Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per.\_\_\_\_\_\_\_

U12 CW #3*Simplifying Non-Perfect Squares – Prime Factoring*

In the last lesson we used the list of perfect squares to find the factors the number under the radical and simplify the non-perfect squares by pulling out the perfect square. In this lesson, we will look at another strategy to simplify a non-perfect square.

**Strategy 2: Prime Factoring** (Use highlighters or colored pencils to color code each step)

1. Using the factor tree method, factor the number inside the square root symbol until all factors are prime numbers.
2. Look for and circle any pairs of numbers among the factors.
3. Put a square around any numbers that are not part of a pair.
4. Remove one number of the circled pair and leave any boxed numbers inside the square root symbol.
5. Using the factor tree method, factor the number inside the square root symbol until all factors are prime numbers.
6. List all the factors under one radical sign.
7. Separate any pairs of numbers under one radical sign and any numbers with no pair under another.
8. Simplify the radical with the pair and write the perfect square right in front of the other radical.

=

or

=

Remember that because we are factoring, all of these numbers are being multiplied, so if you end up with multiple numbers outside or inside the square root symbol, multiply them together, both inside the radical and outside the radical.

*Now you try a few either way:*

*Creating Cubes*

In previous lessons, we learned how to find the area of a square given the side length and how to find the side length of a square given the area. Now we will look at how to find the volume of a cube given its side length and how to find the side length of a cube given its volume.



Find the volume of the cube to the left. Show your work/thinking and describe the method(s) you use.

The cube above is called a perfect cube. A cube is considered a perfect cube if you can arrange smaller unit cubes to build a larger cube. In the example above 27 unit cubes were arranged to build the larger cube shown. Can you build additional perfect cubes to fill in the table below?

The first one has been done for you for the cube shown above.

|  |  |  |  |
| --- | --- | --- | --- |
| **Dimensions** | **Volume of Cube in Exponential Notation**  **(units3)** | **Volume of Cube**  **(units3)** | **Side Length**  **(units)** |
|  | 33 | 27 units3 | 3 units |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

In the previous lessons, we learned the following:

* If we are given the side length of a square, *s*, then its area is *s*2.
* If we are given the area of a square, *A*, then its side length is .

In this section, we see that:

* If we are given the side length of a cube, *s*, then its volume is *s*3.
* If we are given the volume of a cube, *V*, then its side length is .
* Explain in your own words what means:

**Directions:** For Problems 5-8, find the side length of the given cube. Remember to include units in your answer.

1. Find the side length of the cube:

V = 27 in3

1. Find the side length of the cube:
2. Find the side length of the cube:

V = 30 cm3

1. Find the side length of the cube:

V = 125 m3

V = 100 ft3

**Directions:** For 9-11, fill in the following blanks to make each number sentence true.

1. = \_\_\_\_\_\_ because (\_\_\_\_\_)3 =
2. = \_\_\_\_\_\_ because (\_\_\_\_\_)3 =
3. = \_\_\_\_\_\_ because (\_\_\_\_\_)3 =

**Directions:** For 12-14, fill in the following blanks. Use your calculator to check your answer.

1. = \_\_\_\_\_\_
2. = \_\_\_\_\_\_
3. = \_\_\_\_\_\_