

Patterns That Multiply

Spot table 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 _____

SEE THE PATTERN

In a multiplication table, products in a row change by the number at the start of the row when you move one space. A product is even if it can be split into two equal whole-number addends. Use addition to explain the pattern you notice.

WORKED EXAMPLE

Explain why 12×11 is even.

1. $12 \times 11 = 132$.
2. Split 132 into $66 + 66$.
3. The two addends are equal.

Answer: 12×11 is even because $132 = 66 + 66$.

PRACTICE 6 problems

- 1** Complete the pattern: $3 \times 5 = 15$, $3 \times 6 = 18$, $3 \times 7 = \underline{\quad}$.

ANSWER _____

- 2** Look at the pattern: $9 \times 3 = 27$, $9 \times 5 = 45$, $9 \times 7 = 63$. How much does the product grow each time?

ANSWER _____

- 3** Use two equal addends to show why 6×9 is even. $6 \times 9 = \underline{\quad} + \underline{\quad}$.

ANSWER _____

- 4** Complete the equation: $10 \times 3 = \underline{\quad} + \underline{\quad}$. What does this show about 10×3 ?

ANSWER _____

- 5** The products in the 5 row are $5 \times 1 = 5$, $5 \times 2 = 10$, and $5 \times 3 = 15$. What is 5×4 ? Explain the pattern.

ANSWER _____

- 6** Which products are even: 7×4 , 7×5 , or 7×6 ? Explain with equal addends.

ANSWER _____

APPLY IT Show your work

- 1** A game club puts 9 cards in each packet. Mia gets 6 packets. The club notices that adding 2 packets adds 18 cards. How many cards does Mia get?

WORK SPACE

ANSWER _____

- 2** At a robot-building club, 8 teams each build 5 flags. The coach splits all the flags into two equal groups. How many flags are in each group?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A student says, "7 times any even number is even." Test the claim with 7×8 . Is the student correct? Explain using equal addends.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Complete the pattern: $3 \times 5 = 15$, $3 \times 6 = 18$, $3 \times 7 = \underline{\quad}$.	21
2	Look at the pattern: $9 \times 3 = 27$, $9 \times 5 = 45$, $9 \times 7 = 63$. How much does the product grow each time?	18
3	Use two equal addends to show why 6×9 is even. $6 \times 9 = \underline{\quad} + \underline{\quad}$.	$27 + 27$
4	Complete the equation: $10 \times 3 = \underline{\quad} + \underline{\quad}$. What does this show about 10×3 ?	$15 + 15$; 10×3 is even.
5	The products in the 5 row are $5 \times 1 = 5$, $5 \times 2 = 10$, and $5 \times 3 = 15$. What is 5×4 ? Explain the pattern.	20; the products increase by 5 each time.
6	Which products are even: 7×4 , 7×5 , or 7×6 ? Explain with equal addends.	7×4 and 7×6 are even. $7 \times 4 = 28 = 14 + 14$, and $7 \times 6 = 42 = 21 + 21$.

PART 2 • APPLY IT

- 54 cards** Multiply 9×6 to get 54. The pattern also works because three groups of 2 packets add 18 cards each time.
- 20 flags** First find $8 \times 5 = 40$ flags. Then split 40 into two equal addends, $20 + 20$.

CHALLENGE

Yes. $7 \times 8 = 56$, and $56 = 28 + 28$, so the product is even.

Accept any correct equal-addend equation that proves a product is even. For pattern explanations, accept wording that clearly states the product increases by the same amount as the change in the multiplier.