Name _____

Model Multiplication and Division Equations

I Can model and solve multiplication and division equations.

⬛ UNLOCK the Problem Real World

Rashid is buying a movie ticket and a box of popcorn for \$12. The ticket costs 2 times as much as the popcorn. How much does the popcorn cost? How much does the ticket cost?

The cost of the ticket is $2 \times p$, where p is the price of the popcorn.

● How does knowing that a ticket costs 2 times as much as the popcorn help you choose an operation to write an expression?

_____

_____

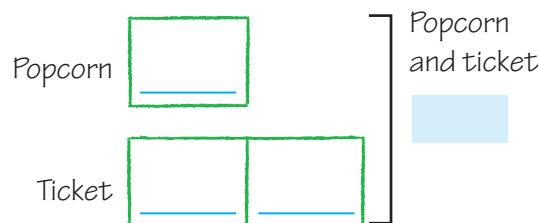**Use a related equation.**

STEP 1

Complete the bar model to represent the popcorn and ticket cost.

The popcorn costs p. Label the box for the popcorn. It represents 1 unit.

The cost of the ticket is _____ times as much. Label the boxes for the ticket.

What is the total cost? _____

How many units are shown in the model? _____

Popcorn [____] ⎤ Popcorn and ticket

Ticket [____|____] ⎦ [____]

Popcorn: 1 unit = _____

Popcorn + ticket: 3 units = _____

STEP 2

Use the bar model to write a multiplication equation.

Cost of popcorn and ticket   Total cost

$3 \times p$ =   _____

To find a missing factor, write a division equation that is related to the multiplication equation. Then divide.

_____ $\div 3 = p$ _____ $= p$

So, 1 bag of popcorn costs _____.

The cost of 1 ticket is 2 times the cost of 1 bag of popcorn.

So, 1 ticket costs _____.

> **Math Idea**
>
> You can write $3 \times p$ as $3 \times p$, $3p$, $3(p)$, or $3 \cdot p$.

Math Talk

MTR 3.1 Complete tasks with mathematical fluency.

What is the total cost of 3 boxes of popcorn and 6 tickets?

Go Online For more help
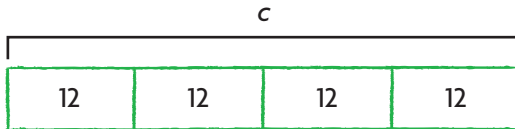
Examples Use a related equation.

Katrina buys a package of trading cards. She divides the cards into 4 equal piles. Each pile contains 12 cards. The equation that describes the number of cards in the package is $c \div 4 = 12$. How many cards were in the package when Katrina bought it?
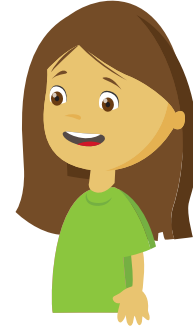
Write a related equation.

MODEL

- Use a bar model to represent the problem.

c

| 12 | 12 | 12 | 12 |

So, the package Katrina bought had _____ trading cards in it.

SOLVE

- Write a related multiplication equation.

Multiplication equation: _____

$c =$ _____

Math Talk

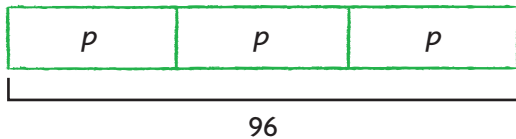**MTR 2.1** Demonstrate understanding in multiple ways.

Explain how the bar models for multiplication and division are related.

Share and Show

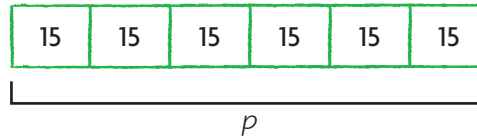**Math Board**

Use the bar models to write an equation. Then solve.

✓ **1.** The cost of 3 pencils is 96 cents. Each pencil costs the same. What is the cost of 1 pencil, p?

| p | p | p |

96

Equation: _____ = 96 $p =$ _____

One pencil costs _____ cents.

✓ **2.** Chef makes 6 batches of chili. Each batch contains 15 pints of tomato sauce. How many pints does she use in all?

| 15 | 15 | 15 | 15 | 15 | 15 |

p

Equation: _____ $p =$ _____

If one pint equals 2 cups, chef uses _____ cups of sauce.

On Your Own

Use a bar model or a related equation to solve. Check your solution.

3. $128 = 8 \times d$

4. $r \div 9 = 17$

5. $6m = 78$

6. $7 = b \div 17$

7. **WRITE** ▸*Math* How can you justify that $j = 348$ is the solution to $j \div 12 = 29$? Explain.

_____