Lesson 10: Operations with Numbers in Scientific Notation

Classwork

Exercise 1

The speed of light is $300{,}000{,}000$ meters per second. The sun is approximately 1.5×10^{11} meters from Earth. How many seconds does it take for sunlight to reach Earth?

Exercise 2

The mass of the moon is about 7.3×10^{22} kg. It would take approximately $26{,}000{,}000$ moons to equal the mass of the sun. Determine the mass of the sun.

Exercise 3

The mass of Earth is 5.9×10^{24} kg. The mass of Pluto is $13{,}000{,}000{,}000{,}000{,}000{,}000$ kg. Compared to Pluto, how much greater is Earth's mass than Pluto's mass?

Exercise 4

Using the information in Exercises 2 and 3, find the combined mass of the moon, Earth, and Pluto.

Exercise 5

How many combined moon, Earth, and Pluto masses (i.e., the answer to Exercise 4) are needed to equal the mass of the sun (i.e., the answer to Exercise 2)?

Problem Set

1. The sun produces 3.8×10^{27} joules of energy per second. How much energy is produced in a year? (Note: a year is approximately $31{,}000{,}000$ seconds).

2. On average, Mercury is about $57{,}000{,}000$ km from the sun, whereas Neptune is about 4.5×10^{9} km from the sun. What is the difference between Mercury's and Neptune's distances from the sun?

3. The mass of Earth is approximately 5.9×10^{24} kg, and the mass of Venus is approximately 4.9×10^{24} kg.
   a. Find their combined mass.
   b. Given that the mass of the sun is approximately 1.9×10^{30} kg, how many Venuses and Earths would it take to equal the mass of the sun?