

## Multiplying Polynomials Containing Radicals

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$$\textcircled{1} \quad 3\sqrt{7} (2\sqrt{12} - 4\sqrt{9})$$

$$6\sqrt{84} - 36\sqrt{7}$$

$$6\sqrt{4 \cdot 21} - 36\sqrt{7}$$

$$12\sqrt{21} - 36\sqrt{7}$$

$$(2+x)(3-y)$$

$$\textcircled{2} \quad (2+\sqrt{7})(3-\sqrt{3})$$

$$6 - 2\sqrt{3} + 3\sqrt{7} - \sqrt{21}$$

$$\textcircled{3} \quad (3-4\sqrt{6}) \cdot (3\sqrt{6}+4)$$

$$9\sqrt{6} + 12 - 12\sqrt{36} - 16\sqrt{6}$$

$$9\sqrt{6} + 12 - 12(6) - 16\sqrt{6}$$

$$\underline{9\sqrt{6}} + 12 - 72 - \underline{16\sqrt{6}}$$

$$-7\sqrt{6} - 60$$

e.g.

$$2\sqrt{3} (4\sqrt{6} - 2) + 4\sqrt{6} (3\sqrt{3} + 2) - 8$$

$$\underline{8\sqrt{18}} - 4\sqrt{3} + \underline{12\sqrt{18}} + 8\sqrt{6} - 8$$

$$20\sqrt{18} - 4\sqrt{3} + 8\sqrt{6} - 8$$

$$20\sqrt{2 \cdot 9} - 4\sqrt{3} + 8\sqrt{6} - 8$$

$$60\sqrt{2} - 4\sqrt{3} + 8\sqrt{6} - 8$$

More on Rationalizing  
the Denominator :

$$\begin{aligned}
 \textcircled{1} \quad \frac{4\sqrt{48}}{-3\sqrt{72}} &= \frac{4\sqrt{16 \cdot 3}}{-3\sqrt{2 \cdot 36}} \\
 &= \frac{16\sqrt{3}}{-18\sqrt{2}} \\
 &= \frac{-8\sqrt{3}}{9\sqrt{2}} \quad \sqrt{2} \\
 &= \frac{-8\sqrt{6}}{9\sqrt{4}} = \frac{-8\sqrt{6}}{18 \div 2} \\
 &= \boxed{\frac{-4\sqrt{6}}{9}}
 \end{aligned}$$

e.g.  $\frac{-6\sqrt{27}}{\sqrt{45}}$

$$\begin{aligned}
 &= \frac{-6\sqrt{3 \cdot 9}}{\sqrt{5 \cdot 9}} = \frac{-18\sqrt{3}}{3\sqrt{5}} \quad \sqrt{5} \\
 &= \frac{-18\sqrt{15}}{3\sqrt{25}} \\
 &= \frac{-18\sqrt{15}}{15 \div 3} \\
 &= \frac{-6\sqrt{15}}{5}
 \end{aligned}$$

Recall

$$4x^2 - 16$$

Conjugates  
(one -, one +)

$$(2x - 4)(2x + 4)$$

$$4x^2 + \cancel{8x} - \cancel{8x} - 16$$

Rationalize a Denominator  
Which is a Binomial.

e.g.

$$\frac{-2\sqrt{3}}{3\sqrt{5} + 5} \quad (3\sqrt{5} - 5)$$

$$\quad \quad \quad (3\sqrt{5} - 5)$$

→ Must multiply top + bottom  
by the conjugate radical  
of the denominator.

$$\frac{-2\sqrt{3}}{3\sqrt{5} + 5} \cdot \frac{(3\sqrt{5} - 5)}{(3\sqrt{5} - 5)}$$

$$= \frac{-6\sqrt{15} + 10\sqrt{3}}{9\sqrt{25} - 15\sqrt{5} + 15\sqrt{5} - 25}$$

$$= \frac{-6\sqrt{15} + 10\sqrt{3}}{45 - 25}$$

$$= \frac{-6\sqrt{15} + 10\sqrt{3}}{20} = \frac{2^{\div 2}(-3\sqrt{15} + 5\sqrt{3})}{20^{\div 2}}$$

$$= \frac{-3\sqrt{15} + 5\sqrt{3}}{10}$$

$$\begin{aligned}
 & \frac{4\sqrt{6} \quad (2\sqrt{6}+3)}{2\sqrt{6}-3 \quad (2\sqrt{6}+3)} \\
 &= \frac{8\sqrt{36} + 12\sqrt{6}}{4\sqrt{36} - 9} \\
 &= \frac{48 + 12\sqrt{6}}{24 - 9} = \frac{48 + 12\sqrt{6}}{15} \\
 &= \boxed{\frac{16 + 4\sqrt{6}}{5}}
 \end{aligned}$$

→ The End

→ Finish Review Booklet

→ " Quiz Pkg

→ " Pretest