Warm Up

Simplify:

$$\frac{3^{-2} \cdot 3^{3}}{3^{-1}}$$

$$\frac{3^{1} \cdot 3^{3}}{3^{2}} = \frac{3^{4}}{3^{2}} = 3^{2}$$

$$\frac{3^{1} \cdot 3^{3}}{3^{2}} = \frac{3^{3}}{3^{1}} = 3^{2}$$

$$\frac{3^{-2} \cdot 3^{3}}{3^{-1}}$$

$$\frac{3^{-2} \cdot 3^{3}}{3^{-1}} = \frac{3^{-2+3}}{3^{-1}}$$

$$= \frac{3^{1}}{3^{-1}} = 3^{1-(-1)} = 3^{2}$$

Wednesday Recap

The approximate total surface area of Earth is 5.1×10^8 km². Salt water has an approximate surface area of 352,000,000 km² and freshwater has an approximate surface area of 9×10^6 km².

a. How much of the Earth's surface is covered by water (salt and fresh combined)?

$352{,}000{,}000 + 9 \times 10^6 =$

$3.52 \times 10^8 + 9 \times 10^6$

$3.52 \times 10^8 + 0.09 \times 10^8 = 3.61 \times 10^8$

b. How much of the Earth's surface is covered by land?

$5.1 \times 10^8 - 3.61 \times 10^8 = 1.49 \times 10^6$ Km²

Total Area — Water Area — Land Area

c. Approximately how many times greater is the Earth's surface area that is covered by water, compared to the amount of the Earth's surface area that is covered by land?

$$\frac{\text{Water Area}}{\text{Land Area}} = \frac{3.61 \times 10^8}{1.49 \times 10^8} = 2.42 \text{ times as large}$$

Let's solve some word problems with scientific notation!

Word Problem Key Words

Addition	Subtraction	Multiplication	Division
Add Added to All together And Combined Gain In all In total Increase More Plus Raise Sum of	By how much Change Decreased by Difference Fewer Greater than How many less How many more How much left Left (leftover) Less Loss Minus Remaining Reduce Take away	Double, triple, etc… In total (when a rate is involved) Multiplied by Of Product Times Total (groups) Twice, three times, etc…	Average Divided evenly How many in each How many times bigger How many times more Per Share equally Split

Word Problem 3-Reads

1st Read: What is the problem about?

2nd Read: What am I trying to figure out?

3rd Read: What is the important information in this problem?

Example 1

1st Read: What is the problem about?

The population of Crowded Town is 4×10^6 and the population of Empty Village is 8×10^3. How much larger is Crowded Town than Empty Village?

Populations of places

2nd Read: What am I trying to figure out?

The population of Crowded Town is 4×10^6 and the population of Empty Village is 8×10^3. How much larger is Crowded Town than Empty Village?

Last sentence is usually what we are looking for.

3rd Read: What is the important information in this problem?

The population of Crowded Town is 4×10^6 and the population of Empty Village is 8×10^3. How much larger is Crowded Town than Empty Village?

$4 \times 10^6 - 8 \times 10^3$

$4 \times 10^6 - 0.008 \times 10^6$

3.992×10^6

Example 2

1st Read: What is the problem about?

The population of Crowded Town is 4×10^6 and the population of Empty Village is 8×10^3. How many times larger is the population of Crowded Town than Empty Village?

2 villages, 2 different sizes

2nd Read: What am I trying to figure out?

The population of Crowded Town is 4×10^6 and the population of Empty Village is 8×10^3. How many times larger is the population of Crowded Town than Empty Village?

Last sentence

How many times larger

3rd Read: What is the important information in this problem?

The population of Crowded Town is 4×10^6 and the population of Empty Village is 8×10^3. How many times larger is the population of Crowded Town than Empty Village?

$$\frac{4 \times 10^6}{8 \times 10^3} = 0.5 \times 10^3$$

$$= 5 \times 10^2$$

Example 3

1st Read: What is the problem about?

An airplane traveled 5.7×10^2 miles per hour for 2.0×10^1 hours. How far did the airplane travel?

Airplane travel

2nd Read: What am I trying to figure out?

An airplane traveled 5.7×10^2 miles per hour for 2.0×10^1 hours. How far did the airplane travel?

3rd Read: What is the important information in this problem?

An airplane traveled 5.7×10^2 miles per hour for 2.0×10^1 hours. How far did the airplane travel?

$$\frac{5.7 \times 10^2 \text{ miles}}{\text{hour}} \cdot \frac{2 \times 10^1 \text{ hours}}{1}$$

$$11.4 \times 10^3 \text{ miles}$$

$$1.14 \times 10^4 \text{ miles}$$

You can also create forms of one with units which helps with our answers.

Scientific Notation Word Problems

Show all work as you solve the problems. **All final answer must be in correct scientific notation form.**

1. Suppose there are 5×10^6 bacteria in every liter of water. How many bacteria are there in 12 liters of water?

2. A TV show had 3.5×10^6 viewers for their first episode and 8.5×10^6 viewers for their second episode. How many viewers did they have overall?

3. In 2013 the Los Angeles Dodgers opening day payroll was about $\$2.16 \times 10^8$ and the Houston Astros opening day payroll was about $\$2.4 \times 10^7$. How much higher was the Dodgers' payroll?

4. The population of the United States is 3×10^8 and the population of the world is 7×10^9. How many times larger is the population of the world than the U.S.?

5. The population of Mathville is 8.4×10^3. The population of Algeville is 1.3×10^4 . How many more people are there in Algeville?

6. If the speed of light is 3×10^8 meters/second, how many seconds does it take light to reach the Earth, if the sun is 1.5×10^{11} meters from Earth?

Homework

Finish front side of worksheet