

Chapter 1 Review

Sections 1-1 thru 1-4

Simplify the expression.

1 $8^{\frac{2}{3}}$

- A) 16
B) 24

- C) 8
D) 4

2 $(3a^{\frac{5}{4}} \cdot 6b^{\frac{1}{3}})(a^{\frac{1}{4}} \cdot 3b^{\frac{1}{6}})$

3 What is the simplified form of the expression?

$\sqrt[5]{243}$

- A) 3
B) 243

- C) 243^5
D) $\sqrt{243^5}$

What is each expression written using each base only once?

4 $(6.16)^{-9} \cdot (6.16)^{10}$

5 $(-8)^{-9} \cdot (-8)^{10}$

6 $11^{10} \cdot 11^7 \cdot 11^{-1}$

What is the simplified form of each expression?

7 $6x^{-4} \cdot 3x^7$

8 $(-2k^4) \cdot 4j^2 \cdot 4k^3$

9 $3x^6 \cdot 5x^{10}$

10 $-4x^2 \cdot 3y^{-5} \cdot 2y^4 \cdot 5x^{-8}$

Find the simplified form of the expression. Give your answer in scientific notation.

11 $(6 \times 10^1)(9 \times 10^{10})$

12 $(3 \times 10^2)(7 \times 10^{-6})$

- 13 Last year, a large trucking company delivered 6.5×10^5 tons of goods with an average value of \$30,000 per ton. What was the total value of the goods delivered? Write the answer in scientific notation.

What is the simplified form of the expression?

14 $(p^{\frac{5}{6}})^{\frac{1}{5}}$

$$15 \quad p^2(p^3)^1$$

$$16 \quad (p^4)^2$$

$$17 \quad (3x^3)\left(-6x^{\frac{1}{2}}\right)$$

$$18 \quad k^4\left(k^{\frac{7}{5}}\right)^{-5}$$

What is the simplified form of each expression?

$$19 \quad (4h^2)^3$$

$$20 \quad (-3g^4h^4)^4(g^5h^6)^3$$

$$21 \quad (10q^8)^{-4}$$

$$22 \quad (-h^6)^3$$

23 $(3a^2b^4)^3(2a^5b^6)^3$

- 24 Suppose a white dwarf star has a diameter of approximately 1.6692×10^4 km. Use the formula $4\pi r^2$ to find the approximate surface area of the star.

What is the simplified form of each expression?

25 $\frac{t^7}{t^2}$

26 $\frac{y^{-10}}{y^4}$

27 $\frac{m^{-8}n^{-3}}{m^{-14}n^8}$

- 28 Scientists believe that there is an extremely massive black hole at the center of the Milky Way. How many times more massive than the Sun would a black hole with a mass of 6.77×10^{36} kg be? The mass of the Sun is approximately 1.99×10^{30} kg.
- 29 Astronomers measure large distances in light-years. One light-year is the distance that light can travel in one year, or approximately 5.88×10^{12} miles. Suppose a star is 4.9×10^2 light-years from Earth. In scientific notation, approximately how many miles is it?

What is the simplified form of the expression?

30 $\left(\frac{3m^2}{8j^5}\right)^3$

31 $\left(\frac{3k}{4}\right)^3$

32 $\left(\frac{1}{3j^7}\right)^3$

33 $\left(\frac{3t^4}{5j^5}\right)^{-3}$

34 $\left(\frac{t^3}{2y^4}\right)^{-2}$

35 $\left(\frac{m^{-2}m^7}{m^{-5}}\right)^{-3}$

36 Write the exponential expression $4x^{\frac{4}{9}}$ in radical form.

- 37 Kepler's Third Law of Orbital Motion states that you can approximate the period P (in Earth years) it takes a planet to complete one orbit of the sun using the function $P = d^{\frac{3}{2}}$, where d is the distance (in astronomical units, AU) from the planet to the sun. How many Earth years would it take for a planet that is 3.96 AU from the sun?
- 38 When you simplify an algebraic expression like $a^{\frac{5}{2}} \cdot a^{\frac{1}{4}}$, you know that the bases of the expressions must be the same. You also need to rewrite the exponents so that they have a common denominator. Explain why you need to find the common denominator to simplify.
- 39 Suppose a spherical asteroid has a radius of approximately 1.8×10^3 m. Use the formula $\left(\frac{4}{3}\right)\pi r^3$ to find the approximate volume of the asteroid.
- 40 Write the radical expression $\frac{4}{\sqrt[3]{x^{11}}}$ in exponential form.