

Lesson 12 Practice Problems

1. Which is larger: the number of meters across the Milky Way, or the number of cells in all humans? Explain or show your reasoning.

Some useful information:

- The Milky Way is about 100,000 light years across.
- There are about 37 trillion cells in a human body.
- One light year is about 10^{16} meters.
- The world population is about 7 billion.

2. Write each number in scientific notation.

- a. 14,700
- b. 0.00083
- c. 760,000,000
- d. 0.038
- e. 0.38
- f. 3.8
- g. 3,800,000,000,000
- h. 0.0000000009

3. Perform the following calculations. Express your answers in scientific notation.

a. $(2 \times 10^5) + (6 \times 10^5)$

b. $(4.1 \times 10^7) \cdot 2$

c. $(1.5 \times 10^{11}) \cdot 3$

d. $(3 \times 10^3)^2$

e. $(9 \times 10^6) \cdot (3 \times 10^6)$

4. Jada is making a scale model of the solar system. The distance from Earth to the Moon is about 2.389×10^5 miles. The distance from Earth to the Sun is about 9.296×10^7 miles. She decides to put Earth on one corner of her dresser and the Moon on another corner, about a foot away. Where should she put the sun?

- On a windowsill in the same room?
- In her kitchen, which is down the hallway?
- A city block away?

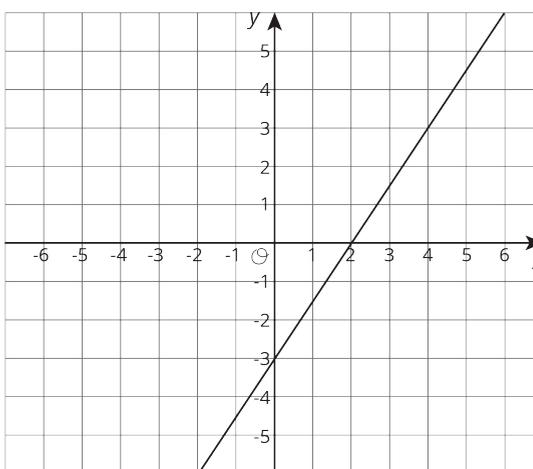
Explain your reasoning.

5. Diego was solving an equation, but when he checked his answer, he saw his solution was incorrect. He knows he made a mistake, but he can't find it. Where is Diego's mistake and what is the solution to the equation?

$$\begin{aligned}
 -4(7 - 2x) &= 3(x + 4) \\
 -28 - 8x &= 3x + 12 \\
 -28 &= 11x + 12 \\
 -40 &= 11x \\
 \frac{40}{11} &= x
 \end{aligned}$$

(From Unit 4, Lesson 13.)

6. Here is the graph for one equation in a system of equations.



- Write a second equation for the system so it has infinitely many solutions.
- Write a second equation whose graph goes through $(0, 2)$ so that the system has no solutions.
- Write a second equation whose graph goes through $(2, 2)$ so that the system has one solution at $(4, 3)$.

(From Unit 5, Lesson 13.)