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| |  | | --- | | **Multiplication/Division  of Radicals** | |

(For this lesson, the term "radical" will refer only to "square root".)

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| When **multiplying** radicals, you must multiply the numbers **OUTSIDE (O)** the radicals**AND** then multiply the numbers **INSIDE (I)**the radicals. http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd1.gif  http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd2.gif |
| When **dividing** radicals, you must divide the numbers **OUTSIDE (O**) the radicals **AND** then divide the numbers**INSIDE (I)**the radicals.  http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd3.gif           such as ...        http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd4.gif |
| Should a radical appear in the denominator of a fraction, it will need to be "removed" if you are trying to simplify the expression.  To "remove" a radical from the denominator, multiply the top and bottom of the fraction  by that same radical to create a rational number (a perfect square radical) in the denominator. This process is called ***rationalizing the denominator.***  http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd5.gif http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd6.gif |

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| **Example 1:** |

http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd7.gif

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| 1.  Multiply the outside numbers first | 2 • 3 = 6 | http://www.regentsprep.org/regents/math/algebra/ao1/radioguy2.gif |
| 2.  Multiply the inside numbers | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd8.gif |
| 3.  Put steps 1 and 2 together and simplify | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd9.gif |
| 4.  **Answer:** | 72 |

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| **Example 2:** |

http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd10.gif

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| 1.  Multiply the outside numbers first | 5 • 7 = 35 | http://www.regentsprep.org/regents/math/algebra/ao1/radioguy.gif | |
| 2.  Multiply the inside numbers | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd11.gif |
| 3.  Put steps 1 and 2 together. | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd12.gif |
| 4.  **Answer:** | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd12.gif |
| **Example 3:** | | |

http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd13.gif

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| 1.  Multiply the outside numbers first | 3 • 1 = 3 | http://www.regentsprep.org/regents/math/algebra/ao1/radioguy2.gif |
| 2.  Multiply the inside numbers | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd14.gif |
| 3.  Put steps 1 and 2 together and      simplify. | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd15.gif |
| 4.  **Answer:** | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd16.gif |

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| **Example 4:** |

http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd17.gif

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| 1.  Remember that this expression is: | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd18.gif | http://www.regentsprep.org/regents/math/algebra/ao1/radioguy.gif |
| 2.  Multiply using distribution (or FOIL): | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd19.gif |
| 3.  Simplify. | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd20.gif |
| 4.  **Answer:** | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd21.gif |

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| **Example 5:** |

http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd22.gif

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| 1.  Divide the outside numbers first. | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd23.gif | http://www.regentsprep.org/regents/math/algebra/ao1/radioguy2.gif |
| 2.  Divide the inside numbers. | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd24.gif |
| 3.  Put steps 1 and 2 together and simplify. | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd25.gif | |
| 4.  **Answer:** | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd26.gif | |

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| **Example 6:** |

http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd27.gif

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| 1.  Multiply top and bottom by the radical. | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd28.gif | http://www.regentsprep.org/regents/math/algebra/ao1/radioguy.gif |
| 2.  **Answer:** | http://www.regentsprep.org/regents/math/algebra/ao1/Lmultd29.gif |