

# 7-2 Practice

## Multiplying Powers With the Same Base

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

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

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

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

Simplify each expression.

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

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

9.  $(-5b^3)(-3b^6) = 15b^9$

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

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

12.  $-8n \cdot 11n^9 = -88n^{10}$

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

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

15.  $(12mn)(-m^3 n^{-2} p^5)(2m) = -24m^5 n^{-1} p^5$

Simplify each expression.

4<sup>th</sup> root of 16

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

then square it

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

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

21.  $8^{\frac{2}{3}}$  cube root

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

23.  $25^{\frac{3}{2}}$   $\sqrt[3]{25} = 5^3 = 125$

$\sqrt[3]{8} = 2^2 = 4$

$\sqrt[3]{64} = 4^3 = 256$

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

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

26.  $(8p^{\frac{1}{6}} \cdot 5m^{\frac{1}{12}})^{\frac{3}{4}} \cdot (8p^{\frac{1}{4}} \cdot 5m^{\frac{5}{6}})^{\frac{3}{12}}$

$42q^{4/3} r^{3/5} \cdot 42q^{1/3} r^{1/5} = 1764 q^{5/3} r^{4/5}$

$6h^{5/2} k^{3/4} \cdot 6k^{3/2} h^{5/4} = 36h^{15/4} k^{9/4}$

$40p^{1/2} m^{1/2} \cdot 40p^{1/4} m^{5/6} = 1600 p^{5/12} m^{8/6}$

Complete each equation.

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

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

29.  $2^8 \cdot 2^{\square} = 2^{-10}$

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

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

32.  $d^7 \cdot d^{-13} \cdot d^{-9} = d^{\square} = -15$

# 7-2 Practice

Form G

## Multiplying Powers With the Same Base

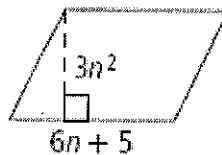
Find the area of each figure.

$$A = bh$$

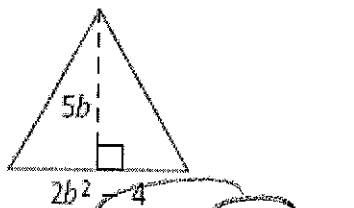
$$A = 6n + 5(3n^2)$$

$$A = 18n^3 + 15n^2$$

34.



35.



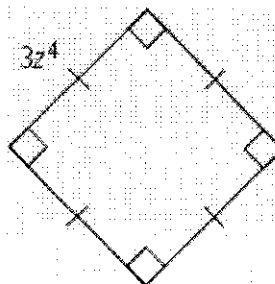
$$A = \frac{b \times h}{2}$$

$$2b^2 - 4(5b)$$

$$\frac{10b^3 - 20b}{2}$$

$$5b^3 - 10b$$

36.



$$3z^4 \cdot 3z^4$$

$$9z^8$$

Simplify each expression.

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

$$\frac{1}{n^{-5}}$$

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

$$\frac{1}{x^{-5}}$$

46.  $7k^4(-2k^6 - k)$

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

47.  $-2x^2(-3x^{\frac{1}{2}} + 5)$

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

48.  $4^x \cdot 4^{x+1} \cdot 4$

$$4^{2x+2}$$

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

$$(n+2)^2$$

# 7-3

## Practice

Form G

### More Multiplication Properties of Exponents

Simplify each expression.

- |   |   |   |  |
|---|---|---|--|
| 1. $(z^5)^3$<br>$z^{15}$  | 2. $(m^4)^{10}$<br>$m^{40}$   | 3. $(v^7)^{\frac{1}{2}}$<br>$v^{7/2}$   | 4. $(k^3)^3$<br>$k^9$  |
| 5. $(x^7)^{-2}$<br>$x^{-14}$  | 6. $(r^{\frac{1}{4}})^{-6}$<br>$r^{-\frac{6}{4}}$   | 7. $b(b^{-8})^{-3}$<br>$b(b^{24})$<br>$b^{25}$                                    | 8. $h^2(h^7)^0$<br>$h^2 h^0 = h^2$   |
| 9. $(m^2)^{\frac{3}{2}} n^{\frac{1}{7}}$<br>$m^3 n^{\frac{1}{7}}$   | 10. $(x^6)^2 (y^3)^0$<br>$x^{12} y^0$   | 11. $(g^5)^{-3} (g^6)^{-2}$<br>$g^{-25} g^{-12} g^{-37}$                          | 12. $(v^2)^3 (w^4)^{\frac{1}{3}}$<br>$v^6 v^{4/3}$                                 |
| 13. $(6a)^4$<br>$1296a^4$   | 14. $(5f)^{-3}$<br>$5^{-3} f^{-3}$  | 15. $(9z)^{\frac{1}{2}}$<br>$3z^{\frac{1}{2}}$                                    | 16. $(10m^3)^{-2}$<br>$10^{-2} m^{-6}$   |
| 17. $(6j^{-2})^{-3}$<br>$6^{-3} j^6$  | 18. $(9d^{10})^{-2}$<br>$9^{-2} d^{-20}$  | 19. $(gh)^0$<br>$g^0 h^0$   | 20. $(qr^6)^{\frac{1}{2}}$<br>$q^{\frac{1}{2}} r^3$                                |
| 21. $(4a^3)^2 a^5$<br>$16 a^6 a^5 = 16a^{11}$   | 22. $(m^7 n^3)^7 (m^4)^3$<br>$m^{49} n^{21} \cdot m^{12}$<br>$m^{61} n^{21}$  | 23. $(xy^2)(xy^2)^{-1}$<br>$xy^2 \cdot x^{-1} y^{-2}$<br>$x^0 y^0$                | 24. $z(y^{-5} z^7)^{-1} y^{-5}$<br>$z y^5 z^{-7} y^{-5} z^{-6} y^0$                |
| 25. $(7t^{-3})^3 (s^5 t^{\frac{1}{4}})^2$<br>$343 t^{-9} s^{10} t^{\frac{2}{4}}$<br>$343 t^{-8.5} s^{10}$<br>$343 t^{-\frac{17}{2}} s^{10}$ | 26. $m^{-9} (m^{-1} n)^{\frac{1}{2}} n^8$<br>$m^{-9} m^{-\frac{1}{2}} n^{\frac{1}{2}} n^8$<br>$m^{-9\frac{1}{2}} n^{8.5}$<br>$m^{-\frac{19}{2}} n^{\frac{17}{2}}$ | 27. $(3b^{-4} c^{-2})^6 c^3$<br>$729 b^{-24} c^{-12} c^3$<br>$729 b^{-24} c^{-9}$ | 28. $5x^{-5} y^2 (2x^{-14})^2$<br>$5x^{-5} y^2 \cdot 4x^{-28}$<br>$20 x^{-33} y^2$ |

# 7-3 Practice (continued)

## More Multiplication Properties of Exponents

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.  $(n^{-8})^\square = n$   
-1/8

45.  $10(g^2)^\square = 10g^6$   
3

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.

$4mn = 4nm$  (mult is commutative)

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

$x^7$  vs  $x^{12}$   
exp mult vs power to power

Simplify each expression.

51.  $2^3(2m)^2$   
 $2^3 \cdot 2^2 \cdot m^2 = 2^5 m^2 = 32m^2$

54.  $(-7p)^3 + 7p^3$   
 $-7^3 p^3 + 7p^3 = -336p^3$

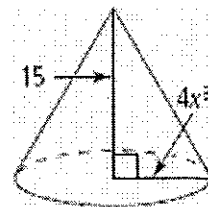
52.  $(68.68)^8(68.68)^{-8}$   
 $(68.68)^0 = 1$

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

53.  $\left(d^{\frac{2}{3}}\right)^{-5} d^3$   
 $d^{-\frac{10}{3}} d^3 = d^{-\frac{1}{3}}$

57. The volume of a circular cone can be determined by the formula

$V = \frac{1}{3}3.14r^2h$ , where  $r$  is the radius of the base and  $h$  is the height of the cone. Find the volume of the cone shown at the right in terms of  $x$ .



$V = \frac{1}{3}(3.14)(4x^3)^2 \cdot 15$

$V = \frac{1}{3}(3.14)(16x^6)$

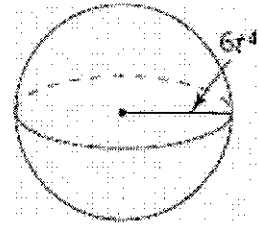
$V \approx 250.2x^6$

I rounded to .33

58. The volume of a sphere can be determined by the formula

$$V = \frac{4}{3}3.14r^3, \text{ where } r \text{ is the radius. Find the volume of the sphere}$$

shown at the right in terms of  $t$ .



$$V = \frac{4}{3}(3.14)(6t^4)^3$$

$$V = \frac{4}{3}(3.14)(216)t^7$$

$$V \approx 902.05t^7$$

I rounded  
to  
1.33