

7.2 Multiplying Powers with the Same Base

$$b^m \cdot b^n = \underline{b^{m+n}}$$

Same base

Add exp.

Problem 1:

a. $3^2 \cdot 3^8 = 3^{2+8} = 3^{10}$

b. $2^6 \cdot 2^5 = 2^{6+5} = 2^{11}$

Problem 2:

a. $-3x^7 \cdot 6x^5$

$$\underline{-3 \cdot 6} \cdot \underline{x^7 x^5}$$

$$-18x^{12}$$

b. $-7a^7 \cdot -5a^4$

$$\underline{(-7)(-5)} a^7 a^4$$

$$35a^{11}$$

c. $(3 \times 10^5)(7 \times 10^2)$

$$3 \cdot 7 \cdot 10^5 \cdot 10^2$$

$$\underline{21 \times 10^7}$$

$$2.1 \times 10^1 \times 10^7$$

$$2.1 \times 10^8$$

d. $(4 \times 10^5)(7 \times 10^{-8})$

$$4 \cdot 7 \cdot 10^5 \cdot 10^{-8}$$

$$28 \cdot 10^{-3}$$

$$2.8 \cdot 10^1 \cdot 10^{-3}$$

$$2.8 \times 10^{-2}$$

Problem 3:

Capella is a star 45 light years from the Earth. One light year is 5.88×10^{12} miles. How far, in miles, is Capella?

$$45 \times 5.88 \times 10^{12}$$

$$\boxed{2.646} \times 10^{14}$$

$$2.646 \times 10^2 \times 10^{12}$$

$$2.646 \times 10^{14}$$

Problem 4:

a. $16^{\frac{1}{4}} = (\underbrace{2 \cdot 2 \cdot 2 \cdot 2}_{4 \cdot 4})^{\frac{1}{4}} = 2$
 $(2^4)^{\frac{1}{4}} = 2$

b. $27^{\frac{1}{3}} = (\underbrace{3 \cdot 3 \cdot 3}_{3 \cdot 3})^{\frac{1}{3}} = 3$

c. $64^{\frac{1}{2}} = (\underbrace{8 \cdot 8}_8)^{\frac{1}{2}} = 8$

$64^{\frac{1}{2}} = (\underbrace{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}_{4 \cdot 8})^{\frac{1}{2}} = 2 \cdot 2 \cdot 2 = 8$

Problem 5:

a. $25^{\frac{3}{2}} = \boxed{25^{\frac{1}{2}}} \cdot 25^{\frac{1}{2}} \cdot 25^{\frac{1}{2}}$
 $\boxed{5 \cdot 5} \cdot (5 \cdot 5)^{\frac{1}{2}} \cdot (5 \cdot 5)^{\frac{1}{2}}$
 $\boxed{5} \cdot 5 \cdot 5$
 $25 \cdot 5$
 $\boxed{125}$

b. $27^{\frac{2}{3}} = 27^{\frac{1}{3}} \cdot 27^{\frac{1}{3}}$
 $(\underbrace{3 \cdot 3 \cdot 3}_{3 \cdot 3})^{\frac{1}{3}} \cdot (\underbrace{3 \cdot 3 \cdot 3}_{3 \cdot 3})^{\frac{1}{3}}$
 $3 \cdot 3$
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c. $16^{\frac{3}{4}} = 16^{\frac{1}{4}} \cdot 16^{\frac{1}{4}} \cdot 16^{\frac{1}{4}}$
 $(\underbrace{2 \cdot 2 \cdot 2 \cdot 2}_{4 \cdot 4})^{\frac{1}{4}} (\underbrace{2 \cdot 2 \cdot 2 \cdot 2}_{4 \cdot 4})^{\frac{1}{4}} (\underbrace{2 \cdot 2 \cdot 2 \cdot 2}_{4 \cdot 4})^{\frac{1}{4}}$
 $2 \cdot 2 \cdot 2$
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