Division and the Distributive Property

Essential Question: How can you use the Distributive Property to find quotients?

Investigate

Materials: ■ color pencils ■ grid paper

You can use the Distributive Property to break apart numbers to make them easier to divide.

The Distributive Property of division says that dividing a sum by a number is the same as dividing each addend by the number and then adding the quotients.

A. Outline a rectangle on a grid to model $69 \div 3$.

Shade columns of 3 until you have 69 squares.

How many groups of 3 can you make? __________

B. Think of 69 as $60 + 9$. Break apart the model into two rectangles to show $(60 + 9) \div 3$. Label and shade the smaller rectangles. Use two different colors.

C. Each rectangle models a division.

$69 \div 3 = (\_\_\_ \div 3) + (\_\_\_ \div 3)$

$= \_\_\_ + \_\_\_\_\_\_\_\_\_$

$= \_\_\_\_\_\_\_\_$

D. Outline another model to show $68 \div 4$.

How many groups of 4 can you make? __________

E. Think of 68 as $40 + 28$. Break apart the model, label, and shade to show two divisions.

$68 \div 4 = (\_\_\_ \div 4) + (\_\_\_ \div 4)$

$= \_\_\_ + \_\_\_\_\_\_\_\_$

$= \_\_\_\_\_\_\_\_$
**Draw Conclusions**

1. Explain how each small rectangle models a quotient and a product in Step C.

2. Compare your answer in Step A to the final quotient in Step C. What can you conclude?

3. **THINK SMARTER** To find the quotient $91 \div 7$, would you break up the dividend into $90 + 1$ or $70 + 21$? Explain.

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**Make Connections**

You can also model $68 \div 4$ using base-ten blocks.

**STEP 1** Model 68.

$68 = \_ + \_ $

**STEP 2** Divide the longs into 4 equal groups.

4 longs divide into 4 equal groups with 2 longs left. Regroup 2 longs as 20 small cubes. Divide them evenly among the 4 groups.

$60 \div 4 = \_ $

**STEP 3** Divide the 8 small cubes into the 4 equal groups.

$8 \div 4 = \_ $

So, $68 \div 4 = (60 \div 4) + (8 \div 4) = \_ + \_ = \_ $
Share and Show

Model the division on the grid.

1. \(26 \div 2 = (\_ \div 2) + (\_ \div 2)\)
   \[-\]
   \[-\]
   \[-\]

2. \(45 \div 3 = (\_ \div 3) + (\_ \div 3)\)
   \[-\]
   \[-\]
   \[-\]

Find the quotient.

3. \(86 \div 2\)
   \[-\]
   \[-\]
   \[-\]

4. \(208 \div 4\)
   \[-\]
   \[-\]
   \[-\]

Use base-ten blocks to model the quotient.
Then record the quotient.

5. \(88 \div 4 = \_\)

6. \(36 \div 3 = \_\)

7. \(186 \div 6 = \_\)

Problem Solving • Applications

8. **WRITE Math** Explain how you can model finding quotients using the Distributive Property.

9. **GO DEEPER** Justin earned $50 mowing lawns and $34 washing cars. He wants to divide his money into 3 equal accounts. How much will he put in each account? Explain.
Pose a Problem

10. **THINK SMARTER** Christelle went to a gift shop. The shop sells candles in a variety of sizes and colors. The picture shows a display of candles.

Write a problem that can be solved using the picture.

**Pose a problem.**

**Solve your problem.**

- **MATHEMATICAL PRACTICE** Describe how you could change the problem by changing the number of rows of candles. Then solve the problem.

**11.** **THINK SMARTER** For 11a–11d, choose Yes or No to indicate if the expression shows a way to break apart the dividend to find the quotient $147 \div 7$.

11a. $(135 \div 7) + (10 \div 7)$

11b. $(147 \div 3) + (147 \div 4)$

11c. $(140 \div 7) + (7 \div 7)$

11d. $(70 \div 7) + (77 \div 7)$
Find the quotient.

1. \(54 \div 3 = \left( \frac{30}{3} \right) + \left( \frac{24}{3} \right)\)
   \[= 10 + 8\]
   \[= 18\]

2. \(81 \div 3 = \) __________
3. \(232 \div 4 = \) __________
4. \(305 \div 5 = \) __________

5. \(246 \div 6 = \) __________
6. \(69 \div 3 = \) __________
7. \(477 \div 9 = \) __________

8. Cecily picked 219 apples. She divided the apples equally into 3 baskets. How many apples are in each basket?

9. Jordan has 260 basketball cards. He divides them into 4 equal groups. How many cards are in each group?

10. The Wilsons drove 324 miles in 6 hours. If they drove the same number of miles each hour, how many miles did they drive in 1 hour?

11. Phil has 189 stamps to put into his stamp album. He puts the same number of stamps on each of 9 pages. How many stamps does Phil put on each page?

12. **WRITE** Math Explain how to use the Distributive Property to solve \(48 \div 3\). Include a model to support your explanation.
Lesson Check (4.NBT.B.6)

1. A landscaping company planted 176 trees in 8 equal rows in the new park. How many trees did the company plant in each row?

2. Arnold can do 65 push-ups in 5 minutes. How many push-ups can he do in 1 minute?

Spiral Review (4.OA.A.3, 4.NBT.B.5, 4.NBT.B.6)

3. Last Saturday, there were 1,486 people at the Cineplex. There were about the same number of people in each of the 6 theaters. Between which two numbers does the number of people in each theater fall?

4. Nancy walked 50 minutes each day for 4 days last week. Gillian walked 35 minutes each day for 6 days last week. How does the total number of minutes that Gillian walked compare to the total number of minutes that Nancy walked?

5. Three boys share 28 toy cars equally. How many cars did each boy get and how many were left over?

6. An airplane flies at a speed of 474 miles per hour. How many miles does the plane fly in 5 hours?