

Lesson 5.10- SWBAT rationalize the denominator with a binomial.

Kickoff- Rationalize the denominator and simplify:

|                                  |                                    |
|----------------------------------|------------------------------------|
| 1) $\frac{\sqrt{5}}{\sqrt{3}}$   | 2) $\frac{3\sqrt{6}}{\sqrt{10}}$   |
| 3) $\frac{\sqrt{2}+6}{\sqrt{3}}$ | 4) $\frac{3\sqrt{5}-2}{4\sqrt{2}}$ |

**Rationalizing with a Binomial in the Denominator**

- 1) Multiply the numerator and the denominator by the conjugate of the denominator
- 2) Simplify!!!! (if possible)

**Conjugates-** the same expression with a different sign in the middle  
 Ex:  $(x - 4)(x + 4)$  or  $(3 + \sqrt{2})(3 - \sqrt{2})$

Examples: Find the conjugate and multiply.

|                     |                     |
|---------------------|---------------------|
| 1) $(\sqrt{2} - 5)$ | 2) $(3 + \sqrt{6})$ |
| 3) $(\sqrt{7} + 1)$ | 4) $(4 - \sqrt{2})$ |

Examples: Rationalize the denominator.

|                                    |                                    |
|------------------------------------|------------------------------------|
| 1) $\frac{2}{4+\sqrt{11}}$         | 2) $\frac{6}{3-\sqrt{5}}$          |
| 3) $\frac{\sqrt{7}+1}{\sqrt{7}-2}$ | 4) $\frac{4-\sqrt{3}}{\sqrt{3}+5}$ |

Practice: Rationalize the denominator and simplify for each of the following.

|                         |                                 |
|-------------------------|---------------------------------|
| 5) $\frac{4}{\sqrt{5}}$ | 6) $\frac{\sqrt{4}}{5\sqrt{3}}$ |
|-------------------------|---------------------------------|

|                           |                                  |
|---------------------------|----------------------------------|
| 7) $\frac{3}{4+\sqrt{5}}$ | 8) $\frac{\sqrt{5}}{5+\sqrt{2}}$ |
|---------------------------|----------------------------------|

|                           |                                     |
|---------------------------|-------------------------------------|
| 9) $\frac{2}{3-\sqrt{3}}$ | 10) $\frac{2-\sqrt{3}}{2+\sqrt{3}}$ |
|---------------------------|-------------------------------------|

11)  $\frac{\sqrt{5}+3}{4-\sqrt{5}}$

12)  $\frac{2-\sqrt{3}}{-3-\sqrt{5}}$