CHAMPLAIN REGIONAL COLLEGE ST. LAWRENCE

MATH DEPT. SOLUTION TO TUTORIAL 5

Solution 5: Law of exponents: square roots, radicals, nth roots, rationalizing.

1. Evaluate each of the following

(a) $\sqrt[3]{64} = 4$

(b) $\sqrt[3]{-216} = -6$

(c) $(81)^{3/4} = 27$

(d) $\sqrt[3]{\frac{27}{8}} = \frac{3}{2}$

(e) $(\frac{16}{81})^{-3/4} = \frac{27}{8}$

(f) $\sqrt[4]{(562)^4} = 562$

2. Remove all possible factors from the radical.

(a) $\sqrt[3]{\frac{16}{27}} = \frac{2}{3}\sqrt[3]{2}$

(b) $54\sqrt{xy^2} = 3y\sqrt{6x}$

(c) $\sqrt[5]{96x^5} = 2x\sqrt[5]{3}$

(d) $\sqrt{\frac{18x^2}{z^3}} = \frac{3x}{z}\sqrt{\frac{2}{z}}$

(e) $\sqrt[3]{72x^3} = 2x\sqrt[3]{9}$

3. Rationalize the denominator. Then simplify if possible.

(a) $\frac{5}{\sqrt{10}} = \frac{1}{2}\sqrt{10}$

(b) $\frac{8}{\sqrt[3]{2}} = 4\,(2)^{2/3}$

(c) $\frac{2x}{5-\sqrt{3}} = \frac{x}{8}(5+\sqrt{3})$

(d) $\frac{3}{\sqrt{5}-\sqrt{6}} = -3(\sqrt{5}+\sqrt{6})$

4. Rationalize the numerator. Then simplify if possible.

(a) $\frac{\sqrt{8}}{4} = \frac{1}{\sqrt{2}}$

(b) $\frac{1+\sqrt{3}}{1-\sqrt{3}} = -\frac{1}{2}(1+\sqrt{3})^2$

(c) $\frac{\sqrt[3]{4}}{6} = \frac{2}{3(4)^{2/3}}$

(d) $\frac{\sqrt{x}+1}{x^2-1} = \frac{1}{(x+1)(\sqrt{x}-1)}$

5. Change from radical to exponential form.

(a) $\sqrt[4]{3^2} = 3^{1/2}$

(b) $\sqrt[6]{(x+2)^4} = (x+2)^{2/3}$

(c) $\sqrt{\sqrt{32}} = (32)^{1/4}$

(d) $\sqrt{\sqrt[4]{2x}} = (2x)^{1/8}$

6. Simplify.

(a) $5\sqrt{x} - 3\sqrt{x} = 2\sqrt{x}$

(b) $4\sqrt{27} - \sqrt{75} = 7\sqrt{3}$

(c) $-2\sqrt{9y} + 10\sqrt{y} = 4\sqrt{y}$

(d) $5^{4/3}\,5^{8/3} = 5^4$

(e) $\frac{(2x^2)^{3/2}}{\sqrt{2}\,x^4} = \frac{2}{x}$

(f) $\frac{x^{4/3}\,y^{2/3}}{(xy)^{1/3}} = x\,y^{1/3}$