### Properties of Radicals

<table>
<thead>
<tr>
<th>Rule</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \sqrt{a} \cdot \sqrt{a} = a ) if ( a \geq 0 )</td>
<td>( \sqrt{3} \cdot \sqrt{3} = 3 )</td>
</tr>
<tr>
<td>( \frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}} ) if ( b \neq 0 )</td>
<td>( \frac{\sqrt{84}}{\sqrt{21}} = \sqrt{\frac{84}{21}} = \sqrt{4} = 2 )</td>
</tr>
<tr>
<td>( n\sqrt{a^m} = (\sqrt[n]{a})^m = a^{m/n} )</td>
<td>( 3\sqrt{8^2} = (\sqrt[3]{8})^2 = 8^{2/3} = 4 )</td>
</tr>
<tr>
<td>( \sqrt[n]{ab} = \sqrt[n]{a} \sqrt[n]{b} )</td>
<td>( \sqrt[3]{8x^4} = \sqrt[3]{8x^3} \sqrt[3]{x} = 2x \sqrt[3]{x} )</td>
</tr>
<tr>
<td>( m\sqrt[n]{a} = mn\sqrt{a} )</td>
<td>( 3\sqrt[3]{x} = 6\sqrt{x} )</td>
</tr>
</tbody>
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### Properties of Exponents

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<tr>
<td>( a^{-n} = \frac{1}{a^n} ) if ( a \neq 0 )</td>
<td>( 6^{-2} = \frac{1}{6^2} = \frac{1}{36} )</td>
</tr>
<tr>
<td>( a^m a^n = a^{m+n} )</td>
<td>( x^5 x^2 = x^7 )</td>
</tr>
<tr>
<td>((ab)^m = a^m b^m )</td>
<td>( (2x)^3 = 2^3 x^3 = 8x^3 )</td>
</tr>
<tr>
<td>( \frac{a^m}{a^n} = a^{m-n} ) if ( a \neq 0 )</td>
<td>( \frac{2^8}{2^5} = 2^{8-5} = 2^3 = 8 )</td>
</tr>
<tr>
<td>( \frac{b^m}{b^n} = b^{m-n} ) if ( b \neq 0 )</td>
<td>( \frac{2^5}{2^8} = 2^{5-8} = 2^{-3} = \frac{1}{2^3} = \frac{1}{8} )</td>
</tr>
<tr>
<td>( \left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} )</td>
<td>( \left(\frac{2}{3}\right)^4 = \frac{2^4}{3^4} = \frac{16}{81} )</td>
</tr>
<tr>
<td>( \left(\frac{a}{b}\right)^{-n} = (\frac{b}{a})^n ) if ( a, b \neq 0 )</td>
<td>( \left(\frac{2}{3}\right)^{-3} = \left(\frac{3}{2}\right)^3 = \frac{27}{8} )</td>
</tr>
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</table>