Assignment

Write

Describe how the components of radical form and rational exponent form of an equivalent expression are related.

Remember

If the difference in the input values is the same, an exponential function shows a constant multiplier between output values, no matter how large or how small the gap between input values.

If n is an integer greater than 1, then $\sqrt[n]{a} = a^{\frac{1}{n}}$.

Practice

Rewrite each radical using a rational exponent.

1. $\sqrt[4]{88}$
2. $\sqrt[10]{46}$
3. $\sqrt[6]{x}$
4. $\sqrt{z}$

Rewrite each power in radical form.

5. $9^{\frac{1}{3}}$
6. $5^{\frac{1}{2}}$
7. $20^{\frac{1}{5}}$
8. $41^{\frac{1}{8}}$

Rewrite each power in radical form. Simplify your answer, if possible.

9. $16^{\frac{3}{2}}$
10. $5^{\frac{7}{4}}$
11. $12^{\frac{2}{5}}$
12. $8^{\frac{4}{3}}$
13. $2^{\frac{5}{6}}$
14. $15^{\frac{6}{7}}$

Rewrite each expression using a rational exponent. Simplify your answer, if possible.

15. $(\sqrt[5]{10})^4$
16. $(\sqrt[4]{t})^4$
17. $(\sqrt{w})^6$
18. $(\sqrt[9]{h})^3$

Rewrite each radical expression by extracting perfect squares.

19. $\sqrt{12}$
20. $\sqrt{30}$
21. $\sqrt{27}$
22. $3\sqrt{75}$
23. $\sqrt{15} \cdot \sqrt{6}$
24. $\sqrt{14} \cdot \sqrt{2}$
25. $\sqrt{8} \cdot \sqrt{7}$
26. $\sqrt{10} \cdot \sqrt{15}$

Solve each exponential equation for x.

27. $4^x = 256$
28. $6^{3x} = 36$
29. $2^{5-x} = \frac{1}{16}$
30. $3^{-2x} = \frac{1}{81}$
31. $4^{x+3} = 4$
32. $\frac{1}{5^{x+4}} = 625$

Stretch

1. How do rational exponents help you to multiply or divide two radicals with different indices ($\sqrt[m]{a} \cdot \sqrt[n]{a}$ or $\frac{\sqrt[m]{a}}{\sqrt[n]{a}}$, when $m \neq n$)? Include two examples to support your answer.

Review

1. Complete the table.

Explicit Formula	Exponential Function	Constant Ratio	*y*-Intercept
$840 \cdot 3^{x-1}$			
$-3 \cdot \left(\frac{1}{5}\right)^{x-1}$			

2. Graph each function.

   a. $y = -3|x + 4| - 2$

   b. $y = 2|x - 1| + 2$

3. Solve each system of linear inequalities.

   a. $\begin{cases} y > -\frac{5}{4}x - 2 \\ x \geq -5 \end{cases}$

   b. $\begin{cases} 2x - 3y > -3 \\ x + 3y > -6 \end{cases}$