Focus on Geometry 8N4: Dividing square roots Page 1 of 2

Objective: To simplify radicals in a fraction

Recall that whenever we have a radical, we can split the number inside the radical (the radicand) into two factors, and each factor can have its own radical. For example: √28= √4 x √7 since 28=4x7. Likewise, whenever we have a fraction inside a radical, we can separate the numerator and the denominator into its own radical; therefore, we can find the square root of each one of those numbers separately. At the end, we reduce the fraction with which we end up if necessary.

**Example 1:** Find the square root of the following fractions:

A)  B)  C)  D) 

**Practice 1:** Find the square root of the following fractions:

A)  B)  C)  D) 

Whenever we simplify a fraction with radicals, radicals are not allowed to be in the denominator at the end; therefore, we will have to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the radical. Rationalizing the radical refers to getting rid of the radical in the denominator and turning it into a rational number, which could be either a whole number or a decimal. What we do is based on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ property.

Recall that when we multiply a number by 1, its value does not change. Recall also that a fraction where both the numerator and the denominator are the same is equal to \_\_\_ because such fraction is a division of both numbers since a fraction is a division.

Therefore, in order to rationalize the radical where the denominator has a square root, we have to multiply the fraction by a fraction where both the numerator and the denominator are the denominator of the original radical.

So, the process for dividing radicals (or simplifying a fraction with radicals in the denominator)is to

1) Simplify the radicals if possible

2) Rationalize the fraction

3) Multiply across (outside with outside and inside with inside)

4) Reduce the new fraction

Note: You can simplify either before, during, or after the division process.

**Example 2:** Simplify the fraction

A)  B)  C)  D) 

**Practice 2:** Simplify the fraction

A)  B)  C)  D) 

Focus on Geometry 8N4: Dividing square roots Page 2 of 2

There will be times when we have a coefficient outside the radical. If that is the case, we have the option of reducing the coefficients if possible before we do the rest of the process. Notice that is it optional as you can simplify before, during or after the division process.

**Example 3:** Simplify the fraction

A)  B)  C) 

**Practice 3:** Simplify the fraction

A)  B)  C) 

Sometimes, if we start with a fraction where both the numerator and denominator are radicals, we can turn it into a radical with a fraction inside, reduce the fraction, and the square root the numbers separately; but that is not necessary, you can still just rationalize the radical and simplify.

**Example 4:** Simplify the fraction

A) B) 

**Practice 4:** Simplify the fraction

A)  B) 