

Unit 4.2 Multiplying powers with the same base PRACTICE

Period: _____

Rewrite each expression using each base only once.

1. $4^5 \cdot 4^3$
 4^8

2. $2^4 \cdot 2^6 \cdot 2^2$
 2^{12}

3. $5^6 \cdot 5^{-2} \cdot 5^{-1}$
 5^3

4. $10^{-4} \cdot 10^4 \cdot 10^2$
 10^2

5. $7^9 \cdot 7^3 \cdot 7^{-10}$
 7^2

6. $9^2 \cdot 9^{-8} \cdot 9^6$
 9^0 or 1

Simplify each expression.

7. $z^8 z^5$
 z^{13}

8. $-4k^{-3} \cdot 6k^4$
 $-24k$

9. $(-5b^3)(-3b^5)$
 $15b^8$

10. $(13x^{-8})(3x^{10})$
 $39x^2$

11. $(-2h^5)(4h^{-3})$
 $-8h^2$

12. $-8n \cdot 11n^5$
 $-88n^6$

13. $mn^2 \cdot m^2 n^{-4} \cdot mn^{-1}$
 $\frac{m^4}{n^3}$

14. $(6a^3 b^{-2})(-4ab^{-8})$
 $-\frac{24a^4}{b^{10}}$

15. $(12mn)(-m^3 n^{-2} p^5)(2m)$
 $-\frac{24m^5 p^5}{n}$

Write each answer in scientific notation.

16. The population of a country in 1950 was
- 6.2×10^7
- . The population in 2030 is projected to be
- 3×10^2
- times the 1950 population. If the projection is correct, what will the population of the country be in 2030?

1.86×10^{10}

17. The area of land that Rhode Island covers is approximately
- 1.5×10^3
- square miles. The area of land that Alaska covers is a little more than
- 4.3×10^2
- times the land area of Rhode Island. What is the approximate area of Alaska in square miles?

$6.45 \times 10^5 \text{ mi}^2$

Simplify each expression.

18. $16^{\frac{1}{4}}$
 2

19. $125^{\frac{1}{3}}$
 5

20. $243^{\frac{1}{5}}$
 3

21. $8^{\frac{2}{3}}$
 4

22. $64^{\frac{4}{3}}$
 256

23. $25^{\frac{3}{2}}$
 125

24. $(7q^{\frac{4}{3}} \cdot 6r^{\frac{1}{5}}) \cdot (7q^{\frac{1}{3}} \cdot 6r^{\frac{1}{5}})$

$1764q^{\frac{5}{3}}r^{\frac{2}{5}}$

25. $(3h^{\frac{5}{2}} \cdot 2k^{\frac{3}{4}}) \cdot (2k^{\frac{3}{2}} \cdot 3h^{\frac{5}{4}})$

$36h^{\frac{15}{4}}k^{\frac{9}{4}}$

26. $(8p^{\frac{1}{6}} \cdot 5m^{\frac{1}{2}}) \cdot (8p^{\frac{1}{4}} \cdot 5m^{\frac{5}{6}})$

$1600p^{\frac{5}{12}}m^{\frac{4}{3}}$

Complete each equation.

27. $9^{-2} \cdot 9^4 = 9^{\square}$

2

28. $5^{\square} \cdot 5^3 = 5^2$

-1

29. $2^8 \cdot 2^{\square} = 2^{-2}$

-10

30. $z^{\square} \cdot z^{-5} = z^3$

8

31. $m^{\frac{1}{3}} \cdot m^{\frac{1}{6}} \cdot m^{\square} = m^2$

$\frac{3}{2}$

32. $d^7 \cdot d^{-13} \cdot d^{-9} = d^{\square}$

-15

Simplify each expression. Write each answer in scientific notation.

33. $(7 \times 10^{17})(8 \times 10^{-28})$

5.6×10^{-10}

34. $(4 \times 10^{-11})(0.8 \times 10^7)$

3.2×10^{-4}

35. $(0.9 \times 10^{15})(0.1 \times 10^{-6})$

9.0×10^7

36. $(0.8 \times 10^5)(0.6 \times 10^{-17})$

4.8×10^{-13}

37. $(0.5 \times 10^3)(0.6 \times 10^0)$

3.0×10^2

38. $(0.2 \times 10^{11})(0.4 \times 10^{-14})$

8.0×10^{-5}

39. The diameter of the moon is approximately 3.5×10^3 kilometers.

a. The diameter of Earth is approximately 3.7 times the diameter of the moon. Determine the diameter of Earth. Write your answer in scientific notation.

b. The distance from the center of Earth to the center of the moon is approximately 30 times the diameter of Earth. Determine the distance from the center of Earth to the center of the moon. Write your answer in scientific notation.

a) $1.295 \times 10^4 \text{ km}$

b) $3.885 \times 10^5 \text{ km}$

Simplify each expression.

40. $\frac{1}{n^{-8} \cdot n^3}$

n^5

41. $\frac{1}{x^4 \cdot x^{-9}}$

x^5

42. $7k^4(-2k^6 - k)$

$-14k^{10} - 7k^5$

43. $-2x^2(-3x^{\frac{1}{2}} + 5)$

$6x^{\frac{5}{2}} - 10x^2$

44. $4^x \cdot 4^{x+1} \cdot 4$

4^{2x+2}

45. $(n+2)^5(n+2)^{-3}$

$(n+2)^2$