LESSON MAKER PRO

Pattern Power

Find multiplication patterns and explain why they work.

GRADE 3 · 3.OA.D.9

CCSS.Math.Content.3.OA.D.9 "Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even..."

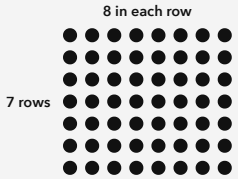
NAME _____ DATE _____

SPOT THE RULE

A multiplication pattern can help you predict the next product. You can break apart one factor, multiply each part, and add the partial products. You can also switch the order of the factors because rows and columns count the same total.

WORKED EXAMPLE

Find 7 x 8 by breaking apart 7 into 5 and 2.



1. 7 x 8 = (5 x 8) + (2 x 8).
2. 5 x 8 = 40.
3. 2 x 8 = 16.
4. 40 + 16 = 56.

Answer: 7 x 8 = 56

PRACTICE 6 problems

1 Complete the pattern: 3, 6, 9, 12, 15, ___. What rule tells how the numbers change?

ANSWER _____

2 Find 4 x 6. Show why the product is even by splitting 4 into two equal parts.

ANSWER _____

3 Which product is greater, 9 x 3 or 3 x 9? Explain.

ANSWER _____

4 Use the break-apart method to find 6 x 9. Split 9 into 3 and 6.

ANSWER _____

5 The products in the 10 row are 10, 20, 30, 40, 50, ___. What is 10 x 6? State the pattern rule.

ANSWER _____

6 Use 4 x 9 to show why 4 times a whole number is even. Write the product as two equal addends.

ANSWER _____

APPLY IT Show your work

1 In a video game, a player earns 6 coins in each of 4 rounds. How many coins does the player earn? Explain why the total is even by splitting 4 into two equal parts.

WORK SPACE

ANSWER _____

2 The game club puts 5 chairs in each of 7 rows. Then the club turns the arrangement so there are 7 chairs in each of 5 rows. Does the number of chairs change? Explain.

WORK SPACE

ANSWER _____

CHALLENGE One step up

For any whole number, explain why 6 times the number is always even. Use an addition equation with words or a number example.

WORK SPACE AND ANSWER

ANSWER KEY

Pattern Power

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Complete the pattern: 3, 6, 9, 12, 15, ___. What rule tells how the numbers change?	**18; add 3 each time.**
2	Find 4 x 6. Show why the product is even by splitting 4 into two equal parts.	**24; 4 x 6 = (2 x 6) + (2 x 6) = 12 + 12 = 24.**
3	Which product is greater, 9 x 3 or 3 x 9? Explain.	**Neither product is greater. Both equal 27 because changing the order of the factors does not change the product.**
4	Use the break-apart method to find 6 x 9. Split 9 into 3 and 6.	**54; 6 x 9 = (6 x 3) + (6 x 6) = 18 + 36 = 54.**
5	The products in the 10 row are 10, 20, 30, 40, 50, ___. What is 10 x 6? State the pattern rule.	**60; add 10 each time. Each product ends in 0.**
6	Use 4 x 9 to show why 4 times a whole number is even. Write the product as two equal addends.	**36; 4 x 9 = 18 + 18.**

PART 2 · APPLY IT

1. **24 coins; (2 x 6) + (2 x 6) = 12 + 12 = 24, so the total is even.** Multiply 4 x 6. Split 4 into 2 + 2 to make two equal addends, 12 + 12.
2. **No. There are 35 chairs both ways because 5 x 7 = 7 x 5 = 35.** Find 5 x 7. Switching the factors describes the same total number of chairs.

CHALLENGE

6 times a number = 3 times the number + 3 times the number. The two addends are equal, so the total is even.

Accept equivalent break-apart equations and clear descriptions of the patterns. For explanations about even products, accept any correct use of two equal addends.