

Unit 5: <sup>+</sup> <sup>-</sup> <sup>x</sup> <sup>÷</sup> Operations on Polynomials  
Containing Square Roots

- foil
- rationalize  
the denominator  
w two terms

$$\begin{array}{c} \sqrt{2} \\ \text{---} \\ (\sqrt{2} + \sqrt{4}) (\sqrt{2} + \sqrt{3}) \\ \text{---} \\ \sqrt{2} + \sqrt{3} + \sqrt{3} \end{array}$$

Recall:

times a monomial  
by a binomial

ex.  $x(x+2)$

$x^2 + 2x$

ex  $x^2(x+4)$

$x^3 + x^2 \cdot 4$

e.x.  $\sqrt{2}(\sqrt{2} + 2\sqrt{6})$

$\sqrt{2 \times 2} + 2\sqrt{2 \times 6}$

$\sqrt{4} + 2\sqrt{12}$

$2 + 2\sqrt{12}$

$2 + 2\sqrt{4 \times 3}$

$2 + 2\sqrt{4} \times \sqrt{3}$

$2 + 2 \cdot 2 \cdot \sqrt{3}$

$2 + 4\sqrt{3}$

e.x.  $7\sqrt{3}(5\sqrt{6} - 2)$

$7 \times 5\sqrt{3 \times 6} - 2 \times 7\sqrt{3}$

$35\sqrt{18} - 14\sqrt{3}$

$35\sqrt{2 \times 9} - 14\sqrt{3}$

$35\sqrt{2} \times \sqrt{9} - 14\sqrt{3}$

$35\sqrt{2} \times 3 - 14\sqrt{3}$

$35 \times 3\sqrt{2} - 14\sqrt{3}$

$105\sqrt{2} - 14\sqrt{3}$

$+ - \textcircled{\times} \div$

ex.  $\sqrt{3}(3\sqrt{2} - \sqrt{9})$

$3\sqrt{3 \times 2} - 1\sqrt{9 \times 3}$

$3\sqrt{6} - \sqrt{27}$

$3\sqrt{6} - \sqrt{9 \times 3}$

$3\sqrt{6} - \sqrt{9} \times \sqrt{3}$

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

27

$\frac{1 \ 27}{3 \ 9}$

Recall :

times a binomial  
by a binomial (FOIL)

$$\begin{array}{l} (x^2 + y) \cdot (x + 2) \\ x^3 + 2x^2 + xy + 2y \end{array} \quad \left| \quad \begin{array}{l} x^2 + y(x + 2) \end{array}$$

e.x.  $(x+2)(x-3)$

$$x^2 - \underline{3x} + \underline{2x} - 6$$

$$x^2 - x - 6$$

ex.

$$(\sqrt{3} + 2\sqrt{5})(3\sqrt{6} - 7\sqrt{5})$$

Pg 5.7

Ex 5.1

$$4. \quad (4 - 3\sqrt{2})^2$$
$$(4 - 3\sqrt{2})(4 - 3\sqrt{2})$$

$$(3\sqrt{2}-4)(3\sqrt{2}-4)$$

$$34 - 24\sqrt{2}$$

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

$$2$$

Rationalize the denominator w 2 terms

e. x.

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

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

★ To rationalize the denominator w 2 terms, times it by itself but change the middle sign. Do the same thing to the top.

$$\frac{\sqrt{3 \times 3} - 2\sqrt{3}}{\sqrt{3 \times 3} - 2\sqrt{3} + 2\sqrt{3} - 4}$$

$$\frac{\sqrt{9} - 2\sqrt{3}}{\sqrt{9} - 4}$$

$$\frac{3 - 2\sqrt{3}}{3 - 4}$$

$$= \frac{3 - 2\sqrt{3}}{-1} = -1(3 - 2\sqrt{3}) = -3 + 2\sqrt{3}$$

Perform the following operations and rationalize the denominator if necessary

$$\frac{\sqrt{3}}{3\sqrt{3} - 5} \left| \frac{(5\sqrt{6} - 3) \times 7\sqrt{3}}{7\sqrt{3} \times 7\sqrt{3}} = \frac{35\sqrt{18} - 21\sqrt{3}}{49 \cdot 3}$$

$$\frac{35\sqrt{9 \cdot 2} - 21\sqrt{3}}{147} \quad \begin{array}{r} 18 \\ 1 \ 18 \\ \hline 2 \ 9 \\ 36 \end{array}$$

$$\frac{35 \cdot 3\sqrt{2} - 21\sqrt{3}}{147}$$

$$\frac{105\sqrt{2} - 21\sqrt{3}}{147} = \frac{\cancel{21}(5\sqrt{2} - \sqrt{3})}{\cancel{21} \cdot 7}$$

only allowed to cancel out when there's one term in the top one term in the bottom.

$$= \frac{5\sqrt{2} - \sqrt{3}}{7}$$

Never cancel out when there's  
two or more terms in the

$$\frac{4x + \cancel{2}}{\cancel{2}}$$

numerator  
or denominator

~~2~~



So wrong!

$$4x$$

$$\frac{4x + 2}{2} = \frac{2(2x+1)}{2}$$

so right  $\rightarrow$   $2x + 1$