

II. Multiplying with Radicals

When **multiplying** radicals, you must multiply the numbers outside the radicals AND then multiply the numbers inside the radicals.

Then Simplify!!!

Example: $O_1 \sqrt{I_1} \cdot O_2 \sqrt{I_2} = O_1 \cdot O_2 \cdot \sqrt{I_1 \cdot I_2}$

$$2\sqrt{3} * 4\sqrt{5} = 2 * 4 * \sqrt{3 * 5} = 8\sqrt{15}$$

$$\sqrt{6} (\sqrt{6} - \sqrt{2})$$

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

$$\boxed{\sqrt{6} - 2\sqrt{3}}$$

Use the FOIL method when multiplying two expressions with radicals that cannot be simplified into a monomial.

$$(6 - \sqrt{5})(3 + \sqrt{5}) = \text{F} \quad \text{O} \quad \text{I} \quad \text{L}$$

$$= (6)(3) + (6)(\sqrt{5}) + (-\sqrt{5})(3) + (-\sqrt{5})(\sqrt{5})$$

$$= 18 + 6\sqrt{5} - 3\sqrt{5} - 5$$

$$= \boxed{13 + 3\sqrt{5}}$$

	6	$-\sqrt{5}$
3	18	$-3\sqrt{5}$
$+\sqrt{5}$	$6\sqrt{5}$	-5

$-\sqrt{5 \cdot 5}$

NOW YOU PRACTICE:

Simplify the following expressions:

1) $(4 + \sqrt{3})(4 - \sqrt{3})$

$$16 - 4\sqrt{3} + 4\sqrt{3} - \sqrt{9} = \boxed{13}$$

2) $(6 - \sqrt{10})(3 + \sqrt{20})$

3) $\sqrt{8}(\sqrt{2} + \sqrt{3})$

4) $(2 - \sqrt{6})(2 - \sqrt{6}) = \boxed{10 - 4\sqrt{6}}$

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

$$\sqrt{6} + \sqrt{10} - 3 - \sqrt{15}$$

$$\boxed{-3 + \sqrt{6} + \sqrt{10} - \sqrt{15}}$$

$\sqrt{24}$
 $(2\sqrt{12})$
 $(2\sqrt{4 \cdot 3})$
 $2 \cdot 2 \cdot 3$

$5 \cdot -2\sqrt{50}$
 $2 \cdot 25$
 $5 \cdot 5$

$$\boxed{18 - 10\sqrt{2} + 12\sqrt{5} - 3\sqrt{10}}$$

	2	$-\sqrt{6}$
2	4	$-2\sqrt{6}$
$-\sqrt{6}$	$-2\sqrt{6}$	6