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.

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Exercise 3

The mass of Earth is 5.9×10^{24} kg. The mass of Pluto is $13{,}000{,}000{,}000{,}000{,}000{,}000{,}000$ 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)?

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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?

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