

Math Sheet

Name _____ Score _____ / 10 Teacher _____ Date _____

Simplifying Rational Exponents

Simplify. Use only positive exponents, with no fractional exponents in a denominator. Assume every variable is positive.

1. $(4 \cdot b^6)^{1.5}$

6. $\left(\frac{a^{\frac{7}{3}} \cdot n^5}{a^{\frac{5}{3}} \cdot n} \right)^6$

2. $y^4 \cdot 8 \cdot y^{\frac{2}{5}} \cdot y^{-4}$

7. $(81 \cdot a^2)^{1.75}$

3. $\frac{9 \cdot b^{\frac{2}{3}}}{21 \cdot b^{\frac{1}{3}}}$

8. $\left(x^{\frac{1}{3}} \right)^8$

4. $\left(m^{\frac{3}{2}} \right)^{-8}$

9. $\frac{8 \cdot y^{\frac{-1}{3}} \cdot n^7}{10 \cdot y \cdot n^{\frac{4}{3}}}$

5. $\left(b^{-7} \cdot x^{\frac{1}{2}} \cdot b \right)^4$

10. $\left(n^{\frac{2}{3}} \right)^7$

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Simplifying Rational Exponents

Worked answer key

Simplify. Use only positive exponents, with no fractional exponents in a denominator. Assume every variable is positive.

1. $(4 \cdot b^6)^{1.5}$

coefficient: $(4)^{(3/2)} = 8$; b: $6 \cdot 3/2 = 9$

All collected variable exponents are already nonnegative.

$$8 \cdot b^9$$

2. $y^4 \cdot 8 \cdot y^{\frac{2}{5}} \cdot y^{-4}$

coefficients: $1 \cdot 8 \cdot 1 = 8$; y: $4 + 2/5 + -4 = 2/5$

All collected variable exponents are already nonnegative.

$$8 \cdot y^{\frac{2}{5}}$$

3.
$$\frac{9 \cdot b^{\frac{2}{3}}}{21 \cdot b^{\frac{1}{3}}}$$

coefficients: $9 / 21 = 3/7$; b: $2/3 - 1/3 = 1/3$

All collected variable exponents are already nonnegative.

$$\frac{3 \cdot b^{\frac{1}{3}}}{7}$$

4. $\left(m^{\frac{3}{2}}\right)^{-8}$

coefficient: $(1)^{(-8)} = 1$; m: $3/2 \cdot -8 = -12$

Positive-exponent form: m: $-12 = 0 - 12$.

$$\frac{1}{m^{12}}$$

5. $\left(b^{-7} \cdot x^{\frac{1}{2}} \cdot b\right)^4$

coefficients: $1 \cdot 1 = 1$; b: $-7 + 1 = -6$; x: $1/2 + 0 = 1/2$

coefficient: $(1)^{(4)} = 1$; b: $-6 \cdot 4 = -24$; x: $1/2 \cdot 4 = 2$

Positive-exponent form: b: $-24 = 0 - 24$.

$$\frac{x^2}{b^{24}}$$

6. $\left(\frac{a^{\frac{7}{3}} \cdot n^5}{a^{\frac{5}{3}} \cdot n}\right)^6$

coefficients: $1 / 1 = 1$; a: $7/3 - 5/3 = 2/3$; n: $5 - 1 = 4$

coefficient: $(1)^{(6)} = 1$; a: $2/3 \cdot 6 = 4$; n: $4 \cdot 6 = 24$

All collected variable exponents are already nonnegative.

$$a^4 \cdot n^{24}$$

7. $(81 \cdot a^2)^{1.75}$

coefficient: $(81)^{(7/4)} = 2187$; a: $2 \cdot 7/4 = 7/2$

All collected variable exponents are already nonnegative.

$$2187 \cdot a^{\frac{7}{2}}$$

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Simplify. Use only positive exponents, with no fractional exponents in a denominator. Assume every variable is positive.

8. $\left(x^{\frac{1}{3}}\right)^8$

coefficient: $(1)^8 = 1$; $x: \frac{1}{3} \cdot 8 = \frac{8}{3}$

All collected variable exponents are already nonnegative.

$$x^{\frac{8}{3}}$$

9.
$$\frac{8 \cdot y^{\frac{-1}{3}} \cdot n^7}{10 \cdot y \cdot n^{\frac{4}{3}}}$$

coefficients: $8 \cdot 1 = 8$; $n: 0 + 7 = 7$; $y: -\frac{1}{3} + 0 = -\frac{1}{3}$

coefficients: $10 \cdot 1 = 10$; $n: 0 + \frac{4}{3} = \frac{4}{3}$; $y: 1 + 0 = 1$

coefficients: $8 / 10 = \frac{4}{5}$; $n: 7 - \frac{4}{3} = \frac{17}{3}$; $y: -\frac{1}{3} - 1 = -\frac{4}{3}$

Positive-exponent form: $y: -\frac{4}{3} = \frac{2}{3} - 2$.

$$\frac{4 \cdot n^{\frac{17}{3}} \cdot y^{\frac{2}{3}}}{5 \cdot y^2}$$

10. $\left(n^{\frac{2}{3}}\right)^7$

coefficient: $(1)^7 = 1$; $n: \frac{2}{3} \cdot 7 = \frac{14}{3}$

All collected variable exponents are already nonnegative.

$$n^{\frac{14}{3}}$$