TOPIC: EVALUATING EXPONENTS

Intro to Exponents

◆ When a number is multiplied by itself _____, it can be written using exponents.

► The **base** is the number being _____ & the **exponent/power** is how many _____ the base is multiplied.

New **Exponent Notation**

$\underbrace{8 \cdot 8 \cdot 8 \cdot 8}_{\text{__ multiplied __ times}} =$ *"___ to the ____ power"*

$\underbrace{b \cdot b \cdot b \cdot \ldots \cdot b}_{\text{__ multiplied __ times}} =$ *"___ to the ____ power"*

(General Exponent Notation)

EXAMPLE Find the value of each exponential expression by rewriting as a product.

(A) 7^2 *"7 _____"*

(B) 10^3 *"10 _____"*

(C) 2^5

◆ A number with *NO* exponent implies an exponent of ___, $b = b^{\text{—}}$.

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PRACTICE Rewrite each product as an exponential expression.

(A) $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$

(B) $\left(\frac{2}{9}\right) \times \left(\frac{2}{9}\right) \times \left(\frac{2}{9}\right) \times \left(\frac{2}{9}\right) \times \left(\frac{2}{9}\right)$

PRACTICE Evaluate the following.

(A) 13^1

(B) 7^3

(C) 2^8

EXAMPLE Evaluate the following.

(A) $\left(\frac{1}{3}\right)^4$

(B) $\left(\frac{7}{4}\right)^3$

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EXAMPLE Write as an expression containing exponents.

$(1.3)(1.3)(1.3)$

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Exponential Expressions with Negative Bases

◆ Recall: Exponents are used to represent repeated multiplication. Ex. $2^4 = 2 \cdot 2 \cdot 2 \cdot 2 = 16$

► Negative numbers raised to an *even* power are _____ and negative numbers raised to an *odd* power are _____.

EXAMPLE Find the value of each exponential expression by rewriting as a product.

$(\boldsymbol{A})$ $(-2)^4$

$(\boldsymbol{B})$ $(-3)^3$

$(\boldsymbol{C})$ -5^2

◆ Note: $-a^n$ means ___ $(a \cdot a \cdot a \cdot \ldots \cdot a)$; it does NOT mean $-a \cdot -a \cdot -a \cdot \ldots \cdot -a$.

PRACTICE Evaluate the following expression.

$(\boldsymbol{A})$ $(-4)^4$

$(\boldsymbol{B})$ $(-11)^3$

$(\boldsymbol{C})$ -2^2

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PRACTICE Evaluate the following fractional or decimal expression.

(***A***) $\left(-\frac{1}{2}\right)^5$

(***B***) $(-0.6)^2$

EXAMPLE Rewrite each product as an exponential expression and indicate whether the sign of the product would be negative or positive.

(***A***) $(-7) \cdot (-7) \cdot (-7) \cdot (-7) \cdot (-7)$

[POSITIVE | NEGATIVE]

(***B***) $(-10) \times (-10) \times (-10) \times (-10)$

[POSITIVE | NEGATIVE]