

**DIVIDING POWERS WITH THE SAME BASE** Simplify the expression. Write your answer as a power. (See Example 1.)

12.  $\frac{8^9}{8^7}$

$8^2$

▶ 13.  $\frac{6^{10}}{6^4}$

$6^6$

14.  $\frac{3^4}{3^1}$

$3^3$

15.  $\frac{4^5}{4^3}$

$4^2$

16.  $\frac{64^4}{64^3}$

$64^1$

17.  $\frac{17^5}{17^2}$

$17^3$

18.  $\frac{72^8}{72^6}$

$72^2$

19.  $\frac{29^{11}}{29^7}$

$29^4$

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20. **YOU BE THE TEACHER** Your friend simplifies the quotient. Is your friend correct? Explain your reasoning.

no they divided the exponents

should subtract

$6^{10}$

$$\frac{6^{15}}{6^5} = 6^{15/5} = 6^3$$

**SIMPLIFYING AN EXPRESSION** Simplify the expression. Write your answer as a power. (See Example 2.)

▶ 21.  $\frac{6^{13}}{6^4 \cdot 6^2}$

$\frac{6^{13}}{6^6} = 6^7$

22.  $\frac{7^5 \cdot 7^3}{7^2}$

$\frac{7^8}{7^2} = 7^6$

23.  $\frac{8^{11}}{8^7 \cdot 8^2}$

$\frac{8^{11}}{8^9} = 8^2$

24.  $\frac{9^{30}}{9^{18} \cdot 9^4}$

$\frac{9^{30}}{9^{22}} = 9^8$

25.  $\frac{5^{22}}{5^8 \cdot 5^9}$

$\frac{5^{22}}{5^{17}} = 5^5$

26.  $\frac{11^8 \cdot 11^6}{11^8}$

$\frac{11^{14}}{11^8} = 11^6$



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27. **MODELING REAL LIFE** The sound intensity of a normal conversation is  $10^6$  times greater than the quietest noise a person can hear. The sound intensity of a jet at takeoff is  $10^{14}$  times greater than the quietest noise a person can hear. How many times more intense is the sound of a jet at takeoff than the sound of a normal conversation?

$$\frac{10^{14}}{10^6} = 10^8$$



**SIMPLIFYING AN EXPRESSION** Simplify the expression. Write your answer as a power.  
(See Example 3.)

28.  $\frac{4^8 \cdot 4^3}{4^4 \cdot 4^2}$

$$\frac{4^{11}}{4^6} = 4^5$$

29.  $\frac{3^2 \cdot 3^6 \cdot 3^5}{3^2 \cdot 3}$

$$\frac{3^8 \cdot 3^5}{3^3} = 3^6 \cdot 3^4 = 3^{10}$$

30.  $\frac{6^2 \cdot 6^{12}}{6^1 \cdot 6^8}$

$$6^1 \cdot 6^4 = 6^5$$

31.  $\frac{7^7 \cdot 7^6}{7^1 \cdot 7^2}$

$$\frac{7^{13}}{7^3} = 7^{10}$$

32.  $\frac{8^5 \cdot 8^{13}}{8^4 \cdot 8^9}$

$$8^1 \cdot 8^5 = 8^6$$

33.  $\frac{9^8 \cdot 9^2 \cdot 9^4 \cdot 9^7}{9^7 \cdot 9^1 \cdot 9^2}$

$$\frac{9^{10} \cdot 9^4 \cdot 9^7}{9^3 \cdot 9^3 \cdot 9^5} = 9^{11}$$

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34. **PATTERNS** The storage capacities and prices of five devices are shown in the table.

- a. How many times more storage does Device D have than Device B?

$$\frac{2^8}{2^6} = 2^2 \text{ GB}$$

- b. Predict the price for a device with  $2^{12}$  GB of storage.

$$\text{\$170}$$

Device	Storage (GB)	Price
A	$2^5$	\$30
B	$2^6$	\$50
C	$2^7$	\$70
D	$2^8$	\$90
E	$2^9$	\$110

$$2^{10} \quad 130$$

$$2^{11} \quad 150$$

$$2^{12} \quad 170$$