

# 5.2 notes pt 1

Tuesday, March 10, 2020 1:11 PM

ex  $(2x)(3x) = 6x^2$        $(2\sqrt{3})(3\sqrt{5}) = 6\sqrt{15}$

PreCalc 11

## 5.2-Working with Radicals pt 1 Multiplying

When **multiplying** radicals: multiply the **coefficients** together and multiply the **radicands** together. Then simplify the **radicand** where possible.

Note that you can only multiply radicals if they have the **same index**.

$\sqrt{3} \cdot \sqrt{3} = \sqrt{9} = 3$ $(\sqrt{3})^2$	$2\sqrt[3]{x} \cdot 3\sqrt[3]{x^4} = 6\sqrt[3]{x^5}$ $= 6\sqrt[3]{x^3 \cdot x^2}$ $= 6x\sqrt[3]{x^2}$
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Expand the radical expression  $(4\sqrt{7})(4\sqrt{75}) \rightarrow$  simplify first

$$= 16\sqrt{525}$$

$$= 16 \cdot 5\sqrt{21}$$

$$= \boxed{80\sqrt{21}}$$

$$\sqrt{525}$$

$$= \sqrt{25 \cdot 21}$$

$$= 5\sqrt{21}$$

$$(4\sqrt{7})(4\sqrt{75})$$

$$= (4\sqrt{7})(4 \cdot 5\sqrt{3})$$

$$= \boxed{80\sqrt{21}}$$

$$\sqrt{75}$$

$$= \sqrt{25} \sqrt{3}$$

$$= 5\sqrt{3}$$

$$(\sqrt{3})^2 = 3$$

Distribute:

Expand  $7\sqrt{3}(5\sqrt{5} - 6\sqrt{3})$

$$= 35\sqrt{15} - 42 \cdot 3$$

$$= \boxed{35\sqrt{15} - 126}$$

Expand  $(8\sqrt{2} - \sqrt{5})(9\sqrt{5} + 6\sqrt{10})$

$$= 72\sqrt{10} + 48\sqrt{20} - 9 \cdot 5 - 6\sqrt{50}$$

$$= 72\sqrt{10} + 48 \cdot 2\sqrt{5} - 45 - 6 \cdot 5\sqrt{2}$$

$$= 72\sqrt{10} + 96\sqrt{5} - 45 - 30\sqrt{2}$$

$\rightarrow$  Reorder in decreasing radicand order.

$$= 72\sqrt{10} + 96\sqrt{5} - 30\sqrt{2} - 45$$

$$\sqrt{20}$$

$$= \sqrt{4} \sqrt{5}$$

$$= 2\sqrt{5}$$

$$\sqrt{50}$$

$$= \sqrt{25} \sqrt{2}$$

$$= 5\sqrt{2}$$

$$\begin{aligned}
 & (3\sqrt{3x} - 2\sqrt{8x^2})^2 \\
 &= (3\sqrt{3x} - 2\sqrt{8x^2})(3\sqrt{3x} - 2\sqrt{8x^2}) \\
 &= 9 \cdot 3x - 6\sqrt{24x \cdot x^2} - 6\sqrt{24x \cdot x^2} + 4 \cdot 8x^2 \\
 &= 27x - 6\sqrt{24} \cdot \sqrt{x \cdot x^2} - 6\sqrt{24} \cdot \sqrt{x \cdot x^2} + 32x^2 \\
 &= 27x - 12x\sqrt{6x} - 12x\sqrt{6x} + 32x^2 \\
 &= 27x - 24x\sqrt{6x} + 32x^2 \\
 & \text{Reorder:} \\
 &= \boxed{32x^2 + 27x - 24x\sqrt{6x}}
 \end{aligned}$$

$$\begin{aligned}
 & [(3\sqrt{3} - 2\sqrt{2})(4\sqrt{5} + \sqrt{2})] + [3\sqrt{3}(3\sqrt{3} - \sqrt{2})] \\
 &= [12\sqrt{15} + 3\sqrt{6} - 8\sqrt{10} - 2 \cdot 2] + [9 \cdot 3 - 3\sqrt{6}] \\
 &= 12\sqrt{15} - 8\sqrt{10} - 4 + 27 \\
 &= \boxed{12\sqrt{15} - 8\sqrt{10} + 23}
 \end{aligned}$$

$$\begin{aligned}
 & [(2\sqrt{7} + 4\sqrt{2}) \cdot (2\sqrt{7} - 4\sqrt{2})] \cdot (3\sqrt{5} + \sqrt{6}) \\
 &= (4 \cdot 7 - 8\sqrt{4} + 8\sqrt{4} - 16 \cdot 2)(3\sqrt{5} + \sqrt{6}) \\
 &= (28 - 32)(3\sqrt{5} + \sqrt{6}) \\
 &= (-4)(3\sqrt{5} + \sqrt{6}) \\
 &= \boxed{-12\sqrt{5} - 4\sqrt{6}}
 \end{aligned}$$

HW: p 289 Questions: 1abc, 2abd, 3ac, 4abc, 5