

## Lesson 3 Practice Problems

1. Write each expression with a single exponent:

a.  $(10^7)^2$

b.  $(10^9)^3$

c.  $(10^6)^3$

d.  $(10^2)^3$

e.  $(10^3)^2$

f.  $(10^5)^7$

2. You have 1,000,000 number cubes, each measuring one inch on a side.

a. If you stacked the cubes on top of one another to make an enormous tower, how high would they reach? Explain your reasoning.

b. If you arranged the cubes on the floor to make a square, would the square fit in your classroom? What would its dimensions be? Explain your reasoning.

c. If you layered the cubes to make one big cube, what would be the dimensions of the big cube? Explain your reasoning.

3. An amoeba divides to form two amoebas after one hour. One hour later, each of the two amoebas divides to form two more. Every hour, each amoeba divides to form two more.
- How many amoebas are there after 1 hour?
  - How many amoebas are there after 2 hours?
  - Write an expression for the number of amoebas after 6 hours.
  - Write an expression for the number of amoebas after 24 hours.
  - Why might exponential notation be preferable to answer these questions?

(From Unit 7, Lesson 1.)

4. Elena noticed that, nine years ago, her cousin Katie was twice as old as Elena was then. Then Elena said, "In four years, I'll be as old as Katie is now!" If Elena is currently  $e$  years old and Katie is  $k$  years old, which system of equations matches the story?

- $$\begin{cases} k - 9 = 2e \\ e + 4 = k \end{cases}$$
- $$\begin{cases} 2k = e - 9 \\ e = k + 4 \end{cases}$$
- $$\begin{cases} k = 2e - 9 \\ e + 4 = k + 4 \end{cases}$$
- $$\begin{cases} k - 9 = 2(e - 9) \\ e + 4 = k \end{cases}$$

(From Unit 4, Lesson 15.)