

More Rational Exponent Practice:

Answer

(you have to use exponent rules here – see Unit 1 cheat sheet)

Simplify then convert into radicals:

1. $\left(\frac{16}{81}\right)^{3/4} = \frac{8}{27}$
 $\left(\sqrt[4]{\frac{16}{81}}\right)^3 = \left(\frac{2}{3}\right)^3 = \frac{8}{27}$

2. $32^{-2/5} = \frac{1}{4}$
 $\frac{1}{32^{2/5}} = \frac{1}{(\sqrt[5]{32})^2} = \frac{1}{2^2}$

3. $\frac{(x^{2/3})^2}{(x^2)^{7/3}} = \frac{1}{x^{10/3}} = \left(\sqrt[3]{x}\right)^{-10}$
 $\frac{x^{4/3}}{x^{14/3}} = x^{-10/3}$

4. $\frac{x^{3/4}y^{1/2}}{(x^2y)^{1/4}} = x^{1/4}y^{1/4} = \sqrt[4]{x}\sqrt[4]{y}$
 $\frac{x^{3/4}y^{1/2}}{x^{1/2}y^{1/4}}$

5. $(2x^4y^{-4/5})^3 (8y^2)^{2/3}$
 $\frac{8x^{12}y^{-12/5} \cdot (\sqrt[3]{8y^2})^2}{8x^{12}y^{12/5} \cdot (2y^{2/3})^2} \rightarrow \frac{8x^{12} \cdot 4y^{4/3}}{y^{12/5}} = \frac{32x^{12}}{y^{16/15}} = \frac{32x^{12}}{(\sqrt[15]{y})^{16}}$

6. $\frac{(x^{15}y^{-5})^{1/5}}{(x^{-2}y^3)^{1/3}} = \frac{x^3y^{-1}}{x^{-2/3}y^1} = x^{11/3}y^{-2} = \frac{(\sqrt[3]{x})^{11}}{y^2}$

Simplify then convert into exponents:

7. $\sqrt[3]{x^2} = x^{2/3}$

8. $\sqrt[3]{4x^3} \cdot 3x^{1/2} = 3x^2$

9. $2\sqrt[6]{3} + 7\sqrt[6]{3}$
 $9\sqrt[6]{3} = 9 \cdot 3^{1/6} = 10.81$

10. $\sqrt[3]{4x^3y^5} \cdot \sqrt[3]{12y^2}$
 $\sqrt[3]{48x^3y^7}$
 Break out of jail in 35
 $48^{1/3} x^{3/3} y^{7/3}$
 OR $2xy\sqrt[3]{6}$
 $24^2 \cdot 2 = 48$
 $3^8 = 2187$
 $4^2 = 16$

17) $\left(\frac{1}{5}\right)^x = y$
 $\log_{\frac{1}{5}} y = x$

18) $6^a = x$
 $\log_6 x = a$

Rewrite each equation in exponential form.

1) $\log_6 36 = 2$

$6^2 = 36$

2) $\log_{289} 17 = \frac{1}{2}$

$289^{\frac{1}{2}} = 17$

3) $\log_{14} \frac{1}{196} = -2$

$14^{-2} = \frac{1}{196}$

4) $\log_3 81 = 4$

$3^4 = 81$

Rewrite each equation in logarithmic form.

5) $64^{\frac{1}{2}} = 8$

$\log_{64} 8 = \frac{1}{2}$

6) $12^2 = 144$

$\log_{12} 144 = 2$

7) $9^{-2} = \frac{1}{81}$

$\log_9 \frac{1}{81} = -2$

8) $\left(\frac{1}{12}\right)^2 = \frac{1}{144}$

$\log_{\frac{1}{12}} \frac{1}{144} = 2$

Rewrite each equation in exponential form.

9) $\log_u \frac{15}{16} = v$

$u^v = \frac{15}{16}$

10) $\log_v u = 4$

$v^4 = u$

11) $\log_{\frac{7}{4}} x = y$

$\left(\frac{7}{4}\right)^y = x$

12) $\log_2 v = u$

$2^u = v$

13) $\log_u v = -16$

$u^{-16} = v$

14) $\log_y x = -8$

$y^{-8} = x$

Rewrite each equation in logarithmic form.

15) $u^{-14} = v$

$\log_u v = -14$

16) $8^b = a$

$\log_8 a = b$

19) $9^x = x$

$\log_9 x = y$

20) $b^a = 123$

$\log_b 123 = a$

Evaluate each expression.

21) $\log_4 64$

3

$4^x = 64$

22) $\log_6 216$

3

23) $\log_4 16$

2

$4^x = 16$

24) $\log_5 \frac{1}{243}$

-5

25) $\log_5 125$

3

$5^x = 125$

26) $\log_2 4$

2

27) $\log_{343} 7$

$\frac{1}{3}$

28) $\log_2 16$

4

29) $\log_{64} 4$

$\frac{1}{3}$

30) $\log_6 \frac{1}{216}$

-3

Simplify each expression.

31) $12^{\log_{12} 144}$

144

$\log_{12} 144 = \log_{12} 144$

32) $5^{\log_5 17}$

17

$\log_5 17 = \log_5 17$

33) $x^{\log_x 72}$

72

$\log_x 72 = \log_x 72$

34) $9^{\log_9 20}$

200

$\log_3 20 = \log_3 20$