

Simplify each expression (you may leave answers in exponential form.)

a) $2^3 \cdot 2^8$

b) $\left(\frac{2}{5}\right)^4 \cdot 5$

c) $\frac{5^6}{5^4}$

d) $2^3 \cdot 3^2$

e) $\frac{x^{20}}{x^{20}}$

f) $7^{-2} \cdot 7^{-4}$

g) $(2^4)^7$

h) 3^0

i) $(x^2y)^4$

Challenge:

j) $\left(\frac{1}{2}\right)^{-3}$

Multiplication

Part 1: Simplify each expression.

1.) $2^3 \cdot 2^4$

2.) $8^1 \cdot 8^3$

3.) $t^4 \cdot t^4$

4.) $x^5 \cdot x^9$

5.) $3^4 \cdot x^3 \cdot x^5$

Part 2: Find the product of the expressions.

6.) $(6x^2)(4x^2)$

7.) $(3x^3y^2)(-6y^5)$

8.) $(5p^3)(-m^8p^2)$

9.) $(10g^3h^8v^6)(11gh^8)$

10.) $(4f^9h^3)(-5f^6)(-3h^2)$

11.) $(-2^2x^3y^4)((-3)^2x^4y^4)$

12.) *Challenge: $(3x^a y^b z^c)(-y^f z^g)$

Power to a Power

Part 1: Find the product. Expand if it helps you.

13.) $(p^2)^5 =$

14.) $(x^m)^2 =$

15.) $(2^3x)^2 =$

16.) $2(3a^2)^3$

17.) $(2x)^2$

18.) $(10^2)^3$

19.) $(-3^2x^6)^5$

20.) $(7j^2)^3$

21.) $\left(\frac{8x^2}{2x^2}\right)^2$

22.) $\left(\frac{3x^2}{2y^2}\right)^5$

Division

Part 1: Simplify to find the quotients.

$$23.) \frac{a^8}{a^3}$$

$$24.) \frac{7^{11}}{7^8}$$

$$25.) \frac{7 \cdot b^5}{b^4}$$

$$26.) \frac{x^{10}}{x^4}$$

$$27.) \frac{12 \cdot g^8 \cdot h^4}{g^3 \cdot h^5}$$

$$28.) \frac{4 \cdot p^{11}}{8 \cdot p^6}$$

$$29.) \frac{c^9}{6c^4}$$

$$30.) \frac{2 \cdot x^3 y^8}{4 \cdot y^2}$$

$$31.) \frac{3x^{14} y^{11}}{18x^2}$$

Negative Exponents

Rewrite **without negative exponents** and simplify.

$$32.) 6 \cdot c^3 \cdot d^{-2}$$

$$33.) 6x^4 x^{-10}$$

$$34.) (2^0 \cdot x^{-3})^4$$

$$36.) \frac{a^{12} b^{-3}}{a^5 b^5}$$

$$37.) \left(\frac{5x^{13} y^5 z^2}{3 \cdot 5^2} \right)^0$$

$$38.) (g^3 \cdot g^{-2})^4$$

$$39.) \left(\frac{4c^{-5}}{8d^0} \right)^3$$

$$40.) \left(\frac{x^{-8}}{y^{11}} \right)^{-2}$$

$$41.) \frac{(2x^3) \cdot (x^4)^2}{8x^{11}}$$