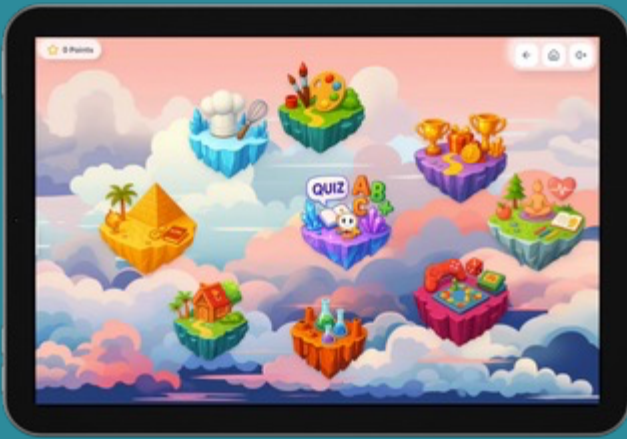


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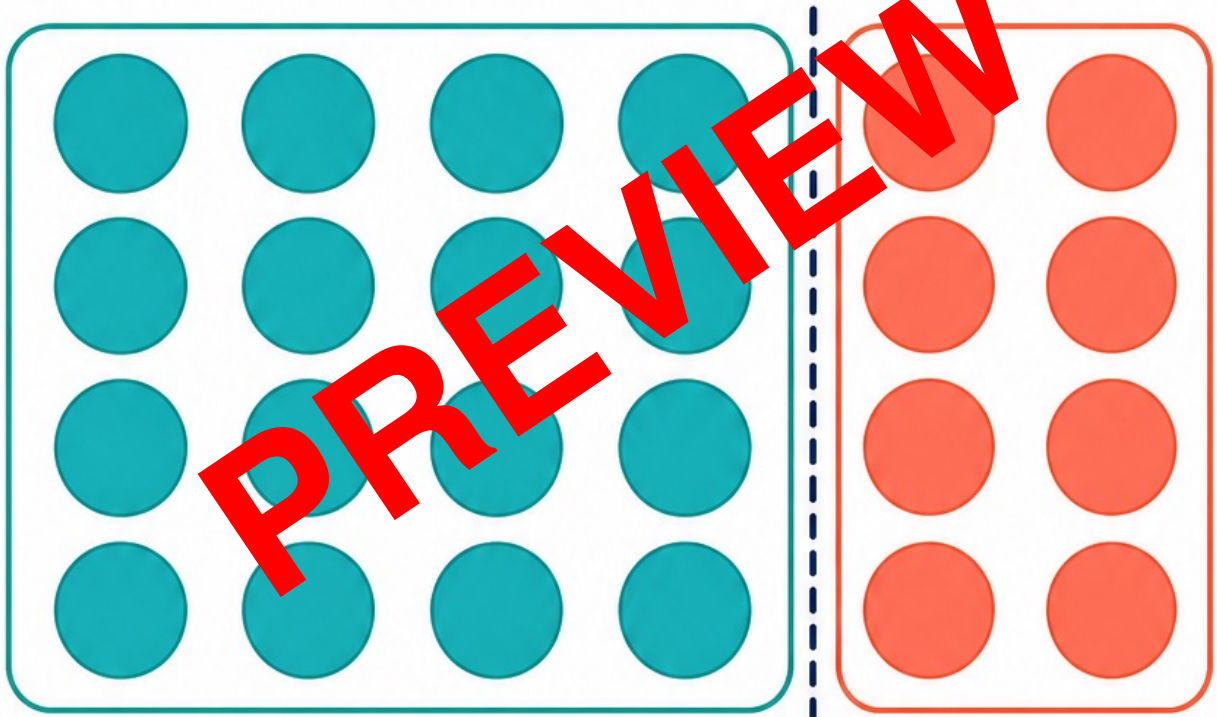
Multiplication Using Partitioning - Year 2

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Partition an Array

1. Split one factor into friendly parts.
2. Multiply each smaller array.
3. Add the partial products.



$$4 \times 6 = (4 \times 4) + (4 \times 2)$$
$$24 = 16 + 8$$

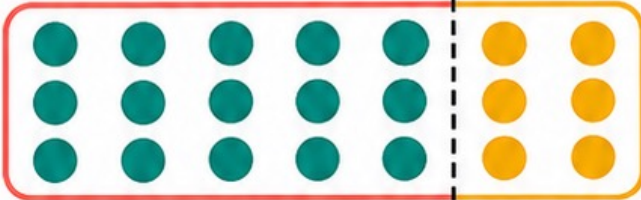
★ Every counter still belongs to the whole array. ★

Partitioning Arrays: 3-Step Helper

Partitioning Arrays

1. Split one factor.
2. Multiply both parts.
3. Add the partial products.

$$3 \times 7 = (3 \times 5) + (3 \times 2)$$
$$21 = 15 + 6$$

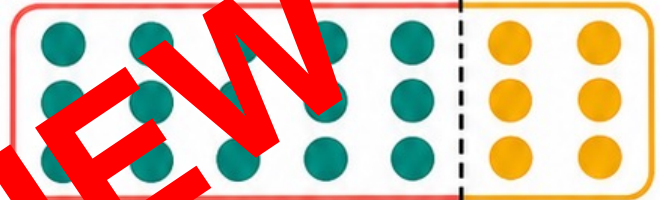


Split. Multiply. Add. Check.

Partitioning Arrays

1. Split one factor.
2. Multiply both parts.
3. Add the partial products.

$$3 \times 7 = (3 \times 5) + (3 \times 2)$$
$$21 = 15 + 6$$

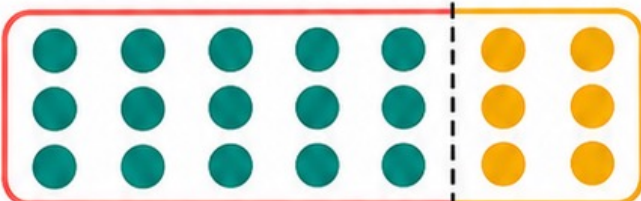


Split. Multiply. Add. Check.

Partitioning Arrays

1. Split one factor.
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3. Add the partial products.

$$3 \times 7 = (3 \times 5) + (3 \times 2)$$
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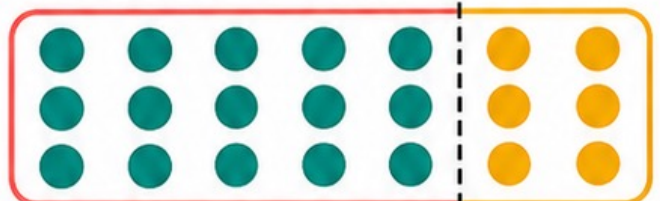


Split. Multiply. Add. Check.

Partitioning Arrays

1. Split one factor.
2. Multiply both parts.
3. Add the partial products.

$$3 \times 7 = (3 \times 5) + (3 \times 2)$$
$$21 = 15 + 6$$



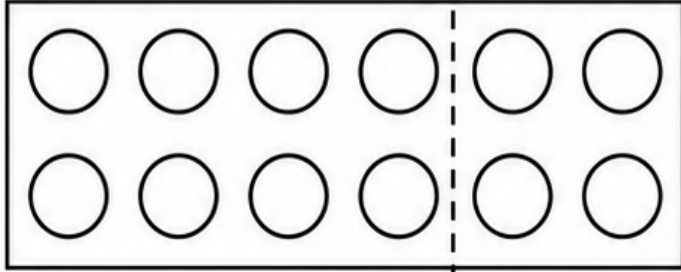
Split. Multiply. Add. Check.

See It, Split It, Solve It

Name: _____

Draw the partition line. Complete both multiplication facts.
Add the parts to find the total.

1

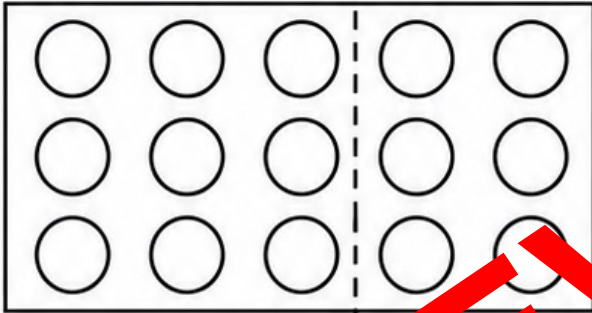


$$2 \times 4 = \square$$

$$2 \times 2 = \square$$

$$\square + \square = \square$$

2

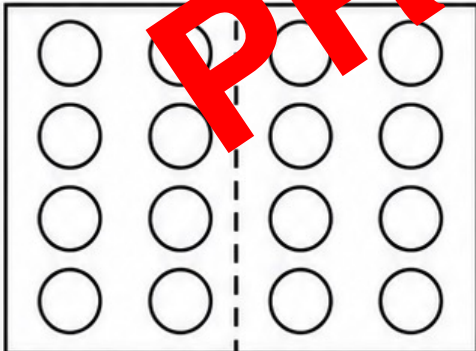


$$3 \times 3 = \square$$

$$3 \times 2 = \square$$

$$\square + \square = \square$$

3

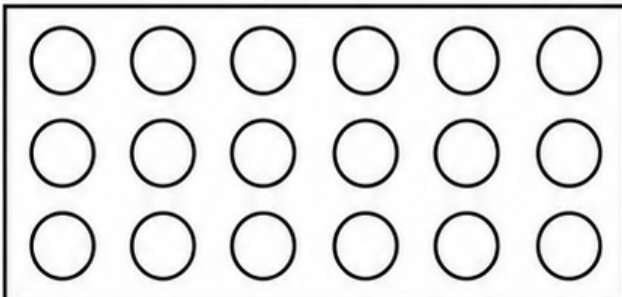


$$4 \times 2 = \square$$

$$4 \times 2 = \square$$

$$\square + \square = \square$$

4



Choose a split.

$$3 \times \square = \square$$

$$3 \times \square = \square$$

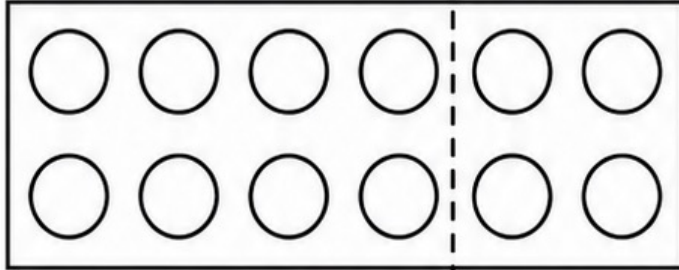
$$\square + \square = \square$$

See It, Split It, Solve It

Name: **ANSWERS**

Draw the partition line. Complete both multiplication facts.
Add the parts to find the total.

1

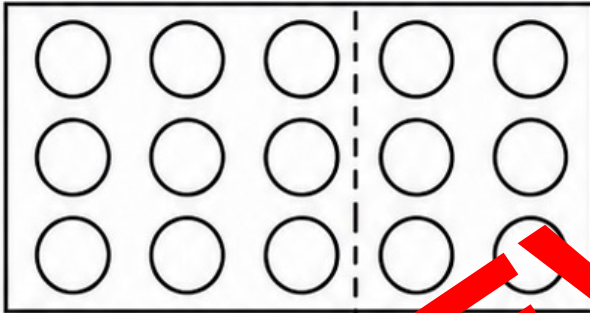


$$2 \times 4 = 8$$

$$2 \times 2 = 4$$

$$8 + 4 = 12$$

2

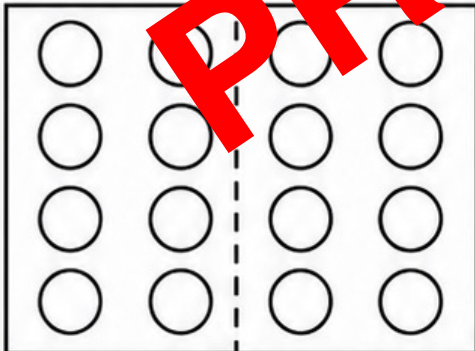


$$3 \times 3 = 9$$

$$3 \times 2 = 6$$

$$9 + 6 = 15$$

3

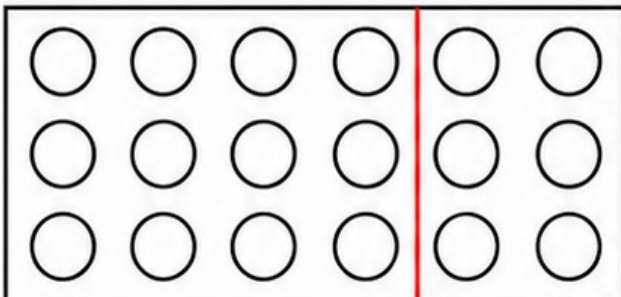


$$4 \times 2 = 8$$

$$4 \times 2 = 8$$

$$8 + 8 = 16$$

4



Choose a split.

$$3 \times 4 = 12$$

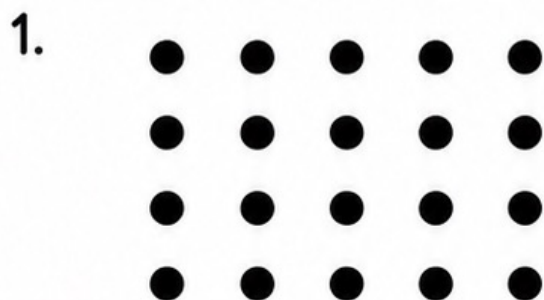
$$3 \times 2 = 6$$

$$12 + 6 = 18$$

Name: _____

Smart Splits

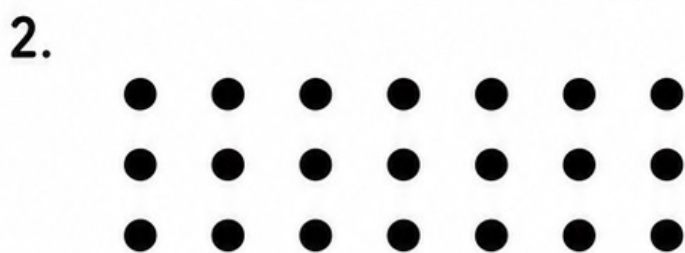
Partition each array into two complete smaller arrays. Solve both parts, then add.



$$4 \times \underline{\quad} = \underline{\quad}$$

$$4 \times \underline{\quad} = \underline{\quad}$$

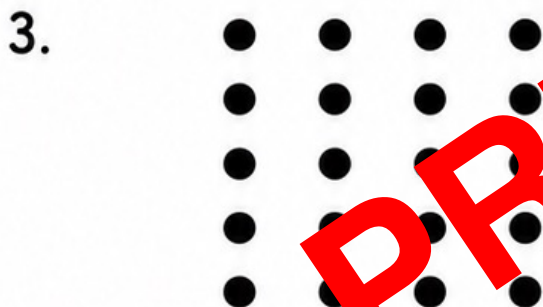
$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$



$$3 \times \underline{\quad} = \underline{\quad}$$

$$3 \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$



$$5 \times \underline{\quad} = \underline{\quad}$$

$$5 \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

4. A garden has 4 rows of 6 bean plants. Draw an array, partition it, and find the total number of plants.

$$4 \times \underline{\quad} = \underline{\quad}$$

$$4 \times \underline{\quad} = \underline{\quad}$$

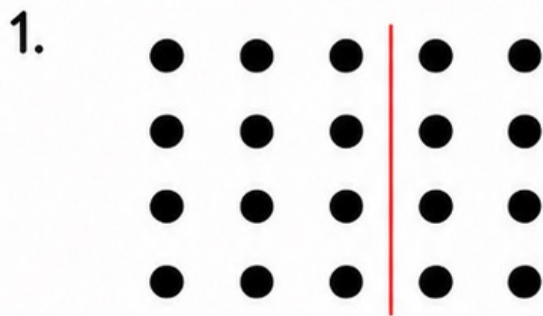
$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

5. How does partitioning help you find the total?

Name: ANSWERS

Smart Splits

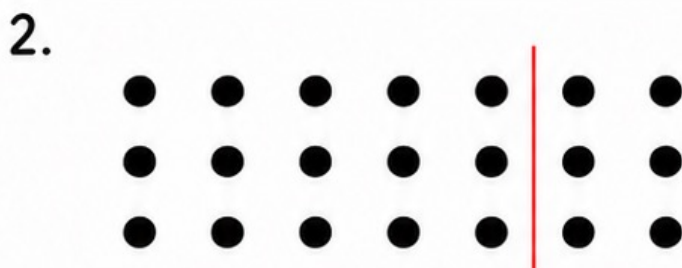
Partition each array into two complete smaller arrays. Solve both parts, then add.



$$4 \times 3 = 12$$

$$4 \times 2 = 8$$

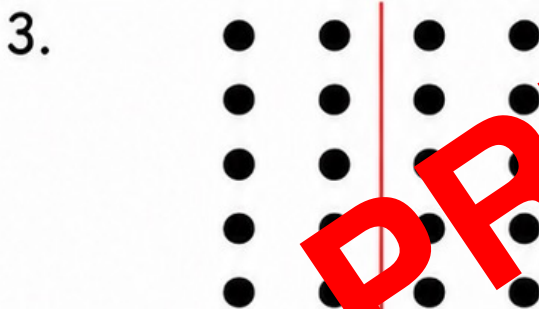
$$12 + 8 = 20$$



$$3 \times 5 = 15$$

$$3 \times 2 = 6$$

$$15 + 6 = 21$$

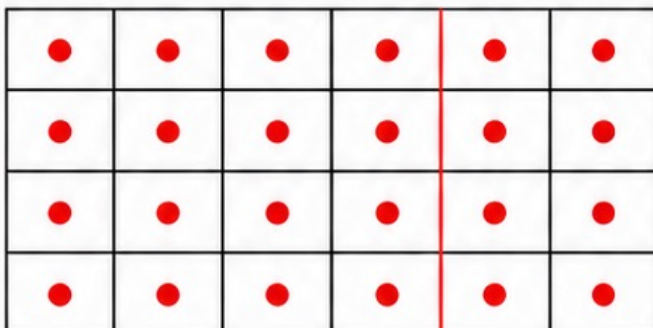


$$5 \times 2 = 10$$

$$5 \times 2 = 10$$

$$10 + 10 = 20$$

4. A garden has 4 rows of 6 bean plants. Draw an array, partition it, and find the total number of plants.



$$4 \times 4 = 16$$

$$4 \times 2 = 8$$

$$16 + 8 = 24$$

5. How does partitioning help you find the total?

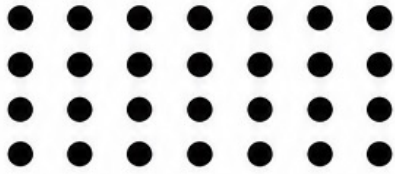
It breaks a larger array into smaller facts, then I add the parts.

Name: _____

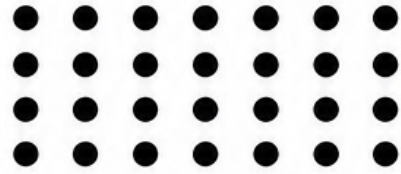
More Than One Way

Partition each array in two different ways. Show that both ways give the same total.

① 4×6

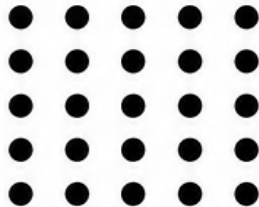


$$\begin{array}{l} \underline{\quad} \times \underline{\quad} = \underline{\quad} \\ \underline{\quad} \times \underline{\quad} = \underline{\quad} \\ \underline{\quad} + \underline{\quad} = \underline{\quad} \end{array}$$

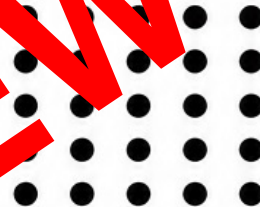


$$\begin{array}{l} \underline{\quad} \times \underline{\quad} = \underline{\quad} \\ \underline{\quad} \times \underline{\quad} = \underline{\quad} \\ \underline{\quad} + \underline{\quad} = \underline{\quad} \end{array}$$

② 5×5



$$\begin{array}{l} \underline{\quad} \times \underline{\quad} = \underline{\quad} \\ \underline{\quad} \times \underline{\quad} = \underline{\quad} \\ \underline{\quad} + \underline{\quad} = \underline{\quad} \end{array}$$



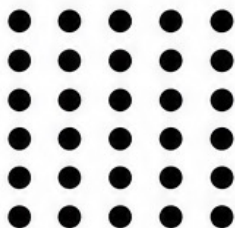
$$\begin{array}{l} \underline{\quad} \times \underline{\quad} = \underline{\quad} \\ \underline{\quad} \times \underline{\quad} = \underline{\quad} \\ \underline{\quad} + \underline{\quad} = \underline{\quad} \end{array}$$



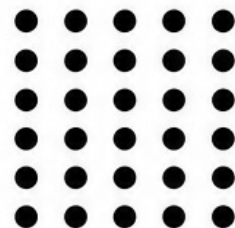
Sam wrote $5 \times 8 = (3 \times 5) + (3 \times 2) = 21$. What part is missing?
Write the correct equation.



Show two ways to partition 6×5 .



$$\begin{array}{l} \underline{\quad} \times \underline{\quad} = \underline{\quad} \\ \underline{\quad} \times \underline{\quad} = \underline{\quad} \\ \underline{\quad} + \underline{\quad} = \underline{\quad} \end{array}$$

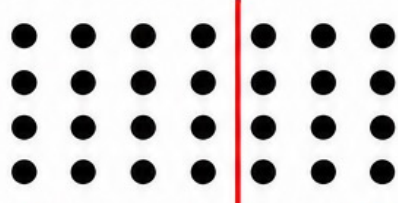


$$\begin{array}{l} \underline{\quad} \times \underline{\quad} = \underline{\quad} \\ \underline{\quad} \times \underline{\quad} = \underline{\quad} \\ \underline{\quad} + \underline{\quad} = \underline{\quad} \end{array}$$

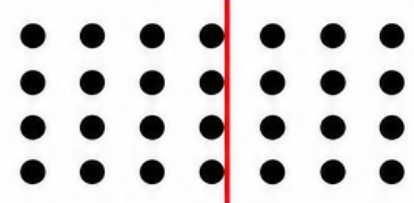
More Than One Way

Partition each array in two different ways. Show that both ways give the same total.

① 4×6

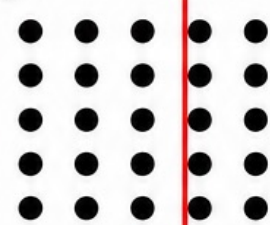


$$\begin{array}{r} 4 \times 4 = 16 \\ 4 \times 2 = 8 \\ 16 + 8 = 24 \end{array}$$

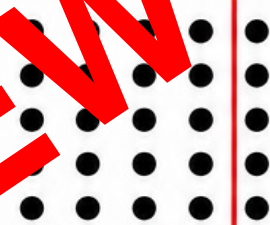


$$\begin{array}{r} 4 \times 3 = 12 \\ 4 \times 3 = 12 \\ 12 + 12 = 24 \end{array}$$

② 5×5



$$\begin{array}{r} 5 \times 3 = 15 \\ 5 \times 2 = 10 \\ 15 + 10 = 25 \end{array}$$



$$\begin{array}{r} 5 \times 4 = 20 \\ 5 \times 1 = 5 \\ 20 + 5 = 25 \end{array}$$

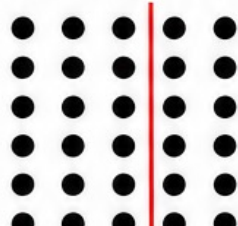


Sam wrote $3 \times 8 = (3 \times 5) + (3 \times 2) = 21$. What part is missing?
Write the correct equation.

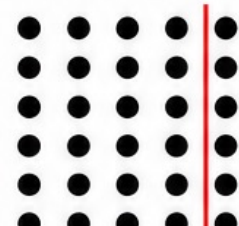
One column of 3 is missing. $3 \times 8 = (3 \times 5) + (3 \times 3) = 15 + 9 = 24$.



Show two ways to partition 6×5 .



$$\begin{array}{r} 6 \times 3 = 18 \\ 6 \times 2 = 12 \\ 18 + 12 = 30 \end{array}$$



$$\begin{array}{r} 6 \times 4 = 24 \\ 6 \times 1 = 6 \\ 24 + 6 = 30 \end{array}$$



Pirate Partition Mat



Build an array. Split it into two complete parts. Solve both parts, then add.

Whole Array



Part A

Part B

Multiplication Facts

Total





Penguin Partition Mat

**Build an array. Split it into two complete parts.
Solve both parts, then add.**



Whole Array



Part A



Part B



Multiplication Facts

Multiplication Facts

Total

Total





Partitioning Garden Challenge



Choose a challenge. Build or draw the array.
Split it into two complete parts. Solve both parts, then add.

2×7



3×6



4×5



5×4



My Array

PREVIEW

Part A



Part B



Multiplication fact A: _____ $\times$ _____ = _____

Multiplication fact B: _____ $\times$ _____ = _____

Total: _____ + _____ = _____



Partitioning Partners

A matching game for 2–4 players



You need

All Partitioning Partners cards



How to play

- 1 Shuffle the cards and place them face down.
- 2 On your turn, turn over three cards.
- 3 Keep the cards if they show one matching set: the whole array, its partitioned facts and its total.
- 4 Explain the split to keep the set.
- 5 Put non-matching cards face down again.

Example of a matching set



$$2 \times 6$$

$$2 \times 4 + 2 \times 2$$



12

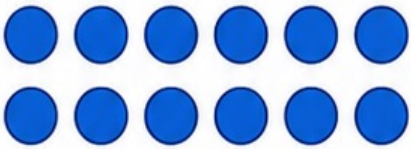


The player with the most complete sets wins.

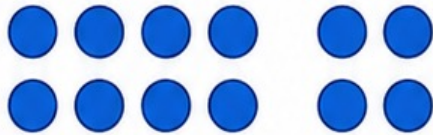


Partitioning Partners - Cards A

$$2 \times 6$$

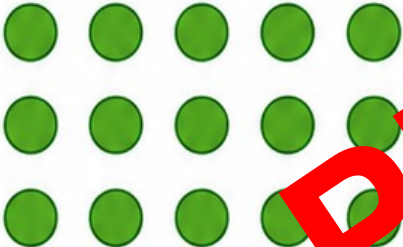


$$2 \times 4 + 2 \times 2$$

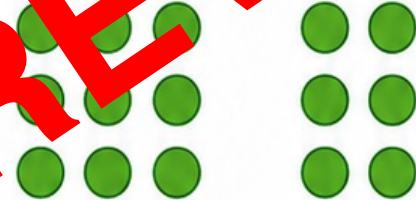


12

$$3 \times 5$$

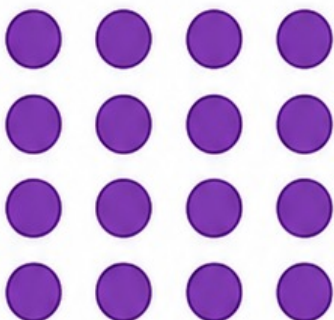


$$3 \times 3 + 3 \times 2$$

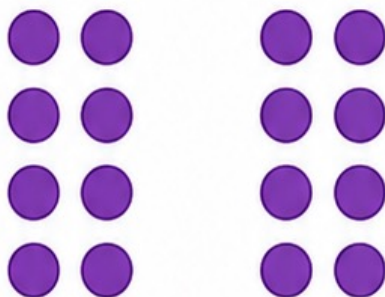


15

$$4 \times 4$$



$$4 \times 2 + 4 \times 2$$

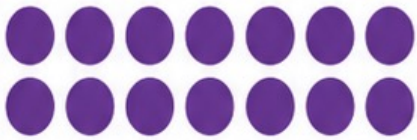


16

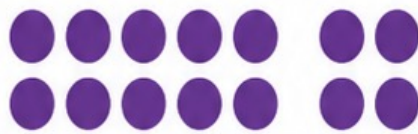
PREVIEW

Partitioning Partners - Cards B

$$2 \times 7$$

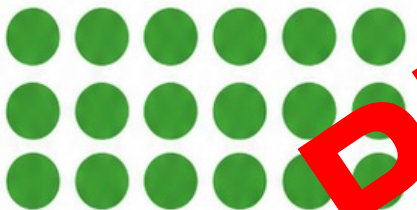


$$2 \times 5 + 2 \times 2$$

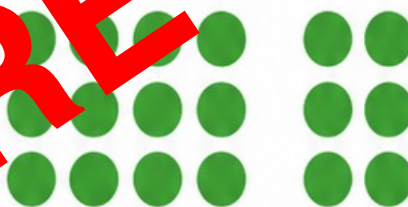


14

$$3 \times 6$$

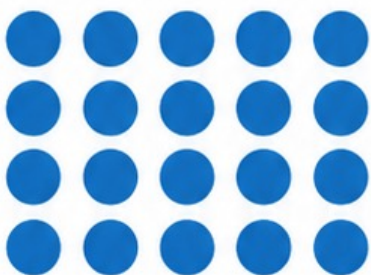


$$3 \times 4 + 3 \times 2$$

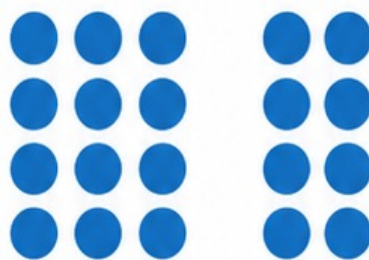


18

$$4 \times 5$$



$$4 \times 3 + 4 \times 2$$

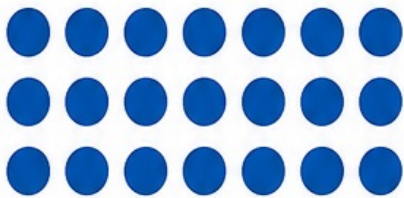


20

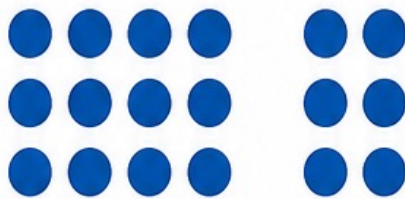
PREVIEW

Partitioning Partners - Cards C

$$3 \times 7$$

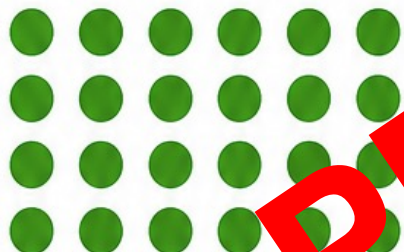


$$3 \times 5 + 3 \times 2$$

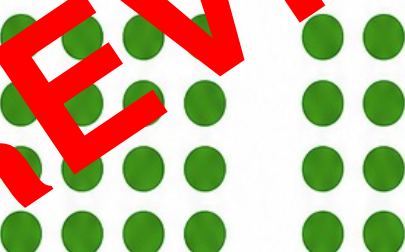


21

$$4 \times 6$$

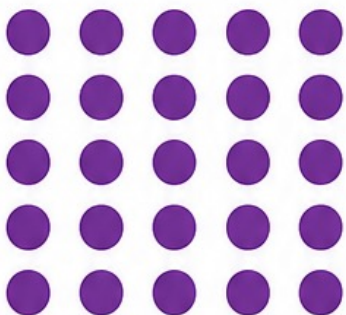


$$4 \times 4 + 4 \times 2$$

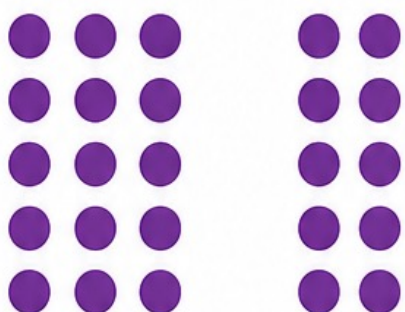


24

$$5 \times 5$$



$$5 \times 3 + 5 \times 2$$



25

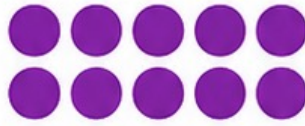
PREVIEW

Partitioning Partners - Cards D

$$2 \times 9$$

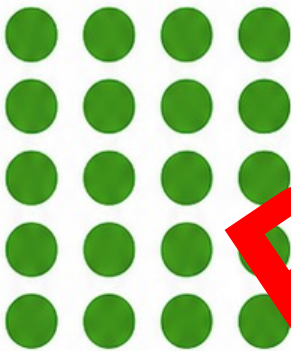


$$2 \times 5 + 2 \times 4$$



18

$$5 \times 4$$

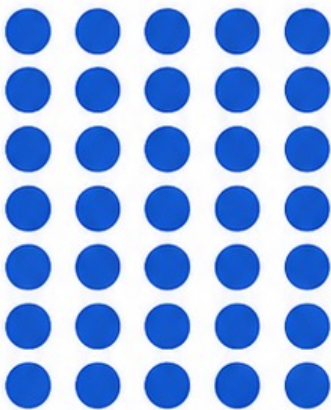


$$5 \times 2 + 5 \times 2$$



20

$$6 \times 5$$



$$6 \times 3 + 6 \times 2$$



30

PREVIEW

Multiplication by Partitioning Assessment

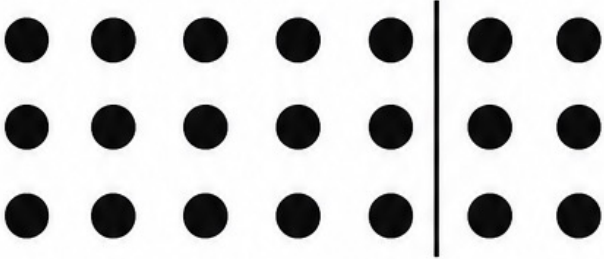
Page 1

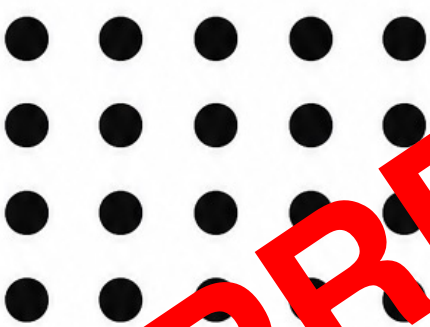
Name: _____

1. Partitioning breaks one array into smaller complete arrays.

☐ True

☐ False

2.  $3 \times 4 = \underline{\quad}$
 $3 \times 2 = \underline{\quad}$
 $\underline{\quad} = \underline{\quad}$

3.  Draw a partition line. Write both facts and the total.

$\underline{\quad} \times \underline{\quad} = \underline{\quad}$
 $\underline{\quad} \times \underline{\quad} = \underline{\quad}$
 $\underline{\quad} + \underline{\quad} = \underline{\quad}$

4. Which split correctly partitions 2×8 ?

- ☐ A. $2 \times 5 + 2 \times 3$
☐ B. $2 \times 4 + 3 \times 4$
☐ C. $2 \times 6 + 2 \times 1$
☐ D. $8 + 8 + 8$

5. Complete one valid partition for 5×4 .

$$5 \times 4 = (5 \times \underline{\quad}) + (5 \times \underline{\quad})$$

$$20 = \underline{\quad} + \underline{\quad}$$

Multiplication by Partitioning Assessment

Page 1

Name: ANSWERS

1. Partitioning breaks one array into smaller complete arrays.

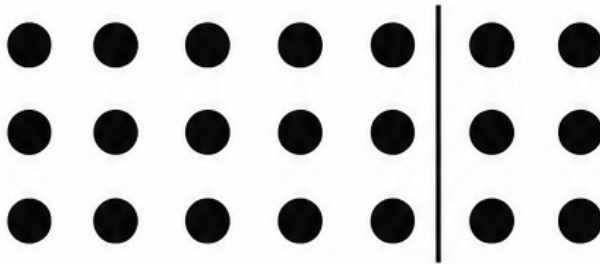


True



False

2.

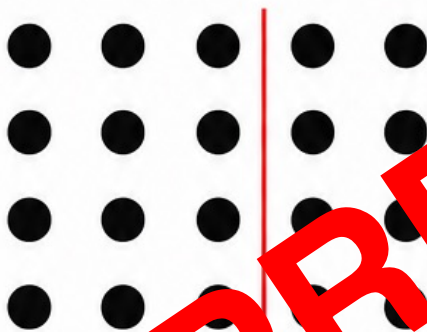


$$3 \times 4 = \underline{12}$$

$$3 \times 2 = \underline{6}$$

$$\underline{12} + \underline{6} = \underline{18}$$

3.



Draw a partition line. Write both facts and the total.

$$\underline{4} \times \underline{3} = \underline{12}$$

$$\underline{4} \times \underline{2} = \underline{8}$$

$$\underline{12} + \underline{8} = \underline{20}$$

4. Which split correctly partitions 2×8 ?



A. $2 \times 5 + 2 \times 3$



B. $2 \times 4 + 3 \times 4$



C. $2 \times 6 + 2 \times 1$



D. $8 + 8 + 8$

5. Complete one valid partition for 5×4 .

$$5 \times 4 = (5 \times \underline{2}) + (5 \times \underline{2})$$

$$20 = \underline{10} + \underline{10}$$

Multiplication by Partitioning Assessment

Page 2

Name: _____



- 1** A park has 4 rows of 7 young trees.
Draw an array, partition it, and find the total number of trees.

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

- 2** Mia: $3 \times 7 = (3 \times 5) + (3 \times 2)$

Eli: $3 \times 7 = (3 \times 4) + (3 \times 3)$

Do both partitions give the same total? Show the totals.

Mia: _____

Eli: _____

Yes

No

- 3** Noah wrote: $4 \times 6 = (4 \times 4) + (4 \times 1)$.

What is missing? Write the correct equation.



- 4** Why can partitioning make a multiplication problem easier to solve?



Multiplication by Partitioning Assessment

Page 2

Name: ANSWERS



- 1 A park has 4 rows of 7 young trees.
Draw an array, partition it, and find the total number of trees.

•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•

$$\underline{4} \times \underline{5} = \underline{20}$$

$$\underline{4} \times \underline{2} = \underline{8}$$

$$\underline{20} + \underline{8} = \underline{28}$$

- 2 Mia: $3 \times 7 = (3 \times 5) + (3 \times 2)$
Eli: $3 \times 7 = (3 \times 4) + (3 \times 3)$
Do both partitions give the same total? Show the totals.

Mia: $\underline{15 + 6 = 21}$

Eli: $\underline{12 + 9 = 21}$

Yes



No

- 3 Noah wrote: $4 \times 6 = (4 \times 4) + (4 \times 1)$.
What is missing? Write the correct equation.

One column of 4 is missing.

$$\underline{4 \times 6 = (4 \times 4) + (4 \times 2) = 16 + 8 = 24.}$$



- 4 Why can partitioning make a multiplication problem easier to solve?

It breaks a larger array into smaller

facts I know, then I add the parts.





Multiplication Using Partitioning - Year 2 Rubric

Criteria	BEGINNING	DEVELOPING	ACHIEVING	CONFIDENT	EXCEEDING
1. Represents multiplication as arrays	Needs support to show an array or shows an incomplete array.	Shows an array with some correct rows and columns with prompts.	Independently shows the array to match the problem using equal rows and columns.	Chooses a sensible array and explains how the rows and columns represent the numbers.	Creates and compares different arrays and explains which is more helpful.
2. Partitions an array accurately	Needs support to partition the array or partition is incomplete or incorrect.	Partitions the array with some correct parts with prompts.	Independently partitions the array into two complete smaller arrays.	Chooses sensible partitions and clearly explains the choice.	Compares different partitions and explains which is most efficient and why.
3. Writes matching multiplication facts	Needs support to write the facts or writes incomplete or incorrect multiplication facts.	Writes some correct facts that match the partitions with prompts.	Independently writes matching multiplication facts for each part.	Writes the facts clearly and links each fact to the partitioned array.	Writes facts for different partitions and explains which facts are easier to use.
4. Adds the parts and explains the total	Needs support to add the parts or shows an incorrect total with little explanation.	Adds the parts with some accuracy with prompts and gives a simple explanation.	Independently adds the parts to find the total and explains how the total matches the array.	Adds the parts accurately and explains clearly how the parts make the total.	Explains why the total is the same for different partitions and connects to the original array.

Overall judgement:

☐

BEGINNING

☐

DEVELOPING

☐

ACHIEVING

☐

CONFIDENT

☐

EXCEEDING

Teacher comment:

Multiplication Using Partitioning



Learning Intention

We are learning to split an array into two smaller arrays.
I can multiply each part and add the partial products.



Multiplication Means Equal Groups

Multiplication combines equal groups.

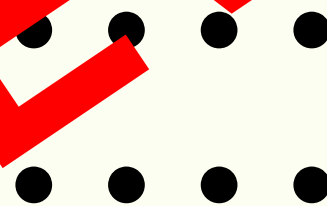
3 groups of 4: $4 + 4 + 4 = 12$

$$3 \times 4 = 12$$



Arrays Show Rows and Columns

An array keeps objects in equal rows and columns.



2 rows of 4 = $2 \times 4 = 8$



What Does Partitioning Mean?

Partitioning means breaking one large array into two complete smaller arrays.

The parts must include every row and every column.



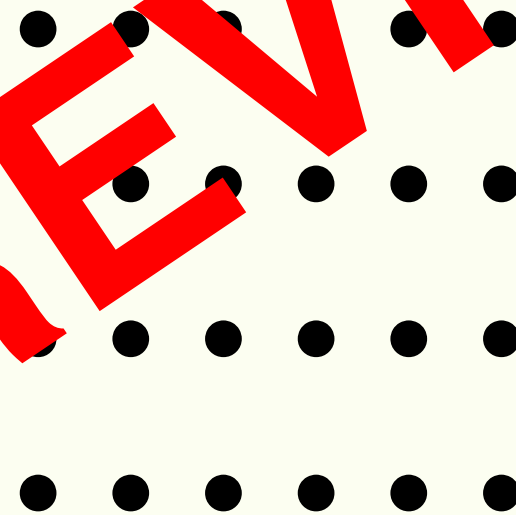
Why Partition an Array?

Smaller arrays often use facts you already know.
Solve each part, then add to find the original total.



Start With the Whole Array

Start with 4 rows of counters.



$$4 \times 6 = ?$$



Choose a Friendly Split

Split the 6 columns into 4 columns and 2 columns.

The array is now 4×4 and 4×2 .



Solve the First Part

First partial product:

$$4 \times 4 = 16$$

Count 4 rows of 4.



Solve the Second Part

Second partial product:

$$4 \times 2 = 8$$

Count 4 rows of 2.



Add the Partial Products

$$4 \times 6 = (4 \times 4) + (4 \times 2)$$

$$24 = 16 + 8$$

The two parts rebuild the whole array.



Try Another Worked Example

Split 7 into 5 and 2.

$$3 \times 7 = (3 \times 5) + (3 \times 2)$$

$$21 = 15 + 6$$



Guided Practice: 2×8

Use a friendly split for 2×8 .

$$1 \times 8 = 5 + 3.$$

What are the two partial products and the total?



Guided Practice: 5×4

Partition 5×4 in a way that helps you.

Can you show $5 \times 2 + 5 \times 2$?



Can Two Splits Both Work?

Two students split 4×5 differently:

$$4 \times 3 + 4 \times 2$$

$$4 \times 4 + 4 \times 1$$

Do both ways give the same total? Explain.



Garden Challenge

A garden has 4 rows of 6 plants.

Partition the array, solve both parts and find the total.



Partitioning Strategy

1. Split one factor into friendly parts.
2. Multiply each smaller array.
3. Add the partial products.
4. Check that every counter is included.

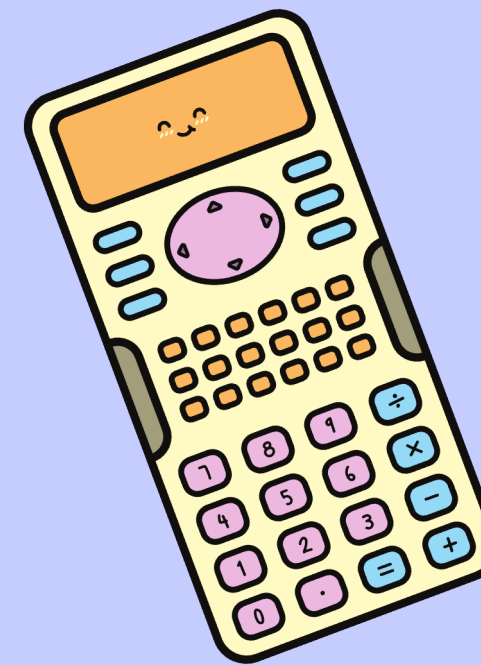
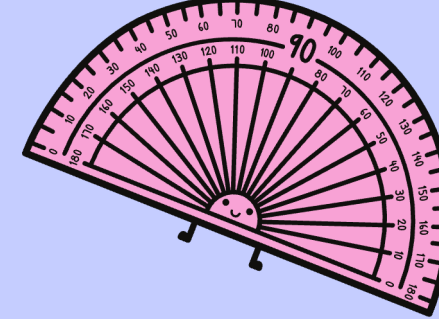
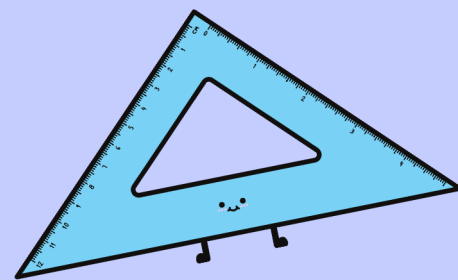
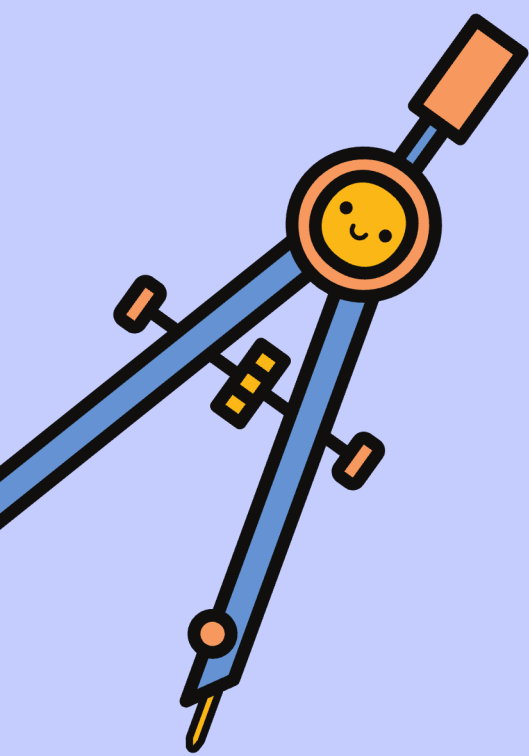


Review

Partitioning does not change the total.

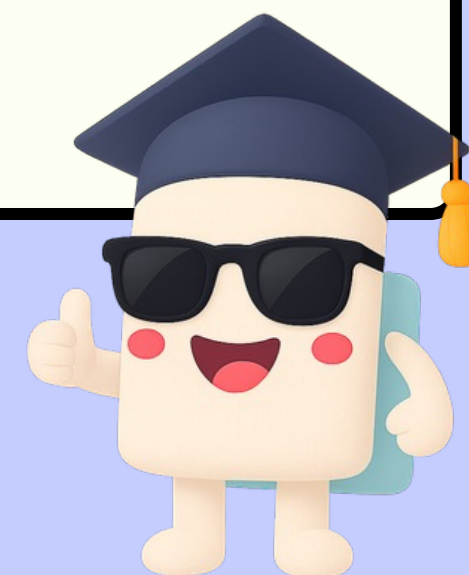
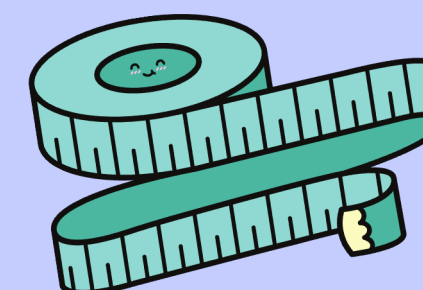
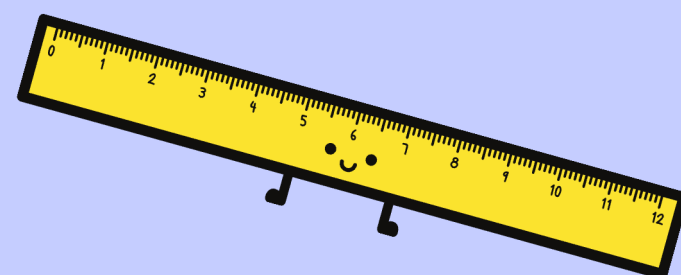
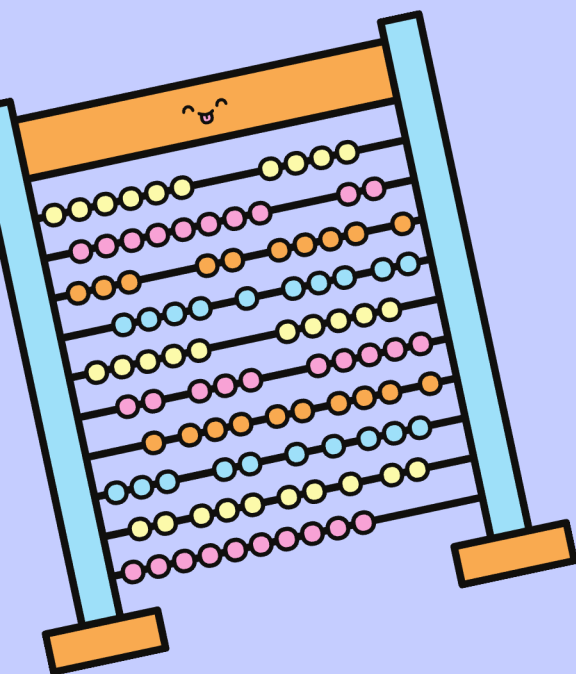
It reorganises one large array into smaller arrays that are easier to solve.





Well Done!

PREVIEW



Multiplication Using Partitioning Quiz



Question 1

Partitioning breaks one larger array into smaller complete arrays.

A. True

B. False



Answer I

Answer: A. True

Every row and column must still be included.



Question 2

When you partition an array, the two parts must cover the whole original array.

A. True

B. False



Answer 2

Answer: A. True

The array must rebuild the whole array.



Question 3

Which split correctly partitions 2×7 ?

A. $2 \times 3 + 2 \times 2$

B. $2 \times 4 + 3 \times 3$

C. $2 \times 6 + 2 \times 2$

D. $7 + 7 + 7$

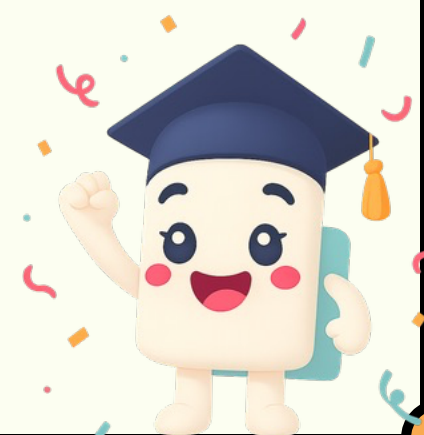


Answer 3

PREVIEW

Answer: A $2 \times 5 + 2 \times 2$

$$10 + 4 = 14$$



Question 4

Which equation is equal to 4×5 ?

A. $4 \times 3 + 4 \times 2$

B. $4 \times 2 + 3 \times 3$

C. $5 \times 5 + 1$

D. $4 + 5$

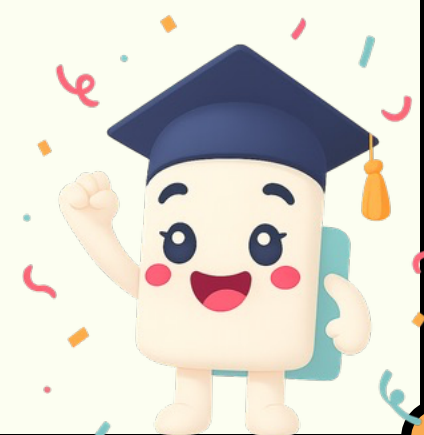


Answer 4

PREVIEW

Answer: A $4 \times 3 + 4 \times 2$

$$12 + 8 = 20$$



Question 5

Use $3 \times 3 = 3 \times 2$ to solve 3×6 .

What is the total?



Answer 5

$$3 \times 4 = 12$$

$$2 \times 3 = 6$$

$$12 + 6 = 18$$



Question 6

Partition 5×4 into two smaller arrays.

Write both facts and the total.



Answer 6

one answer:

$$5 \times 4 = (5 \times 2) + (5 \times 2)$$
$$20 = 10 + 10$$

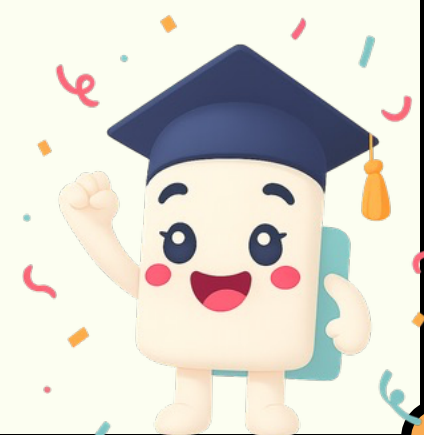

Question 7

PREVIEW

Noah wrote:

$$4 \times \square = 4 \times 4 + 4 \times 1$$

What part is missing?



Answer 7

One column of 4 is missing.

$$4 \times 6 = (4 \times 4) + (4 \times 2)$$

$$24 = 16 + 8$$



Question 8

Three rows hold 7 shells in each row. Split 7 as $5 + 2$. Which total is correct?

A. 15 B. 18 C. 21 D. 24



Answer 8

PREVIEW

Answer C. 21

$$3 \times 5 = 15 \text{ and } 3 \times 2 = 6$$

$$15 + 6 = 21$$



Question 9

Show two different partitions for 4×6 .

PREVIEW



Answer 9

Two possible answers:

$$4 \times 4 + 4 \times 2 = 16 + 8 = 24$$

$$4 \times 3 + 4 \times 3 = 12 + 12 = 24$$



Question 10

How does partitioning help you solve a multiplication problem?

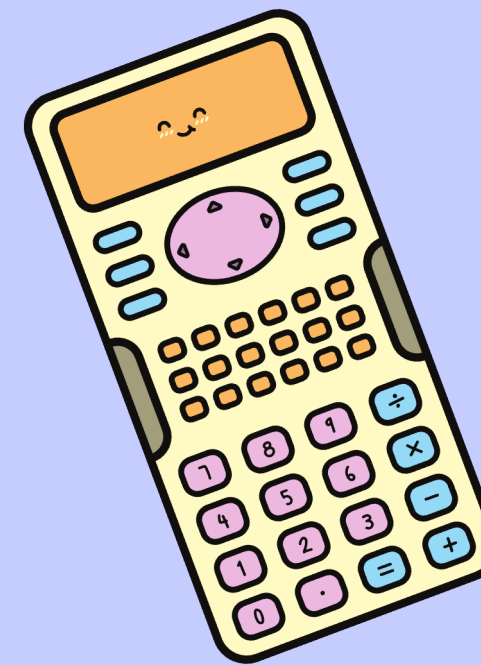
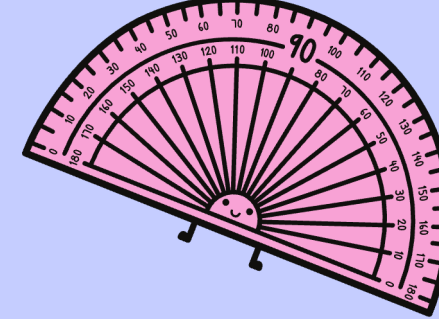
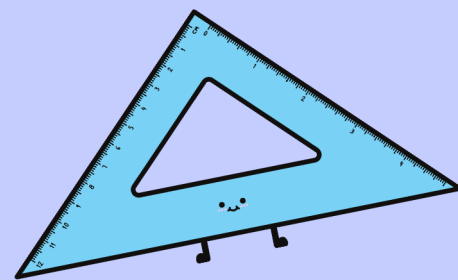
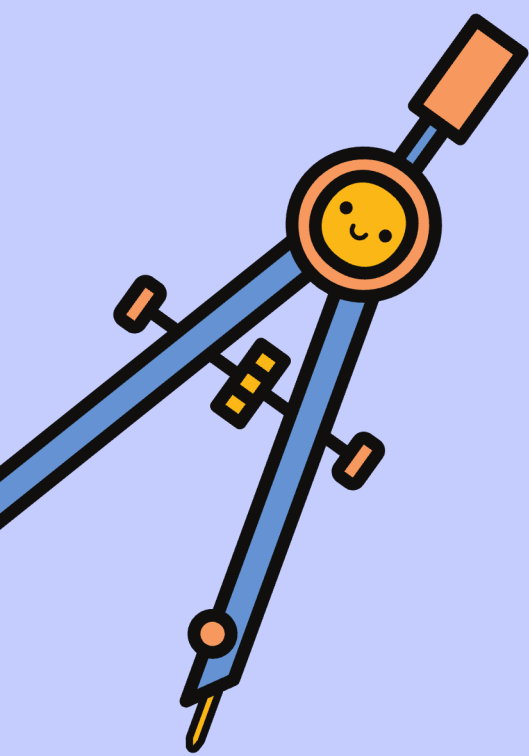
PREVIEW



Answer 10

It breaks a larger number into smaller facts I know.
I solve both parts, then add them to find the total.





Well Done!

PREVIEW

