Arrays and multiplication

Things in neat rows, like window panes, are quick to count. Count one row, count the rows, and multiply.

WORDS TO KNOW

Array: things set out in rows, with the same number in every row.

Row: a line of things going across.

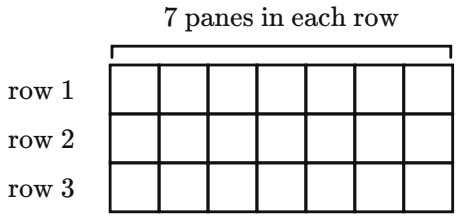
Column: a line of things going up and down.

Product: the answer to a multiplication.

KEY IDEAS

1. Count one row, then count the rows

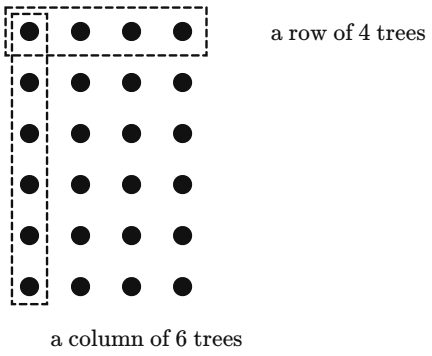
This window has 3 rows. Each row has 7 panes. Every row is the same. So the window is 3 groups of 7, and that is 3 × 7.



> How many in all = rows × how many in each row
>
> In this lesson, the first number counts the rows.

2. Rows go across, columns go up and down

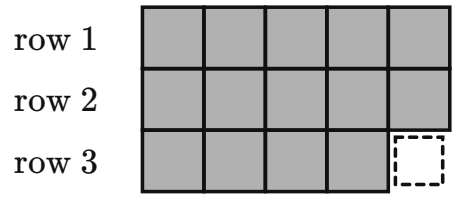
You can count an array by rows or by columns. You get the same answer both ways.



> Count by rows, or count by columns. Same trees, same count.

3. Every row must be the same

These stamps are not an array. The last row is short. Add one stamp, and every row has 5.



> An array has the same number in every row. No row is short.

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WATCH OUT

- **Do not add the two numbers.** Rows plus how many in a row counts nothing. Multiply them.
- **Do not count one thing at a time.** Count one row. Then skip-count, one number for each row.
- **Check that the rows are equal.** If one row is short, it is not an array yet.

WORKED EXAMPLES

> **Example 1. A sheet has 5 rows of stickers. Each row has 5 stickers. How many stickers are there?**
>
> 1. There are 5 rows. Each row is a group of 5.
> 2. Skip-count by fives, one number for each row: 5, 10, 15, 20, 25.
> 3. So 5 × 5 = 25.
>
> **Answer:** 25 stickers. **Check:** 5 + 5 + 5 + 5 + 5 = 25.

> **Example 2. Sam has 10 apples. Find every array he can make.**
>
> 1. Rows of 1: 10 rows, since 10 × 1 = 10.
> 2. Rows of 2: 5 rows, since 5 × 2 = 10.
> 3. Rows of 3 do not work: 3, 6, 9, 12 skips 10.
> 4. Rows of 4 do not work: 4, 8, 12 skips 10.
> 5. Rows of 5: 2 rows, since 2 × 5 = 10.
> 6. Rows of 6, 7, 8 or 9 do not work. One row is too few. Two rows are too many.
> 7. Rows of 10: 1 row, since 1 × 10 = 10.
>
> **Answer:** 10 rows of 1, 5 rows of 2, 2 rows of 5, and 1 row of 10.

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