|  |  |
| --- | --- |
|

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

 |

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

|  |
| --- |
| 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.gifhttp://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.gifhttp://www.regentsprep.org/regents/math/algebra/ao1/Lmultd6.gif  |

|  |
| --- |
| **Example 1:** |



|  |  |  |
| --- | --- | --- |
| 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 |

|  |
| --- |
| **Example 2:** |



|  |  |  |
| --- | --- | --- |
| 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:** |



|  |  |  |
| --- | --- | --- |
| 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 |

|  |
| --- |
| **Example 4:** |



|  |  |  |
| --- | --- | --- |
| 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 |

|  |
| --- |
| **Example 5:** |



|  |  |  |
| --- | --- | --- |
| 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 |

|  |
| --- |
| **Example 6:** |



|  |  |  |
| --- | --- | --- |
| 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 |