Division of Radicals

To divide $a\sqrt{b}$ by $c\sqrt{d}$ we divide the coefficients to get the coefficient of the quotient and divide the radicands to get the radicand of the quotient. (As in multiplication, this process has no meaning if the indexes are not alike.)

Thus, $a\sqrt{b} \div c\sqrt{d} = \frac{a}{c} \cdot \sqrt{\frac{b}{d}}$

Example 1. $\frac{\sqrt{21}}{\sqrt{3}} = \sqrt{\frac{21}{3}} = \sqrt{7}$

Example 2. $12\sqrt{6} \div 3\sqrt{2} = 4\sqrt{3}$

Example 3. $\frac{5}{\sqrt{5}} = \frac{\sqrt{5} \cdot \sqrt{5}}{\sqrt{5}} = \sqrt{5}$

Exercises [A]

Divide, and simplify the results if possible.

1. $\sqrt{12}/\sqrt{3}$
2. $\sqrt{27}/\sqrt{9}$
3. $\sqrt{14}/\sqrt{7}$
4. $\sqrt{15} \div \sqrt{3}$
5. $2\sqrt{35} \div \sqrt{5}$
6. $\sqrt{18} \div \sqrt{3}$
7. $\sqrt{45} \div 2\sqrt{5}$
8. $\sqrt{52} \div \sqrt{13}$
9. $\sqrt{6\,a^2b} \div \sqrt{2\,ab}$
10. $\sqrt{4\,a^3b^2} \div \sqrt{4\,a^3b}$
11. $\sqrt{20\,a^4} \div \sqrt{10}$
12. $14\sqrt{10} \div 7\sqrt{2}$
13. $3/\sqrt{3}$
14. $7/\sqrt{7}$
15. $\sqrt{9} \div \sqrt{3}$
16. $\sqrt{3\,x} \div \sqrt{x}$
17. $\sqrt{5\,y^3} \div \sqrt{y}$
18. $\sqrt{\frac{2}{3}} \div \sqrt{\frac{3}{2}}$
19. $\sqrt{\frac{1}{2}} \div \sqrt{\frac{1}{8}}$
20. $\sqrt{6} \div \sqrt{\frac{2}{3}}$
21. $\sqrt{\frac{7}{6}} \div \sqrt{6}$

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1. 2
2. $\sqrt{3}$
3. $\sqrt{2}$
4. $\sqrt{5}$
5. $2\sqrt{7}$
6. $\sqrt{6}$
7. $\frac{3}{2}$
8. 2
9. $\sqrt{3a}$
10. $\sqrt{b}$
11. $a^2\sqrt{2}$
12. $2\sqrt{5}$
13. $\sqrt{3}$
14. $\sqrt{7}$
15. $\sqrt{3}$
16. $\sqrt{3}$
17. $y\sqrt{5}$
18. $\frac{2}{3}$
19. 2
20. 3
21. $\frac{1}{6}\sqrt{7}$

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1. $2 + \sqrt{2}$
2. $4\sqrt{3} - 6$
3. $\sqrt{5} + 5$
4. $2\sqrt{10} - 4$
5. $4\sqrt{3} - 3\sqrt{2}$
6. $\sqrt{3} + 1$
7. $2 - \sqrt{2}$
8. $4\sqrt{5}$
9. $12 + 7\sqrt{6}$
10. $9 - 6\sqrt{3}$
11. 2
12. $5 + 2\sqrt{6}$