

Math 0408 – Intermediate Algebra  
Operations with Radicals

Perform the indicated operation and simplify:

1.  $\sqrt{48a^2b^3c^4}$

2.  $\sqrt[3]{48a^2b^3c^4}$

3.  $\sqrt[5]{243x^7y^{10}z^5}$

4.  $9a\sqrt{20a^3b^2} + 7b\sqrt{45a^5}$

5.  $b^3\sqrt{24a^5b} + 3a^3\sqrt{81a^2b^4}$

6.  $x^4\sqrt{5xy^8} + y^4\sqrt{405x^5y^4} + y^2\sqrt[4]{80x^5}$

7.  $(2\sqrt{a} - 3\sqrt{b})^2$

8.  $(\sqrt{x} + 5)(\sqrt{x} - 3)$

9.  $\sqrt{\frac{1}{6}}$

10.  $\frac{5}{\sqrt[3]{3}}$

11.  $\sqrt[4]{\frac{1}{8x^3}}$

12.  $\frac{\sqrt{x} - 1}{2 - \sqrt{x}}$

Solutions:

1.  $\sqrt{48a^2b^3c^4}$

$$4abc^2\sqrt{3b}$$

3.  $\sqrt[5]{243x^7y^{10}z^5}$

$$3xy^2z\sqrt[5]{x^2}$$

5.  $b^3\sqrt{24a^5b} + 3a^3\sqrt{81a^2b^4}$

$$11ab^3\sqrt{3a^2b}$$

7.  $(2\sqrt{a} - 3\sqrt{b})^2$

$$4a - 12\sqrt{ab} + 9b$$

9.  $\sqrt{\frac{1}{6}}$

$$\frac{\sqrt{6}}{6}$$

11.  $\sqrt[4]{\frac{1}{8x^3}}$

$$\frac{\sqrt[4]{2x}}{2x}$$

2.  $\sqrt[3]{48a^2b^3c^4}$

$$2bc\sqrt[3]{6a^2c}$$

4.  $9a\sqrt{20a^3b^2} + 7b\sqrt{45a^5}$

$$39a^2b\sqrt{5a}$$

6.  $x^4\sqrt{5xy^8} + y^4\sqrt{405x^5y^4} + y^2\sqrt[4]{80x^5}$

$$6xy^2\sqrt[4]{5x}$$

8.  $(\sqrt{x} + 5)(\sqrt{x} - 3)$

$$x + 2\sqrt{x} - 15$$

10.  $\frac{5}{\sqrt[3]{3}}$

$$\frac{5\sqrt[3]{9}}{3}$$

12.  $\frac{\sqrt{x} - 1}{2 - \sqrt{x}}$

$$\frac{x + 2\sqrt{x} - 2}{4 - x}$$