

Pitfalls
Teacher Notes

Implementation Guidelines:

- 1) Review the purpose of the activity and the math words.
 - 2) Give students the Starter Problem. Give them time to work on it individually.
 - 3) Discuss the OK solution.
Why did the student tell us that " 9^5 is equal to 59,049"?
How did the student determine that 3^3 is equal to 27?
Why did the student do " $9 \cdot 27 = 243$ "?
 - 4) Discuss the Pitfall
What did the student mean by "you add exponents in order to combine them"?
 - 5) Things to Remember
What should we remember so we don't make this pitfall?
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Purpose: To simplify expressions with multiple exponents.

Math words: Exponent Tells how many times a number or variable is used as a factor (AIMS)

- Starter Problem

Is the following statement true or false? Explain your reasoning.

$$3^2 \cdot 3^3 = 9^5$$

Student #1: OK

The statement is false because 3^2 is equal to 9, 3^3 is equal to 27, and $9 \cdot 27 = 243$, but 9^5 is equal to 59,049 -- so the statement must be false.

Student #2: Pitfall

The statement is true because $3 \cdot 3 = 9$, and $2 + 3 = 5$, and we know that you add exponents in order to combine them, so $3^2 \cdot 3^3$ is equal to 9^5 , so the statement is true.

Name _____ Date _____ Teacher _____

Working with Exponents!

• Starter Problem

Is the following statement true or false? Explain your reasoning.

$$3^2 \cdot 3^3 = 9^5$$

Student #1:

OK

The statement is false because 3^2 is equal to 9, 3^3 is equal to 27, and $9 \cdot 27 = 243$, but 9^5 is equal to 59,049 -- so the statement must be false.

Student #2:

Pitfall

The statement is true because $3 \cdot 3 = 9$, and $2 + 3 = 5$, and we know that you add exponents in order to combine them, so $3^2 \cdot 3^3$ is equal to 9^5 , so the statement is true.

Name _____ Date _____ Teacher _____

Working with Exponents!

• Starter Problem

Find x in the equation below. Explain your reasoning.

$$a^2 \cdot a^5 = a^x$$

Student #1:

OK

In the equation $a^2 \cdot a^5 = a^x$, x is equal to 7, because a^2 is equal to $a \cdot a$,
and a^5 is equal to $a \cdot a \cdot a \cdot a \cdot a$,
so $a^2 \cdot a^5 = a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a = a^7$.

Student #2:

Pitfall

In the equation $a^2 \cdot a^5 = a^x$, x is equal to 10, because
I can factor out an a ,
so $a^2 \cdot a^5 = a^{(2 \cdot 5)} = a^{10}$.

Name _____ Date _____ Teacher _____

Working with Exponents!

• Starter Problem

Is the following statement true or false? Explain your reasoning.

$$\frac{b^8}{b^2} = b^4$$

Student #1:

OK

The statement is false because

b^8 is equal to $b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b$ and

b^2 is equal to $b \cdot b$,

so if I rewrite the fraction as

$$\frac{b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b}{b \cdot b}$$

I can simplify by canceling two factors of b from the numerator and denominator, and I'm left with

$$\frac{b \cdot b \cdot b \cdot b \cdot b \cdot b}{1}$$

which equals b^6 not b^4 -- so the statement is false.

Student #2:

Pitfall

The statement is true because 8 divided by 2 is four.

Name _____ Date _____ Teacher _____

Working with Exponents!

• Starter Problem

Is the following statement true or false? Explain your reasoning.

$$(a^2)^4 = a^6$$

Student #1:

OK

*The statement is false because $(a^2)^4$ is equal to $(a^2) \cdot (a^2) \cdot (a^2) \cdot (a^2)$, and that equals $a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a$ which equals a^8 , not a^6
-- so the statement must be false.*

Student #2:

Pitfall

The statement is true because when you multiply, you add exponents, and 2 plus 4 is six, so $(a^2)^4$ equals a^6 .