Assignment

Complete pgs. 278-279

Questions 1 - 6

Solutions

SOLUTIONS ⇒ 5.1 WORKING WITH RADICALS

1. Copy and complete the table.

Mixed Radical Form	Entire Radical Form
$4\sqrt{7}$	$\sqrt{4^2(7)}=\sqrt{16(7)}=\sqrt{112}$
$\sqrt{2\times5\times5}=5\sqrt{2}$	$\sqrt{50}$
$-11\sqrt{8}$	$-\sqrt{(11)^2(8)}=-\sqrt{121(8)}=-\sqrt{968}$
$-\sqrt{2\times2\times2\times5\times5}=-(5)(2)\sqrt{2}$ $=-10\sqrt{2}$	$-\sqrt{200}$

2. Express each radical as a mixed radical in simplest form.

a) $\sqrt{56}$
$=\sqrt{2\times2\times2\times7}$
$=2\sqrt{2\times7}$
$=2\sqrt{14}$

b) $3\sqrt{75}$
$=3\sqrt{3\times5\times5}$
$=3(5)\sqrt{3}$
$=15\sqrt{3}$

c) $\sqrt[3]{24}$
$=\sqrt[3]{2\times2\times2\times3}$
$=2\sqrt[3]{3}$

d) $\sqrt{c^3d^2}$, $c\geq0, d\geq0$
$=\sqrt{c^2(c)(d^2)}$
$=cd\sqrt{c}$

$$\sqrt[2]{(\cancel{c})(\cancel{c})(c)(\cancel{d})(\cancel{d})}$$

$cd\sqrt{c}$

Solutions

3. Write each expression in simplest form. Identify the values of the variable for which the radical represents a real number.

a) $3\sqrt{8m^4}$
$= 3\sqrt{2\times2\times2(m^2)(m^2)}$
$= 3(2)m^2\sqrt{2}$
$= 6m^2\sqrt{2}, m\in R$

b) $\sqrt[3]{24q^5}$
$= \sqrt[3]{2\times2\times2\times3(q^3)(q^2)}$
$= 2q\sqrt[3]{3q^2}, q\in R$

d) $-2\sqrt[5]{160s^5t^6}$
$= -2\sqrt[5]{2\times2\times2\times2\times2\times5(s^5)(t^5)(t)}$
$= -2(2)st\sqrt[5]{5t}$
$= -4st\sqrt[5]{5t}, \ s,t\in R$

4. Copy and complete the table. State the values of the variable for which the radical represents a real number.

Mixed Radical Form	Entire Radical Form
$3n\sqrt{5}$	$\sqrt{(3n)^2(5)} = \sqrt{9n^2(5)} = \sqrt{45n^2}$ $\{\sqrt{45n^2}, n\geq0 \text{ or } -\sqrt{45n^2}, n<0\}$
$\sqrt[3]{2\times2\times2\times2\times-3\times-3\times-3}$ $= (2)(-3)\sqrt[3]{2}$ $= -6\sqrt[3]{2}$	$\sqrt[3]{-432}$
$\frac{1}{2a}\sqrt[3]{7a}$	$\sqrt[3]{\left(\frac{1}{2a}\right)^3(7a)} = \sqrt[3]{\frac{1}{8a^3}(7a)}$ $= \sqrt[3]{\frac{7a}{8a^3}}$ $= \sqrt[3]{\frac{7}{8a^2}}, a\neq0$
$\sqrt[3]{2\times2\times2\times2\times2\times2\times2\times x^3\times x}$ $= (2)(2)x\sqrt[3]{2x}$ $= 4x\sqrt[3]{2x}$	$\sqrt[3]{128x^4}$

Solutions

5. Express each pair of terms as like radicals. Explain your strategy.

a) $15\sqrt{5}$ and $8\sqrt{125}$ {Express both radicals in terms of $\sqrt{5}$}

$= 8\sqrt{5 \times 5 \times 5}$

$= (8)(5)\sqrt{5}$

$= 40\sqrt{5}$

b) $8\sqrt{112z^8}$ and $48\sqrt{7z^4}$ {Express both radicals in terms of $\sqrt{7}$}

$= 8\sqrt{(2)(2)(2)(2)(7)(z^2)(z^2)(z^2)(z^2)}$

$= 8(2)(2)(z)(z)(z)(z)\sqrt{7}$

$= 32z^4\sqrt{7}$

$48\sqrt{7z^4}$

$= 48\sqrt{7(z^2)(z^2)}$

$= 48(z)(z)\sqrt{7}$

$= 48z^2\sqrt{7}$

c) $-35\sqrt[4]{w^2}$ and $3\sqrt[4]{81w^{10}}$ {Express both radicals in terms of $\sqrt{w^2}$}

$= 3\sqrt[4]{(3)(3)(3)(3)(w^4)(w^4)(w^2)}$

$= 3(3)(w)(w)\sqrt[4]{w^2}$

$= 9w^2\sqrt[4]{w^2}$

d) $6\sqrt[3]{2}$ and $6\sqrt[3]{54}$ {Express both radicals in terms of $\sqrt{2}$}

$= 6\sqrt[3]{(2)(3)(3)(3)}$

$= 6(3)\sqrt[3]{2}$

$= 18\sqrt[3]{2}$

Solutions

6. Order each set of numbers from least to greatest.

a) $3\sqrt{6}$, 10, $7\sqrt{2}$

$3\sqrt{6} = \sqrt{3^2(6)} = \sqrt{(9)(6)} = \sqrt{54}$

$10 = \sqrt{100}$

$7\sqrt{2} = \sqrt{7^2(2)} = \sqrt{(49)(2)} = \sqrt{98}$

The numbers from least to greatest are $3\sqrt{6}$, $7\sqrt{2}$, and 10.

b) $-2\sqrt{3}$, -4, $-3\sqrt{2}$, and $-2\sqrt{\frac{7}{2}}$

$-2\sqrt{3} = -\sqrt{2^2(3)} = -\sqrt{(4)(3)} = -\sqrt{12}$

$-4 = -\sqrt{16}$

$-3\sqrt{2} = -\sqrt{3^2(2)} = -\sqrt{(9)(2)} = -\sqrt{18}$

$-2\sqrt{\frac{7}{2}} = -\sqrt{(2)^2\left(\frac{7}{2}\right)} = -\sqrt{(4)\left(\frac{7}{2}\right)} = -\sqrt{\frac{28}{2}} = -\sqrt{14}$

The numbers from least to greatest are $-3\sqrt{2}$, -4, $-2\sqrt{\frac{7}{2}}$, and $-2\sqrt{3}$.

c) $\sqrt[3]{21}$, $3\sqrt[3]{2}$, 2.8, $2\sqrt[3]{5}$

$\sqrt[3]{21}$

$3\sqrt[3]{2} = \sqrt[3]{3^3(2)} = \sqrt[3]{(27)(2)} = \sqrt[3]{54}$

$2.8 = \sqrt[3]{2.8^3} = \sqrt[3]{21.952}$

$2\sqrt[3]{5} = \sqrt[3]{2^3(5)} = \sqrt[3]{(8)(5)} = \sqrt[3]{40}$

The numbers from least to greatest are $\sqrt[3]{21}$, 2.8, $2\sqrt[3]{5}$, and $3\sqrt[3]{2}$.

Attachments

M0705001.IPP

Nesting Squares.gsp