Aim: How do we multiply and divide more complicated radicals?

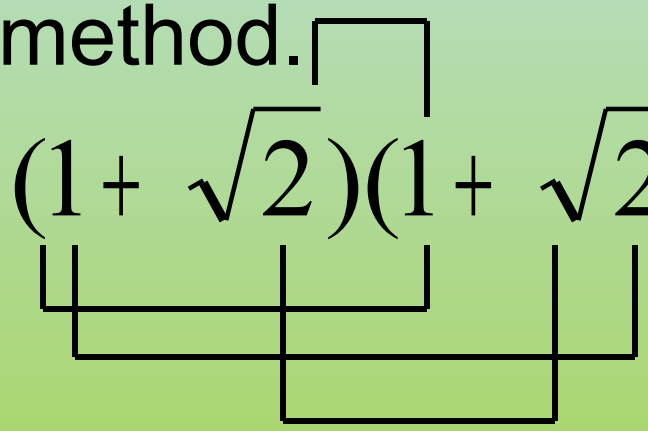
Do Now: 1. Multiply: $(1+\ x)(1+\ x)$

2. Multiply: $(1+\ \sqrt{2})(1+\ \sqrt{2})$

3. Divide: $\dfrac{15x^3+\ 5x^2}{5x}$

4. Divide: $\dfrac{15\sqrt{8}-\ 5\sqrt{6}}{5\sqrt{2}}$

To multiply binomials involved radicals, we can treat the radical as a variable and use the **FOIL** method.



$$(1+\sqrt{2})(1+\sqrt{2}) = 1^1 + \sqrt{2} + \sqrt{2} + \sqrt{2}^2$$

$$= 1 + 2\sqrt{2} + 2 = 3 + 2\sqrt{2}$$

$$(3+\sqrt{6x})(1+\sqrt{2x}) = 3 + 3\sqrt{2x} + \sqrt{6x} + \sqrt{12x^2}$$

$$= 3 + 3\sqrt{2x} + \sqrt{6x} + \sqrt{4 \cdot 3x^2}$$

$$= 3 + 3\sqrt{2x} + \sqrt{6x} + 2x\sqrt{3}$$

To divide $\dfrac{15\sqrt{8} - 5\sqrt{6}}{5\sqrt{2}}$

we can separate the fraction into two fractions as

$$\frac{15\sqrt{8}}{5\sqrt{2}} - \frac{5\sqrt{6}}{5\sqrt{2}} = 3\sqrt{\frac{8}{2}} - \sqrt{\frac{6}{2}} = 3\sqrt{4} - \sqrt{3} = 6 - \sqrt{3}$$

Simplify: $\dfrac{12\sqrt{10a^2b} + 8\sqrt{15ab^2}}{4\sqrt{5ab}} = \dfrac{12\sqrt{10a^2b}}{4\sqrt{5ab}} + \dfrac{8\sqrt{15ab^2}}{4\sqrt{5ab}}$

$$= 3\sqrt{\frac{10a^2b}{5ab}} + 2\sqrt{\frac{15ab^2}{5ab}} = 3\sqrt{2a} + 2\sqrt{3b}$$

Express the product in simplest form

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

$9 - 2\sqrt{6}$

$(9 + \sqrt{2x})(1 + \sqrt{2x})$

$2x + 9 + 10\sqrt{2x}$

$(7 + \sqrt{5a})(7 - \sqrt{5a})$

49 – 5*a*

$\dfrac{3\sqrt{10} - 9\sqrt{50}}{3\sqrt{5}}$

$\sqrt{2} - 3\sqrt{10}$

$\dfrac{\sqrt[3]{27x^3} + \sqrt[3]{36x^5}}{\sqrt[3]{3x^3}}$

$\sqrt[3]{9} + \sqrt[3]{12x^2}$