October 15, 2018

Section 2.4

Exponent Laws I

Write each expression as a product [Repeated multiplication] and then evaluate:

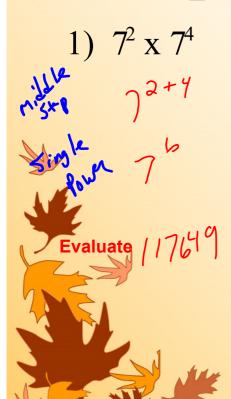|	Product[repeated multiplication]	Evaluate	Single Power
1) $3^2 \times 3^2$	$3 \times 3 \times 3 \times 3$	81	3^4
2) $2^2 \times 2^5$	$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$	128	2^7
3) $(-5)^2 \times (-5)^4$	$(-5)(-5)(-5)(-5)(-5)(-5)$	15625	$(-5)^6$

Do you notice anything???

Exponent Law for a Product of Powers

To multiply powers with the same base, add the exponents.

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

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

SORRY IT'S THE LAW

✳✳✳ must be the same base ✳✳✳

single power } one base one exponent!

middle step

$$8^4 \times 8^3 = 8^{4+3}$$

$\boxed{8^7}$ single power

IT'S THE LAW

1. Write as a single power.
2. Evaluate

1) $7^2 \times 7^4$ 2) $(-2)^5 \times (-2)^3$ 3) $4^5 \times 4^1$

middle step

7^{2+4}

single power

7^6

Evaluate 117649

$(-2)^{5+3}$

$(-2)^8$

256

4^{5+1}

4^6

4096

Write as a repeated multiplication

	Repeated Multiplication	Evaluate	Single Power

1) $\dfrac{2^6}{2^2}$ $\dfrac{2 \times 2 \times 2 \times 2 \times 2 \times 2}{2 \times 2}$ 16 2^4

2) $\dfrac{7^6}{7^4}$ $\dfrac{7 \times 7 \times 7 \times 7 \times 7 \times 7}{7 \times 7 \times 7 \times 7}$ 49 7^2

$\dfrac{(-5)^7}{(-5)^3}$ $\dfrac{(-5)(-5)(-5)(-5)(-5)(-5)(-5)}{(-5)(-5)(-5)}$ 625 $(-5)^4$

$\dfrac{(2)^3}{(2)^3}$ $\dfrac{2 \times 2 \times 2}{2 \times 2 \times 2}$ 1 2^0

Exponent Law for a Quotient of Powers

[dividing]

To divide powers with the same base, subtract the exponents.

$$a^m \div a^n = a^{m-n} \quad \left\} \quad \frac{a^m}{a^n} = a^{m-n} \right.$$

✳✳ The base must be the same! ✳✳

Middle step   single

power

a) $(-2)^6 \div (-2)^5$ $(-2)^{6-5}$ $(-2)^1$

(-2)

Express as a **single power** then **evaluate**

a) $\dfrac{5^8}{5^2} =$ 5^{8-2} middle step

Single power

$\boxed{5^6}$

Evaluate $= 15625$

b) $\dfrac{(-2)^3}{(-2)^0} = (-2)^{3-0}$

$(-2)^3$

-8

c) $8^7 \div 8^4 = 8^{7-4}$

$\boxed{8^3}$ 512

Express as a single power.

a) $3^2 \times 3^4 \div 3^3 =$

Middle Step 3^{2+4-3}

3^3

b) $(-4)^8 \div (-4)^3 \times (-4)^2$ $(-4)^{8-3+2}$

$(-4)^7$

-16384

Express as a single power:

1. $3^4 \times 3^6 \div 3^2$

3^{4+6-2}

3^8

2. $\dfrac{3^8 \times 3^9 \times 3^1}{3^4 \times 3^2}$

$\dfrac{3^{8+9+1}}{3^{4+2}}$

$\dfrac{3^{18}}{3^6} = 3^{12}$

PAGE 76-77   [Page 476 Answers]

Questions 4, 5, 7,8

#4.

a) $5^5 \times 5^4$

5^{5+4}

5^9

#5.a) $4^5 \div 4^3$ Ques

4^{5-3} Middle Step

4^2 Single Power

#7, #8. a) $3^4 \times 3^9 \div 3^{11}$

3^{4+9-11}