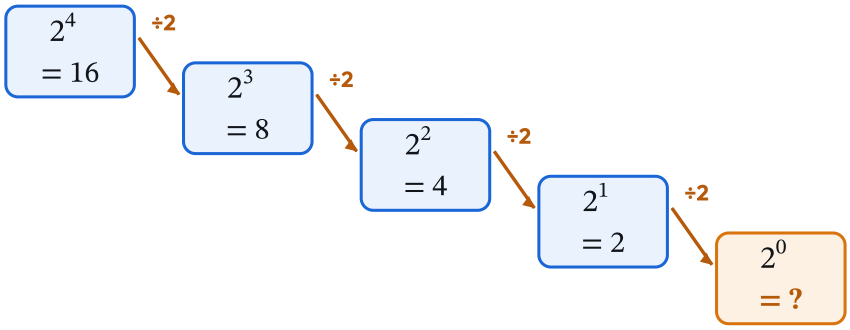
Names (pair) _____ Date _____

Powers with Exponent Zero

Example



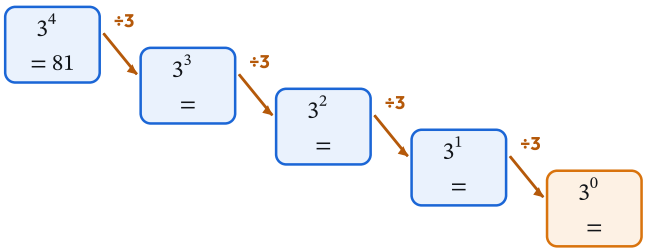
Each step down divides by 2: $16 \to 8 \to 4 \to 2$. From the step $2^1 = 2$ we go down once more, again dividing by 2:

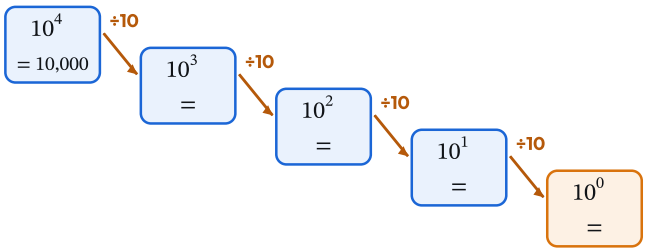
$2^0 = 2 \div 2 = 1$

Remember

For every number $a \neq 0$, $a^0 = 1$. This is an **agreement**, but not a random one: only with $a^0 = 1$ does the staircase continue by the same rule, and does $a^m \div a^n = a^{m-n}$ also work when $m = n$ (because $a^n \div a^n = 1$). We do not use 0^0.

1 ON YOUR OWN Complete the staircases. Each step down divides by the same number.





2 ON YOUR OWN Work out.

$7^0 =$ ☐ $\quad 1^0 =$ ☐ $\quad 100^0 =$ ☐

$\left(\frac{1}{2}\right)^0 =$ ☐ $\quad 2^0 + 3^0 =$ ☐ $\quad 5^0 \times 5^3 =$ ☐

Names (group) _____ Date _____

3 IN A GROUP **Three explanations.** Read how three students explain that $2^0 = 1$. Which one convinces you most? Why?

Ana

"On the staircase $16, 8, 4, 2$ we divide by 2 each time. The next step is $2 \div 2 = 1$."

Ivan

"$2^3 \div 2^3 = 1$, because any number divided by itself is 1. By the rule it is $2^{3-3} = 2^0$."

Mia

"I start from 1 and multiply by 2 as many times as the raised number says. If it says 0, I do not multiply at all, so 1 is left."

_____

_____

4 IN PAIRS True or false? Correct the false statements.

a) $4^0 = 0$ **true** / **false**

Correction: _____

b) $10^0 = 10$**, because it is** 1 **with no zeros.** **true** / **false**

Correction: _____

c) $0^5 = 0$ **true** / **false**

Correction: _____

d) $2^0 \times 2^5 = 2^5$ **true** / **false**

Correction: _____

The Powers app · otooly.com/powers

Staircase mode with **Fill in**: type the values of the steps all the way to 2^0. In **Starting from 1** mode, see what it says when there are no steps.

★ ON YOUR OWN **Exit card.** $6^0 =$ ☐ $0^6 =$ ☐ Why are the answers different?

☐