

HW22: Properties of Exponents (2.1)

Simplify. Show all necessary work. Answers should contain only positive exponents.

1. $2x^3y^{-2} \cdot 2x^5$

2. $5a^4b^{-1} \cdot 3a^{-1}b^5$

3. $(2x^3)(3x^5)(6x)^2$

4. $(3x^{-2}y^4)^{-2}$

5. $\frac{3x^4}{(-6x)^{-2}}$

6. $\left(\frac{x^2}{4x^{-1}}\right)^{-3}$

7. $5(x^3)^{-3}(2x)^{-4}$

8. $\frac{(2a^2b^{-2} \cdot 3b^{-2})^{-2}}{ab^2 \cdot 2a^3b}$

9. Jonah was trying to rewrite expressions using the properties of exponents. In each problem, he made a mistake. Explain where he made a mistake in each part, and provide a correct solution.

Jonah's Incorrect Work

A. $(3x^2)^{-3} = -9x^{-6}$

B. $\frac{2}{3x^{-5}} = 6x^5$

Write each expression in exponential form.

10. $(\sqrt[3]{p})^5$

11. $(\sqrt[6]{10x})^7$

Write each expression in radical form.

12. $(4m)^{\frac{5}{3}}$

13. $n^{\frac{5}{6}}$

Simplify. Show all work.

14. $\sqrt[4]{16x^8}$

15. $\sqrt[3]{-56x^8y^8}$

Simplify. Your answer should only contain positive exponents with no fractional exponents in the denominator.

16. $3n^{-\frac{1}{2}} \cdot 3n$

17. $2b^{-\frac{1}{4}} \cdot 3b^{-\frac{3}{2}}$

$$18. (v^{-1})^{\frac{3}{2}}$$

$$19. \left(x^{-\frac{1}{2}}\right)^{\frac{1}{4}}$$

$$20. \left(\frac{125}{x^2}\right)^{-\frac{1}{3}}$$

$$21. \frac{(\sqrt[3]{8x^3})^2}{\sqrt{4x^2}}$$

Answers

1. $\frac{4x^8}{y^2}$

2. $15a^3b^4$

3. $216x^{10}$

4. $\frac{x^4}{9y^8}$

5. $108x^6$

6. $\frac{64}{x^9}$

7. $\frac{5}{16x^{13}}$

8. $\frac{b^5}{72a^8}$

9a. He multiplied 3 by the exponent -3 . The correct solution is $3^{-3}x^{-6} = \frac{1}{27x^6}$.

9b. He brought the 3 up to the numerator when he rewrote x^{-5} . The correct solution is $\frac{2x^5}{3}$.

10. $p^{\frac{5}{3}}$

11. $(10x)^{\frac{7}{6}}$

12. $\sqrt[3]{(4m)^5}$

13. $\sqrt[6]{n^5}$

14. $2x^2$

15. $-2x^2y^2\sqrt[3]{7x^2y^2}$

16. $9n^{\frac{1}{2}}$

17. $\frac{6b^{\frac{1}{4}}}{b^2}$ or $\frac{6\sqrt[4]{b}}{b^2}$

18. $\frac{v^{\frac{1}{2}}}{v^2}$ or $\frac{\sqrt{v}}{v^2}$

19. $\frac{x^{\frac{7}{8}}}{x}$ or $\frac{\sqrt[8]{x^7}}{x}$

20. $\frac{x^{\frac{2}{3}}}{5}$ or $\frac{\sqrt[3]{x^2}}{5}$

21. $2x$