1, ACE Exercise 5 (continued)**

**HINT:**

1. For each data set, what is the maximum value? The minimum value? The mode?

2. For each line plot, what is the maximum value? The minimum value? The mode?

3. How can you use the maximum values, minimum values, modes, and ranges to compare data sets?

4. What are the differences between the original line plots and the line plots that Jasmine prefers? Which line plot makes it easier for you to compare data sets?
Data About Us

Investigation 2, ACE Exercise 19

Sabrina, Diego, and Marcus entered a Dance-a-thon that ran from 9 A.M. to 7 P.M. The times that each student danced are shown at the right.

a. Write the number of hours each student spent dancing as a mixed number.

b. Look at the data from part (a). Without doing any computations, do you think the mean time spent dancing is the same as, less than, or greater than the median? Explain.

HINT:

1. For how many hours did Sabrina dance from 9:15 A.M. to 12:15 P.M.? From 12:15 P.M. to 1 P.M.? What is the total number of hours Sabrina danced?

2. Follow similar steps to find the total dancing times for Diego and Marcus.

3. Compare the total dancing times of the three students. Use this information to help you answer part (b).
Data About Us

Investigation 3, ACE Exercise 1

Servers at the Mugwump Diner receive tips for excellent service.

a. On Monday, four servers earned the tips below. Find the range of the tips.

b. The four servers shared their tips equally. How much money did each server get? Explain.

c. Yanna was busy clearing a table when the tips were shared. Yanna also received $16.10 in tips. Suppose Yanna’s tips were included with the other tips, and the total was shared equally among the five servers. Without doing any computations, will the four servers receive less than, the same as, or more than they did before Yanna’s tips were included? Explain.

HINT:

1. What is the greatest amount of tips earned? The least amount of tips earned?

2. What is the total amount of tips the servers shared? How many servers are sharing the tips?

3. Compare Yanna’s tips to the amount of tips that each server received after sharing the tips.
Data About Us

Investigation 3, ACE Exercises 17 and 18

For Exercises 17 and 18, use the dot plots below.

17. Compare the two sets of data. Which group has longer names? Explain.

18. Look at the distribution for females. Suppose that the data for four names with 18 or more letters changed. These students now have name lengths of ten or fewer letters.
   a. Draw a plot showing this change.
   b. Will the change affect the median name length for females? Explain.
   c. Will the change affect the mean name length for females? Explain.
Data About Us

Investigation 3, ACE Exercises 17 and 18 (continued)

HINT:

1. For Exercise 17, what information can you use to compare the two sets of data?
2. For Exercise 18, what is the mean of the original data set? What is the median of the original data set?
3. Draw a dot plot for the new data set after four data values have changed.
4. What is the mean of the new data set? What is the median of the new data set?
5. Did the mean or median change?
Data About Us

Investigation 4, ACE Exercises 1–4

For Exercises 1–4, use the dot plot and histograms below. The graphs show the number of minutes it takes a class of students to travel to school.

1. How many students spend exactly 10 minutes traveling to school?

2. Which histogram can you use to determine how many students spent at least 15 minutes traveling to school? Explain your reasoning.

3. How many students are in the class? Explain how you can use one of the histograms to find your answer.

4. What is the median time it takes the students to travel to school? Explain your reasoning.
Data About Us

Investigation 4, ACE Exercises 1–4 (continued)

HINT:

1. Which graph can you use to find exact travel times?

2. Compare the two histograms. What are the sizes of the intervals for each histogram?

3. What does the height of the bar of a histogram represent? How can you use this information to find the number of students in the class?

4. Which graph can you use to find the median travel time?