

Answers to Assignment (ID: 1)

1) $2x^3$
5) $6x^3$

2) $6v$
6) $2v$

3) $3r^3$
7) $-\frac{y}{x^5}$

4) $2n^2$
8) $-\frac{m^2}{n^{12}}$

9) $\frac{b^{15}}{a^7}$

10) $-\frac{y^5}{x^{30}}$

11) $\frac{1}{m^{15}n^9}$

12) $\frac{x^3}{y^5}$

13) $\frac{y}{x^6}$

14) $\frac{x^7}{8y^8}$

15) $\frac{1}{y^{15}}$

16) $256a^{13}b^{32}$

17) $\frac{1}{4x^3y^2}$

18) $\frac{1}{16x^8y^{19}}$

$$\textcircled{7} \boxed{(-y^{-1})^2} \cdot -x^{-5}y^3$$

$$(-y^{-1})(-y^{-1})$$

$$y^{-1+(-1)}$$

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

$$-y^{-2+3}x^{-5}$$

$$-y^1x^{-5} = -\frac{y}{x^5}$$

$$\textcircled{6} 1v^1 \cdot 2v^0$$

$$2 \cdot v^{1+0}$$

$$2v^1$$

$$\textcircled{H} \frac{x^4 y^{-2} \cdot 2x^3 y^2}{(2y^2)^4} = \frac{2x^{4+3} y^{-2+2}}{2^4 y^8}$$

$$\frac{2^1}{2^4} = 2^{1-4} = 2^{-3} = \frac{1}{2^3} = \frac{1}{2 \cdot 2 \cdot 2} = \frac{1}{8}$$

$$= \frac{2^1 x^7 y^0}{2^4 y^8} = \frac{x^7}{8y^8}$$

Converting between Radical Form

$$\sqrt[a]{x^b} = x^{\frac{b}{a}}$$

$\frac{b}{a}$ exponent
Root

$$(\sqrt[a]{x})^b = x^{\frac{b}{a}}$$

Example 1

Change between radical notation and rational exponent notation

Rewrite the expression using rational exponent notation.

1. $(\sqrt[5]{63})^3$
 $(63)^{\frac{3}{5}}$

2. $(\sqrt[3]{-25})^4$
 $(-25)^{\frac{4}{3}}$

3. $(\sqrt[6]{124})^7$
 $(124)^{\frac{7}{6}}$

Rewrite the expression using radical notation.

4. $(-57)^{\frac{4}{3}}$
 $(\sqrt[3]{-57})^4$
 $\sqrt[3]{(-57)^4}$

5. $13^{\frac{3}{2}}$
 $(\sqrt{13})^3$

6. $204^{\frac{5}{8}}$
 $(\sqrt[8]{204})^5$

Example 2

Evaluate an expression without a calculator

a) $36^{3/2}$

$$(6^2)^{3/2}$$

$$6^{2 \cdot \frac{3}{2}} = 6^3$$

$$= 216$$

c) $16^{-1/4}$

$$2^4 \quad 4^2$$

$$(2^4)^{-1/4} = 2^{-1} = \frac{1}{2}$$

b) $64^{-1/6}$

$$(2^6)^{-1/6} = 2^{-1} = \frac{1}{2}$$

$$8^2 \quad 4^3 \quad 2^6$$

d) $8^{4/3}$

$$(2^3)^{4/3} = 2^4 = 16$$

$$16$$

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| <p>Example a Convert the following to a rational exponent</p> $\sqrt[5]{x^2 y^3 z^{10}} = \sqrt[5]{x^2} \cdot \sqrt[5]{y^3} \cdot \sqrt[5]{z^{10}}$ $(x^2 y^3 z^{10})^{\frac{1}{5}}$ $x^{\frac{2}{5}} y^{\frac{3}{5}} z^2$ | <p>Example b Convert the following to a radical</p> $x^{\frac{1}{2}} y^{\frac{5}{4}}$ $x^{\frac{2}{4}} y^{\frac{5}{4}}$ $\sqrt[4]{x^2 y^5}$ |
| <p>Example c Simplify the following</p> $(x^{\frac{2}{3}} y^{\frac{4}{9}})^{\frac{9}{2}}$ $x^{\frac{2}{3} \cdot \frac{9}{2}} y^{\frac{4}{9} \cdot \frac{9}{2}}$ $x^3 y^2$ | <p>Example d Simplify the following</p> $x^{\frac{1}{5}} x^{\frac{2}{3}}$ $\frac{1}{5} + \frac{2}{3} = \frac{3}{15} + \frac{10}{15}$ $x^{\frac{13}{15}}$ |



