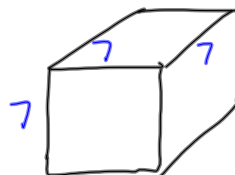


Sec. 8.1 Laws of Exponents: Multiplying Monomials

Exponents

$$x^m = \underbrace{x \cdot x \cdot x \cdots x}_{m \text{ factors}}$$

base \swarrow x^m \searrow exponent



Evaluate.

a. $4^3 = \underline{4 \cdot 4 \cdot 4} = 16 \cdot 4 = \underline{64}$

b. $7^2 = \underline{7 \cdot 7} = \underline{49}$

c. $5^1 = 5$

d. $2^4 = (2 \cdot 2)(2 \cdot 2) = 4 \cdot 2 \cdot 2 = 8 \cdot 2 = 16$
 $4 \cdot 4 = 16$

Product of Powers

Try: $x^5 \cdot x^2 = x^{5+2} = x^7$

$$x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x$$

$$x^7$$

Rule: $\underbrace{x^m \cdot x^n}_{\text{same base}} = x^{m+n}$

If: multiply \rightarrow then add exponents

Simplify

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

$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

b. $6^2 \cdot 6^1 = 6^3 = 216$

c. $j^3 \cdot j^4 = j^{3+4} = j^7$

d. $7^a \cdot 7^b = 7^{a+b}$

How could we solve (two ways)

a. $2^x \cdot 2^3 = 2^7$?

$$\frac{300}{10} = 30 \quad 2^{x+3} = 2^7$$

$$\frac{30 \cdot \cancel{10}}{\cancel{10}} = 30 \quad \begin{array}{r} x+3 = 7 \\ -3 \quad -3 \\ \hline x = 4 \end{array}$$

$$\frac{2^x \cdot \cancel{8}}{\cancel{8}} = \frac{128}{8}$$

$$2^x = 16$$

$$2^4 = 16$$

$$x = 4$$

b. $2^x \cdot 2^4 = 2^6$

$$\underline{2^{x+4}} = \underline{2^6}$$

$$\begin{array}{r} x+4 = 6 \\ -4 \quad -4 \\ \hline x = 2 \end{array}$$

Simplify.

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(19 - 47) odd

$$\begin{aligned} \text{a. } & (-2c^2)(3c^3) \\ & -2 \cdot c^2 \cdot 3 \cdot c^3 \\ & (-2 \cdot 3)(c^2 \cdot c^3) \\ & -6c^5 \end{aligned}$$