

8.2 Practice



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▶ Review & Refresh

Write the product using exponents.

1. $11 \cdot 11 \cdot 11 \cdot 11 \cdot 11$

2. $(-6) \cdot (-6) \cdot (-6) \cdot z \cdot z$

Find the value of y for the given value of x .

3. $y = -4x$; $x = 7$

4. $y = 5x + 6$; $x = -2$

5. $y = 10 - 3x$; $x = 3$

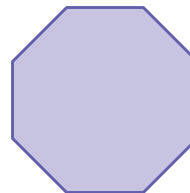
6. What is the measure of each interior angle of the regular polygon?

A. 45°

B. 135°

C. 1080°

D. 1440°



▶▶ Concepts, Skills, & Problem Solving

FINDING PRODUCTS OF POWERS Write the expression in repeated multiplication form. Then write the expression as a power. (See Exploration 1, p. 325.)

7. $5^6 \cdot 5^3$

8. $(6^4)^2$

9. $(-8)^3 \cdot (-8)^4$

FINDING POWERS Simplify the expression. Write your answer as a power.

10. $3^2 \cdot 3^2$

11. $8^{10} \cdot 8^4$

12. $(5^4)^3$

13. $((-3)^2)^4$

14. $(-4)^5 \cdot (-4)^7$

15. $h^6 \cdot h$

16. $(b^{12})^3$

17. $\left(\frac{2}{3}\right)^2 \cdot \left(\frac{2}{3}\right)^6$

18. $(3.8^3)^4$

19. $(n^3)^5$

20. $\left(\left(-\frac{3}{4}\right)^5\right)^2$

21. $\left(-\frac{5}{7}\right)^8 \cdot \left(-\frac{5}{7}\right)^9$

MP YOU BE THE TEACHER Your friend simplifies the expression. Is your friend correct? Explain your reasoning.

22.

$$5^2 \cdot 5^9 = (5 \cdot 5)^{2+9} \\ = 25^{11}$$

23.

$$(r^6)^4 = r^{6+4} \\ = r^{10}$$

FINDING A POWER OF A PRODUCT Simplify the expression.

24. $(6g)^3$

25. $(-3v)^5$

26. $\left(\frac{1}{5}k\right)^2$

27. $(1.2m)^4$

28. $(rt)^{12}$

29. $\left(-\frac{3}{4}p\right)^3$



30. **MP PRECISION** Is $3^2 + 3^3$ equal to 3^5 ? Explain.

31. **MP PROBLEM SOLVING** A display case for the artifact shown is in the shape of a cube. Each side of the display case is three times longer than the width w of the artifact.

- Write a power that represents the volume of the case.
- Simplify your expression in part (a).

32. **MP LOGIC** Show that $(3 \cdot 8 \cdot x)^7 = 6^7 \cdot 4^7 \cdot x^7$.

33. **MP MODELING REAL LIFE** The lowest altitude of an altocumulus cloud is about 3^8 feet. The highest altitude of an altocumulus cloud is about 3 times the lowest altitude. What is the highest altitude of an altocumulus cloud? Write your answer as a power.



34. **GEOMETRY** A square pyramid has a height h and a base with side length s . The side lengths of the base increase by 50%. Write a formula for the volume of the new pyramid in terms of s and h .

35. **MP MODELING REAL LIFE** The United States Postal Service delivers about $2^4 \cdot 3 \cdot 5^3$ pieces of mail each second. There are $2^8 \cdot 3^4 \cdot 5^2$ seconds in 6 days. How many pieces of mail does the United States Postal Service deliver in 6 days? Write your answer as an expression involving three powers.

36. **MP REASONING** The row numbers y and column numbers x of a chessboard are shown. Each position on the chessboard has a stack of pennies. (Only the first row is shown.) The number of pennies in each stack is $2^x \cdot 2^y$.

- Which locations have 32 pennies in their stacks?
- How much money (in dollars) is in the location with the tallest stack?
- A penny is about 0.06 inch thick. About how tall is the tallest stack?



37. **CRITICAL THINKING** Find the value of x in the equation without evaluating the power.

a. $2^5 \cdot 2^x = 256$

b. $\left(\frac{1}{3}\right)^2 \cdot \left(\frac{1}{3}\right)^x = \frac{1}{729}$