

# Practice with Rational Bases

Let's practice with exponents.

## 6.1 Which Three Go Together: Exponents

Which three go together? Why do they go together?

A

$$\frac{2^8}{2^5}$$

B

$$(4^{-5})^8$$

C

$$\left(\frac{3}{4}\right)^{-5} \cdot \left(\frac{3}{4}\right)^8$$

D

$$\frac{10^{-8}}{5^5}$$

## 6.2 Exponent Rule Practice

For each expression, write at least 3 different equivalent expressions.

1.  $(6^2)^4$

2.  $\frac{4^5}{4^{-8}}$

3.  $3^{-12}$

## 6.3 Inconsistent Bases

Mark each equation as true or false. What could you change about the false equations to make them true?

1.  $\left(\frac{1}{3}\right)^2 \cdot \left(\frac{1}{3}\right)^4 = \left(\frac{1}{3}\right)^6$

2.  $5^4 + 5^5 = 5^9$

3.  $\left(\frac{1}{2}\right)^4 \cdot 10^3 = 5^7$

4.  $3^2 \cdot 5^2 = 15^2$



## Are you ready for more?

Solve this equation:  $3^{x-5} = 9^{x+4}$ . Explain or show your reasoning.

## Lesson 6 Summary

We can keep track of repeated factors using exponent rules. These exponent rules work with other bases in exactly the same way as they did with a base of 10. For example,

$$\begin{aligned}7^5 \cdot 7^3 &= 7^{5+3} \\ (2^4)^3 &= 2^{4 \cdot 3} \\ \frac{\left(\frac{1}{3}\right)^4}{\left(\frac{1}{3}\right)^2} &= \left(\frac{1}{3}\right)^{4-2}\end{aligned}$$

The exponent rules also work with negative exponents. For example, to write  $5^{-6}$  with a single positive exponent, we can write  $\frac{1}{5^6}$ .

These rules do not work when the bases are not the same. For example  $\frac{6^5}{3^2} \neq 2^3$ . We can check this by expanding the factors:  $\frac{6^5}{3^2} = \frac{6 \cdot 6 \cdot 6 \cdot 6 \cdot 6}{3 \cdot 3}$ , which is not equal to 3 factors that are 2.