

Unit 4.3 More multiplication properties of exponents

PRACTICE

Period: _____

Rewrite each expression using each base only once.

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|---|---|---|--|
| 1. $(z^5)^3$
z^{15} | 2. $(m^4)^{10}$
m^{40} | 3. $(v^7)^{\frac{1}{2}}$
$v^{\frac{7}{2}}$ | 4. $(k^{\frac{4}{3}})^3$
k^4 |
| 5. $(x^7)^{-2}$
$\frac{1}{x^{14}}$ | 6. $(r^{\frac{1}{4}})^{-6}$
$\frac{1}{r^{\frac{3}{2}}}$ | 7. $b(b^{-8})^{-3}$
b^{25} | 8. $h^2(h^7)^0$
h^2 |
| 9. $(m^2)^{\frac{3}{2}}n^{\frac{1}{7}}$
$m^3n^{\frac{1}{7}}$ | 10. $(x^6)^2(y^3)^0$
x^{12} | 11. $(g^5)^{-5}(g^6)^{-2}$
$\frac{1}{g^{37}}$ | 12. $(v^2)^3(w^4)^{\frac{1}{3}}$
$v^6w^{\frac{4}{3}}$ |
| 13. $(6a)^4$
$1296a^4$ | 14. $(5f)^{-3}$
$\frac{1}{125f^3}$ | 15. $(9z)^{\frac{1}{2}}$
$3z^{\frac{1}{2}}$ | 16. $(10m^3)^{-2}$
$\frac{1}{100m^6}$ |
| 17. $(6j^{-2})^{-3}$
$\frac{j^6}{216}$ | 18. $(9d^{10})^{-2}$
$\frac{1}{81d^{20}}$ | 19. $(gh)^0$
1 | 20. $(qr^6)^{\frac{1}{2}}$
$q^{\frac{1}{2}}r^3$ |
| 21. $(4a^3)^2a^5$
$16a^{11}$ | 22. $(m^{\frac{4}{7}}n^3)^7(m^4)^3$
$m^{16}n^{21}$ | 23. $(xy^2)(xy^2)^{-1}$
1 | 24. $z(y^{-5}z^7)^{-1}y^{-5}$
$\frac{1}{z^6}$ |
| 25. $(7t^{-3})^3(s^5t^{\frac{1}{4}})^2$
$\frac{343s^{10}}{t^{\frac{17}{2}}}$ | 26. $m^{-9}(m^{-1}n)^{\frac{1}{2}}n^8$
$\frac{\frac{17}{n^2}}{m^{\frac{19}{2}}}$ | 27. $(3b^{-4}c^{-2})^6c^3$
$\frac{729}{b^{24}c^9}$ | 28. $5x^{-5}y^2(2x^{-14})^2$
$\frac{20y^2}{x^{33}}$ |

Simplify. Write each answer in scientific notation.

- | | | | |
|---|---|---|---|
| 29. $(5 \times 10^7)^2$
2.5×10^{15} | 30. $(2 \times 10^4)^6$
6.4×10^{25} | 31. $(9 \times 10^{-12})^2$
8.1×10^{-23} | 32. $(3 \times 10^{-8})^3$
2.7×10^{-23} |
| 33. $(3.6 \times 10^5)^2$
1.296×10^{11} | 34. $(9.3 \times 10^{-6})^{-2}$
<i>about</i> 1.16×10^{10} | 35. $(1.7 \times 10^{-8})^3$
4.913×10^{-24} | 36. $(6.24 \times 10^{13})^3$
<i>about</i> 2.4297×10^{41} |

37. The radius of a cylinder is 5.4×10^6 cm. The height of the cylinder is 2.5×10^3 cm. What is the volume of the cylinder? (Hint: $V = \pi r^2 h$)

about $2.29 \times 10^{17} \text{ cm}^3$

38. The side length of a square is 9.6×10^5 in. What is the area of the square?

$9.216 \times 10^{11} \text{ in.}^2$

39. The side length of a cube is 3.78×10^3 ft. What is the volume of the cube?

about $5.401 \times 10^{10} \text{ ft}^3$

Complete each equation.

40. $(p^4)^\square = p^8$

2

41. $(z^\square)^6 = z^{-24}$

-4

42. $(t^{12})^\square = 1$

0

43. $(w^3)^\square = w^{-12}$

-4

44. $(n^{-8})^\square = n$

$-\frac{1}{8}$

45. $10(g^2)^\square = 10g^6$

3

46. $(3a^\square)^3 = 27a^{\frac{3}{2}}$

$\frac{1}{2}$

47. $(6q^4r^\square)^2 = 36q^8$

0

48. $(x^4y^3)^\square = \frac{1}{x^8y^6}$

-2

49. **Writing** Is $(y^m)^n = (y^n)^m$ a true statement? Explain your reasoning.

Yes, they both equal y^{mn}

50. **Reasoning** What is the difference between x^4x^3 and $(x^4)^3$? Justify your answer.

$x^4x^3 = x^7$ whereas $(x^4)^3 = x^{12}$

Simplify each expression.

51. $2^3(2m)^2$

$32m^2$

52. $(68.68)^8(68.68)^{-8}$

1

53. $\left(d^{\frac{2}{3}}\right)^{-5} d^3$

$\frac{1}{d^{\frac{1}{3}}}$

54. $(-7p)^3 + 7p^3$

$-336p^3$

55. $4a\left(0\frac{1}{2}\right)b^4(-b)^{-7}$

0

56. $(10^{-5})^3(9.9 \times 10^{-12})^2$

9.801×10^{-38}