

Section 2.1 Modeling Squares and Cubes

Definitions- define the following and provide an example

1. Power A numerical expression that shows repeated multiplication ex 2^3
2. Base The number used as a factor in an exponent
 2^3 Base
3. Exponent The number used to express the # of factors in a power 2^3 exponent
4. Perfect square Product of a natural # multiplied by itself
ex $(4) = 2 \times 2$
5. Perfect Cube Product of a natural # multiplied by itself twice ex $(8) = 2 \times 2 \times 2$

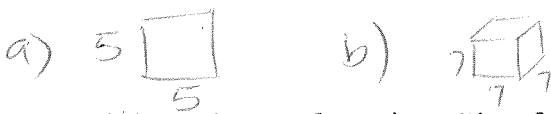
1. The side length of a cube is 6 cm. Find the a) area of 1 face
b) surface area c) volume

a) $6 \times 6 = 36 \text{ cm}^2$ b) $6(6^2) = 6 \times 36 = 216 \text{ cm}^2$ c) $6^3 = 216 \text{ cm}^3$

2. A cube has a side length of 10 cm. a) Write the volume as a power b) Find the volume in cm^3

a) ~~10 cm^3~~ 10^3 b) 1000 cm^3

3. Sketch a model for the following a) 5^2 b) 7^3



4. Find the volume of a cube with a face area of 64 cm^2

 $V = 8^3 = 512 \text{ cm}^3$

5. Find the area of a face of a cube with a volume of 27 cm^3

 $A = 3^2 = 9 \text{ cm}^2$

Summary: A perfect square can be shown as a power $36 = 6^2 = 6 \times 6$

A perfect cube can be shown as a power $125 = 5^3 = 5 \times 5 \times 5$

Write as a power

1. $2 \times 2 \times 2 \times 2$

2^4

2. $\left(-\frac{1}{4}\right)\left(-\frac{1}{4}\right)\left(-\frac{1}{4}\right)$

$\left(-\frac{1}{4}\right)^3$

Write each of the following numbers as a power of 3

3) 9

3^2

4) 81

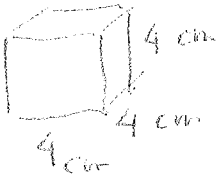
3^4

5) 243

3^5

6. The side length of a cube is 4 cm.

a) Sketch a model



b) Determine the area of one face as a power of 4



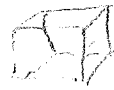
$A = 4 \times 4 = 4^2$

c) Determine the surface area



$$\begin{aligned} SA &= 6 \times 4^2 \\ &= 6 \times 16 \\ &= 96 \text{ cm}^2 \end{aligned}$$

d) Determine the volume as a power of 4

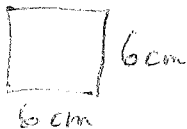


$$\begin{aligned} V &= 4 \times 4 \times 4 \\ &= 4^3 \end{aligned}$$

7. Determine the area of a square with a side length of 6 cm,

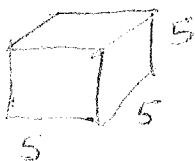
a) as a power, and

b) in standard form



$A = 6^2$

$$\begin{aligned} A &= 6^2 \\ &= 36 \text{ cm}^2 \end{aligned}$$

8. Sketch a model for the number 5^3 .

$V = 5^3$