

Unit 1: Radicals

1.3 Multiplying Radicals

Warm Up: Adding/Subtracting radicals was similar to adding/subtracting polynomials. Multiplying is also similar to polynomials.

a) $2xy^3(5xy - 2x^2)$
 $= 10x^2y^4 - 4x^3y^3$

b) $(2x + 5)(3x - 4)$
 $= 6x^2 - 8x + 15x - 20$
 $= 6x^2 + 7x - 20$

c) $(4a - 5b)^2$
 $= (4a - 5b)(4a - 5b)$
 $= 16a^2 - 20ab - 20ab + 25b^2$
 $= 16a^2 - 40ab + 25b^2$

Rule: Multiply coefficients by coefficient and radicands by radicands. Simplify.


"Numbers in front multiply. Numbers underneath multiply."

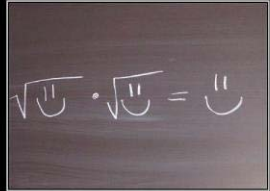
Ex.)

a) $3\sqrt{12} \cdot \sqrt{6}$
 $= 3\sqrt{2 \cdot 3} \cdot \sqrt{6}$
 $= 6\sqrt{3} \cdot \sqrt{6}$
 $= 6\sqrt{18}$
 $= 6\sqrt{9 \cdot 2}$
 $= 18\sqrt{2}$

b) $\sqrt{18a^2} \cdot 4\sqrt{3a^2}$
 $= \sqrt{9 \cdot 2 \cdot a^2} \cdot 4\sqrt{3 \cdot a^2}$
 $= 3a\sqrt{2} \cdot 4a\sqrt{3}$
 $= 12a^2\sqrt{6}$

c) $-3\sqrt{3}(2 + \sqrt{6})$
 $= -6\sqrt{3} - 3\sqrt{18}$
 $= -6\sqrt{3} - 3\sqrt{9 \cdot 2}$
 $= -6\sqrt{3} - 9\sqrt{2}$





MATH
Some are better at explaining it than others.

Ex.) Simplify.


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

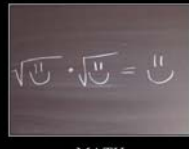
$$= 2\sqrt{9} - 2\sqrt{6} + 3\sqrt{6} - 3\sqrt{4}$$

$$= 2(\underline{3}) + \sqrt{6} - 3(\underline{2})$$

$$= \boxed{\sqrt{6}}$$

$\sqrt{2} \cdot \sqrt{2} = (\sqrt{2})^2 = 2$
 $\sqrt{4} = 2$





MATH
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Ex.) Simplify.

a) $(\sqrt{x} - 2\sqrt{y})(\sqrt{x} + 2\sqrt{y}) + (3\sqrt{x} + \sqrt{y})(3\sqrt{x} + \sqrt{y})$

$$= \sqrt{x^2} + 2\sqrt{xy} - 2\sqrt{xy} - 4\sqrt{y^2} + 9\sqrt{x^2} + 3\sqrt{xy} + 3\sqrt{xy} + \sqrt{y^2}$$

$$= x - 4y + 9x + 6\sqrt{xy} + y$$

$$= \boxed{10x - 3y + 6\sqrt{xy}}$$

b) $(3\sqrt{2} + \sqrt{5})(\sqrt{2} + 7) + (2\sqrt{2} + \sqrt{5})(2\sqrt{2} - \sqrt{5})$

$$= -3\sqrt{4} - 21\sqrt{2} + \sqrt{10} + 7\sqrt{5} + -4\sqrt{4} + 2\sqrt{10} + 2\sqrt{10} - \sqrt{25}$$

$$= \underline{-3(2)} - 21\sqrt{2} + \sqrt{10} + 7\sqrt{5} - \underline{4(2)} + \underline{4\sqrt{10}} - \underline{5}$$

$$= \boxed{5\sqrt{10} + 7\sqrt{5} - 21\sqrt{2} - 19}$$

Pg. 289 # 1-5.