

**Elementary Algebra**  
**Skill-BUILDER # SQRT – 4**  
**Dividing Square Root Radicals**

To divide square root radicals we divide the radicands following the rule:

$$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}, \quad b \neq 0.$$

**Examples** Perform the division.

1.  $\frac{\sqrt{20}}{\sqrt{5}}$

Solution:  $\frac{\sqrt{20}}{\sqrt{5}} = \sqrt{\frac{20}{5}} = \sqrt{4} = 2$

We can have variables which we assume to represent positive real numbers.

2.  $\frac{\sqrt{72x^5y^3}}{\sqrt{2xy}}$

Solution:  $\frac{\sqrt{72x^5y^3}}{\sqrt{2xy}} = \sqrt{\frac{72x^5y^3}{2xy}} = \sqrt{36x^4y^2} = 6x^2y$

We can have factors sitting outside the radicals.

3.  $\frac{8a\sqrt{75a^3b^7}}{5b\sqrt{3ab^9}}$

Solution:  $\frac{8a\sqrt{75a^3b^7}}{5b\sqrt{3ab^9}} = \frac{8a}{5b} \cdot \sqrt{\frac{75a^3b^7}{3ab^9}} = \frac{8a}{5b} \cdot \sqrt{\frac{25a^2}{b^2}} = \frac{8a}{5b} \cdot \frac{5a}{b} = \frac{8a^2}{b^2}$

We can combine division with multiplication.

4.  $\frac{(2x\sqrt{3xy^5})(y\sqrt{8x^2y^3})}{-4y\sqrt{6x^5y}}$

Solution:

$$\frac{(2x\sqrt{3xy^5})(y\sqrt{8x^2y^3})}{-4y\sqrt{6x^5y}} = \frac{2xy}{-4y} \cdot \sqrt{\frac{3xy^5 \cdot 8x^2y^3}{6x^5y}} = \frac{2xy}{-4y} \cdot \sqrt{\frac{24x^7y^8}{6x^5y}} = \frac{2xy}{-4y} \cdot \sqrt{4x^2y^7} = \frac{2xy}{-4y} \cdot \frac{2xy}{1} = -x^2$$

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Find the following. Assume all variables represent positive real numbers.

1. $\frac{\sqrt{108}}{\sqrt{3}}$	2. $\frac{\sqrt{72}}{\sqrt{8}}$
3. $\frac{\sqrt{50x^5}}{\sqrt{2x}}$	4. $\frac{\sqrt{63ab^7}}{\sqrt{7a^3b}}$
5. $\frac{15x^2\sqrt{28xy^3}}{2y\sqrt{63x^3y}}$	6. $\frac{7a^2\sqrt{162ab^2}}{12b\sqrt{98a^5}}$
7. $\frac{(2\sqrt{6})(3\sqrt{15})}{(4\sqrt{8})(\sqrt{20})}$	8. $\frac{(ab\sqrt{9ab^2})(6b\sqrt{3a^2b})}{18\sqrt{ab}}$

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**Answers**

1. 6	2. 3
3. $5x^2$	4. $\frac{3b^3}{a}$
5. $5x$	6. $\frac{3}{4}$
7. $\frac{9}{8}$	8. $a^2b^3\sqrt{3}$

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