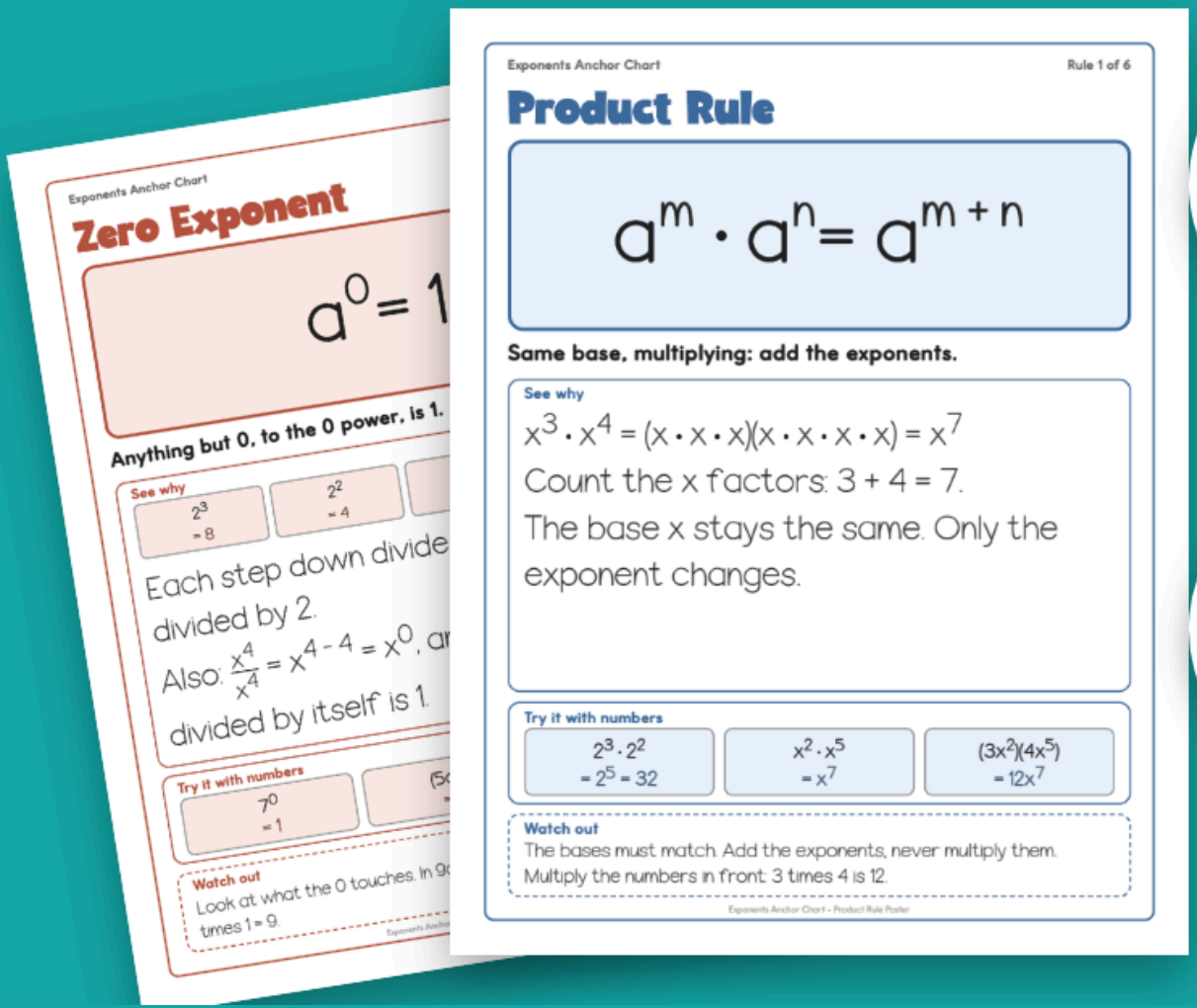
EXPONENTS ANCHOR CHART

GRADES 6-8 POSTERS + NOTES



27 PAGES

ANSWER KEY

Bright Path Sped

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Print at 100 percent

Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart. The ink saver posters use a white background and a thin outline, so they print light on any printer. Every student page is black and white inside a colored border.

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PREVIEW

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What Is an Exponent?

5^3

5 is the base

3 is the exponent

5^3 is a power

The exponent tells how many times to use the base as a factor.

See why

$5^3 = 5 \cdot 5 \cdot 5 = 125$

$2^4 = 2 \cdot 2 \cdot 2 \cdot 2 = 16$

$x^4 = x \cdot x \cdot x \cdot x$

Try it with numbers

10^2 $= 10 \cdot 10 = 100$	3^3 $= 3 \cdot 3 \cdot 3 = 27$	2^5 $= 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$

Watch out

5^3 does not mean 5 times 3. It means 5 times 5 times 5, which is 125, not 15.

PREVIEW

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Quotient Rule

$$\frac{a^m}{a^n} = a^{m-n}$$

Same base, dividing: subtract the exponents, top minus bottom.

See why

$$\frac{x^7}{x^3} = \frac{x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}{x \cdot x \cdot x} = x^4$$

Three x factors cancel: 7 - 3 = 4.

The base x stays the same. Subtract the exponents.

Try it with numbers

$\frac{5^6}{5^4}$ $= 5^2 = 25$	$\frac{y^8}{y^3}$ $= y^5$	$\frac{12x^8}{4x^3}$ $= 3x^5$

Watch out

Top minus bottom. Divide the numbers in front, never subtract them: 12 divided by 4 is 3.

PREVIEW

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Zero Exponent

$$a^0 = 1$$

Anything but 0, to the 0 power, is 1.

See why

2^3	2^2	2^1	2^0
$= 8$	$= 4$	$= 2$	$= 1$

Each step down divides by 2, so 2^0 is 2 divided by 2.

Also: $\frac{x^4}{x^4} = x^{4-4} = x^0$, and anything divided by itself is 1.

Try it with numbers

7^0	$(5a)^0$	$9a^0$
$= 1$	$= 1$	$= 9$

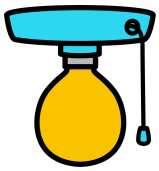
Watch out

Look at what the 0 touches. In $9a^0$ only the a has the 0, so $9a^0 = 9$ times $1 = 9$.

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My name _____ Date _____



My Exponents Anchor Chart

Read each rule. Write it in your own words. Try it.

This is your own exponents anchor chart. Keep it next to you.

1. Parts of a Power

$a^n = a \cdot a \cdot \ldots \cdot a$

In my own words

$3^3 =$

2. Product Rule

$a^m \cdot a^n = a^{m+n}$

In my own words

$x^2 \cdot x^5 =$

3. Quotient Rule

$\frac{a^m}{a^n} = a^{m-n}$

In my own words

$\frac{y^8}{y^3} =$

4. Power of a Power

$(a^m)^n = a^{m \cdot n}$

In my own words

$(m^3)^3 =$

5. Zero Exponent

$a^0 = 1$

In my own words

$(5a)^0 =$

6. Negative Exponent

$a^{-n} = \frac{1}{a^n}$

In my own words

$a^{-2} =$

PREVIEW

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My name _____ Date _____

Exponents Anchor Chart Notebook Page 1

Fill in each half sheet. Tape it in your notebook.

1. Parts of a Power

5^3 = 5 times 5 times 5

Example $10^2 = 10 \cdot 10 = 100$

In my own words

Try it $4^2 =$ ☐

2. Product Rule

$a^m \cdot a^n = a^{m+n}$

Example $2^3 \cdot 2^2 = 2^5 = 32$

In my own words

Try it $a^4 \cdot a^3 =$ ☐

PREVIEW

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My name _____ Date _____

Exponents Anchor Chart Notebook Page 3

Fill in each half sheet. Tape it in your notebook.

5. Zero Exponent

$a^0 = 1$

Example $7^0 = 1$

In my own words

Try it $9^0 =$ ☐

6. Negative Exponent

$a^{-n} = \frac{1}{a^n}$

Example $3^{-2} = \frac{1}{9}$

In my own words

Try it $4^{-1} =$ ☐

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My name _____ Date _____

Exponents Anchor Chart Practice B

Simplify. Show your steps.

Zero and negative exponents, then two rules in one problem. Check each step.

1 $6x^0$

Answer

2 x^{-4}

Answer

3 3^{-2}

Answer

4 $a^5 \cdot a^{-8}$

Answer

5 $(x^2)^3 \cdot x^4$

Answer

6 $(2x^3)^2 \cdot x$

Answer

PREVIEW

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Product Rule

$$a^m \cdot a^n = a^{m+n}$$

Same base, multiplying: add the exponents.

See why

$x^3 \cdot x^4 = (x \cdot x \cdot x)(x \cdot x \cdot x \cdot x) = x^7$

Count the x factors: 3 + 4 = 7.

The base x stays the same. Only the exponent changes.

Try it with numbers

$2^3 \cdot 2^2$ $= 2^5 = 32$	$x^2 \cdot x^5$ $= x^7$	$(3x^2)(4x^5)$ $= 12x^7$

Watch out

The bases must match. Add the exponents, never multiply them.

Multiply the numbers in front: 3 times 4 is 12.

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Power of a Power

$$(a^m)^n = a^{m \cdot n}$$

A power to a power: multiply the exponents.

See why

$(x^2)^3 = x^2 \cdot x^2 \cdot x^2 = x^6$

Three groups of 2 x factors: 2 times 3 = 6.

The base x stays the same. Multiply the exponents.

Try it with numbers

$(2^3)^2$ $= 2^6 = 64$	$(m^3)^3$ $= m^9$	$(2x^3)^2$ $= 4x^6$

Watch out

Multiply the exponents here, never add. The outside exponent reaches every factor in the parentheses, numbers too: 2 squared is 4.

PREVIEW

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Negative Exponent

$$a^{-n} = \frac{1}{a^n}$$

A negative exponent means flip to the other side of the fraction bar. The exponent turns positive.

See why

$2^1 = 2$	$2^0 = 1$	$2^{-1} = \frac{1}{2}$	$2^{-2} = \frac{1}{4}$	$2^{-3} = \frac{1}{8}$

Keep dividing by 2 as the exponent goes down.

So $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$. Flip it to the bottom.

Try it with numbers

$3^{-2} = \frac{1}{9}$	$x^{-3} = \frac{1}{x^3}$	$5a^{-2} = \frac{5}{a^2}$

Watch out

A negative exponent does not make the answer negative: 2^{-3} is 1/8, not -8. Only the base it touches flips: in $5a^{-2}$ the 5 stays on top.

PREVIEW

Class Tracker and Grid

Every student on one grid: items right on each scored page. 24 items on 6 pages.

Class or group _____ Teacher _____ Month _____

Student	Chart (of 6)	Notebook 1 (of 2)	Notebook 2 (of 2)	Notebook 3 (of 2)	Practice A (of 6)	Practice B (of 6)	Total (of 24)

PREVIEW

How to use this grid

One row per student. After a scored page, write the number right out of the items in its column; blank means not tried yet, never wrong. The total is the sum of the row. The pages are the fill-in chart (page 10), the notebook half-sheets (pages 11 to 13) and practice (pages 14 and 15); the keys are on page 22.

Who needs the posters again?

A low number in the chart column means that student needs the posters (pages 4 to 9) next to them. A low number on Practice B is a reason to look at the zero and negative posters (pages 8 and 9) first.

This month we are working on (your own standard or wording)

Exponents at Home

Dear family, this week we are using an exponents anchor chart in math. These questions are for talking, not for a grade. Short answers are fine.

Student _____ Week of _____

Three things to talk about

- Ask your student what 2 to the 3rd power means (2 times 2 times 2, which is 8) and what 10 to the 2nd power is (100).
- Ask what happens to the exponents when you multiply two powers of the same base. (They add.)
- Ask what any number to the 0 power equals. (1, as long as the number is not 0.)

My words from home

A power I can write _____

A rule I used this week _____

An answer I checked _____

Words that may come up

Base: the number or letter being multiplied. **Exponent:** how many times the base is a factor. **Power:** a base with an exponent. **Simplify:** write it in the shortest form, with positive exponents.

Note from the teacher

Note from home

PREVIEW