

## MBF 3C Quiz: The Exponent Laws

Expectation

Through this assessment, you will have another opportunity to demonstrate your ability to ...

demonstrate an understanding of exponents

Did you?

1. True OR False? **Correct** each false statement in the space provided below each statement.

- a. T The *base* in the power  $(-3)^4$  is  $(-3)$ .
- b. F When multiplying powers of the same base (E.g.,  $2^3 \times 2^4$ ), multiply the exponents. ADD
- c. T The power  $\left(\frac{1}{2}\right)^3$  means  $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$ .
- d. T When dividing powers of the same base (E.g.,  $2^4 \div 2^3$ ), *subtract* the exponents.
- e. F When a power is raised to an exponent—E.g.,  $(2^3)^4$ —add the exponents. multiply

2. Simplify by writing as a single power (E.g.,  $2^2 \times 2^4 = 2^6$ )

a.  $10^2 \times 10^4 = 10^{2+4} = 10^6$  ✓

b.  $(2^3)^2 = 2^{3 \times 2} = 2^6$  ✓

c.  $\frac{7^{23}}{7^{21}} = 7^{23-21} = 7^2$  ✓

3. Simplify by writing as a single power.

a.  $\left(\frac{3^4}{3^2}\right)^2 = \left(3^{4-2}\right)^2 = (3^2)^2 = 3^4$  ✓

b.  $\frac{5^7 \times 5^4}{5^6 \times 5^2} = \frac{5^{7+4}}{5^{6+2}} = \frac{5^{11}}{5^8} = 5^{11-8} = 5^3$  ✓

4. Read the *Example* and *Solution* that follow.**Example**

The table shows the first 10 powers of 2.

$2^1$	$2^2$	$2^3$	$2^4$	$2^5$	$2^6$	$2^7$	$2^8$	$2^9$	$2^{10}$
2	4	8	16	32	64	128	256	512	1024

Use the table to evaluate  $32 \times 16$  without multiplying or dividing.**Solution**

$$\begin{aligned} 32 \times 16 &= 2^5 \times 2^4 \\ &= 2^9 \\ &= 512 \end{aligned}$$

Use the table to represent each number as a power of 2.

Use the exponent rules to simplify the expression.

Use the table to evaluate the power.

- Use the table below.
- Evaluate each expression WITHOUT multiplying or dividing. Show two lines in each of your solutions.
- Consider the *Example* and *Solution* that you read on the first page for guidance.

$3^1$	$3^2$	$3^3$	$3^4$	$3^5$	$3^6$
3	9	27	81	243	729

a.  $3^2 \times 3^3 = 3^{2+3}$   
 $= 3^5$  ✓  
 $= 243$  ✓

b.  $\frac{729}{81} = \frac{3^6}{3^4}$  ✓  
 $= 3^{6-4}$   
 $= 3^2$  ✓  
 $= 9$  ✓

c.  $(3^2)^3 = 3^{2 \times 3}$   
 $= 3^6$  ✓  
 $= 729$  ✓

5. Create AND and simplify your own expression that involves the use of **each of the exponents laws**.

ANSWERS WILL VARY.

- ① ZERO RULE\* E.g.,
- ② DIVISION RULE
- ③ POWER OF A POWER
- ④ NEGATIVE EXPONENT

$$\left[ \frac{2^6 \times 2^0}{2^4} \right]^{-1}$$

$$= \left[ \frac{2^6 \times 1}{2^4} \right]^{-1}$$

$$= \left[ \frac{2^6}{2^4} \right]^{-1}$$

$$= \left[ 2^{6-4} \right]^{-1}$$

$$= \left[ 2^2 \right]^{-1}$$

$$= \left( 2^{2 \times 3} \right)^{-1}$$

$$= (2^6)^{-1}$$

$$= \frac{1}{2^6}$$

\* MULTIPLICATION RULE COULD ALSO HAVE BEEN USED IN STEP ①.

Assessment:

KU	#1 & #2	Demonstrates an understanding of the basic principles of the exponent laws	Still learning...	Almost there ☺	Got It!
KU	#3	Applies understanding to simplifying expressions effectively	Still learning...	Almost there ☺	Got It!
T/PS	#4	Identifies everything that's important to solving the problem	Still learning...	Almost there ☺	Got It!
T/PS	#5	-Shows a complete solution process -Identifies everything that's important to solving the problem -Shows full understanding of how important parts of the problem relate to one another	Still learning...	Almost there ☺	Got It!

Reflection: If you chose "Still learning..." and/or "Almost there ☺", please describe your choice and what you will do/need to deepen your learning.