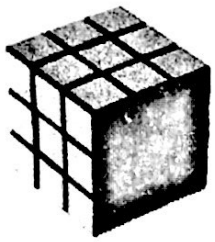
Name:_____ Date:_____ Per._____

U7 CWK #4: *Creating Cubes*

In the 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. In this section, we will study 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.



1. Find the volume of the cube to the left. Describe the method(s) you are using.

3·3·3 $V = l \cdot w \cdot h$

Base = 3·3=9 Middle layer: 3·3=9 Top 3·3=9 =27

2. 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 Exponential Notation ($units^3$)	Volume of Cube ($units^3$)	Side Length (units)
$3 \times 3 \times 3$	3^3	27 $units^3$	3 units
$2 \cdot 2 \cdot 2$	2^3	8 $units^3$	2 units
$4 \times 4 \times 4$	4^3	64 u^3	4 u.
$5 \times 5 \times 5$	5^3	125 u^3	5 u.
$6 \times 6 \times 6$	6^3	216 u^3	6 u.
$7 \times 7 \times 7$	7^3	343 u^3	7 u.
$8 \times 8 \times 8$	8^3	512 u^3	8 u.
$9 \times 9 \times 9$	9^3	729 u^3	9 u.

In the previous sections, 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 $\sqrt{A}$.

$$A = s^2$$
$$s = \sqrt{A}$$

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 $\sqrt[3]{V}$.
- Explain in your own words what $\sqrt[3]{V}$ means:

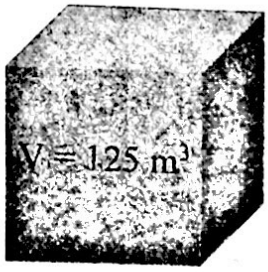
$$V = s^3$$
$$s = \sqrt[3]{V}$$

3. Find the side length of the cube: 3 in.

$\sqrt[3]{3}$

$27 in.^3$

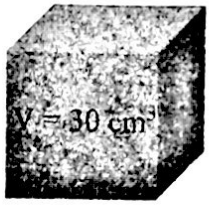
4. Find the side length of the cube: 5 m.



$\sqrt[3]{125}$

$125 m^3$

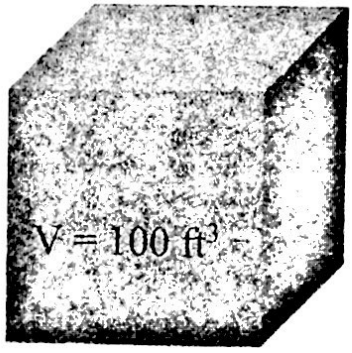
5. Find the side length of the cube: $\sqrt[3]{30}$ cm.



$\sqrt[3]{30}$

$30 cm^3$

6. Find the side length of the cube: $\sqrt[3]{100}$ ft.



$100 ft.^3$

Directions: Fill in the following blanks.

7. $\sqrt[3]{27}$ = 3 because (3)^3 = 27

8. $\sqrt[3]{64}$ = 4 because (4)^3 = 64

9. $\sqrt[3]{1}$ = 1 because (1)^3 = 1

10. $\sqrt[3]{125}$ = 5

11. $\sqrt[3]{343}$ = 7

12. $\sqrt[3]{\frac{1}{216}}$ = $\frac{1}{6}$ $\frac{\sqrt[3]{1}}{\sqrt[3]{216}}$

13. $\sqrt[3]{\frac{1}{1000}}$ = $\frac{1}{10}$ $\frac{\sqrt[3]{1}}{\sqrt[3]{1000}}$

14. $\sqrt[3]{\frac{8}{125}}$ = $\frac{2}{5}$

15. $\sqrt[3]{0.001}$ = .1 $\frac{\sqrt[3]{1}}{\sqrt[3]{1000}} = \frac{1}{10}$

16. $\sqrt[3]{0.027}$ = .3 $\frac{\sqrt[3]{27}}{\sqrt[3]{1000}} = \frac{3}{10}$

17. $\sqrt[3]{32}$ = $2\sqrt{4}$ $\sqrt[3]{8 \cdot 4}$

18. $\sqrt[3]{135}$ = $3\sqrt{5}$ $\sqrt[3]{27 \cdot 5}$

Same way of Simplify

$1^3 = 1$
$2^3 = 8$
$3^3 = 27$
$4^3 = 64$
$5^3 = 125$
$6^3 = 216$
$7^3 = 343$
$8^3 = 512$
$9^3 = 729$
$10^3 = 1000$