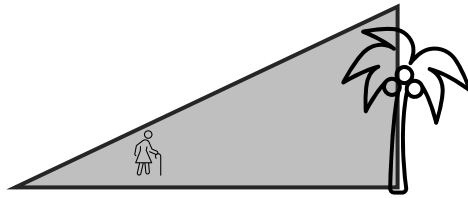
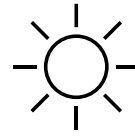


Problems with Proportions and Similarity

Shady Dealings.

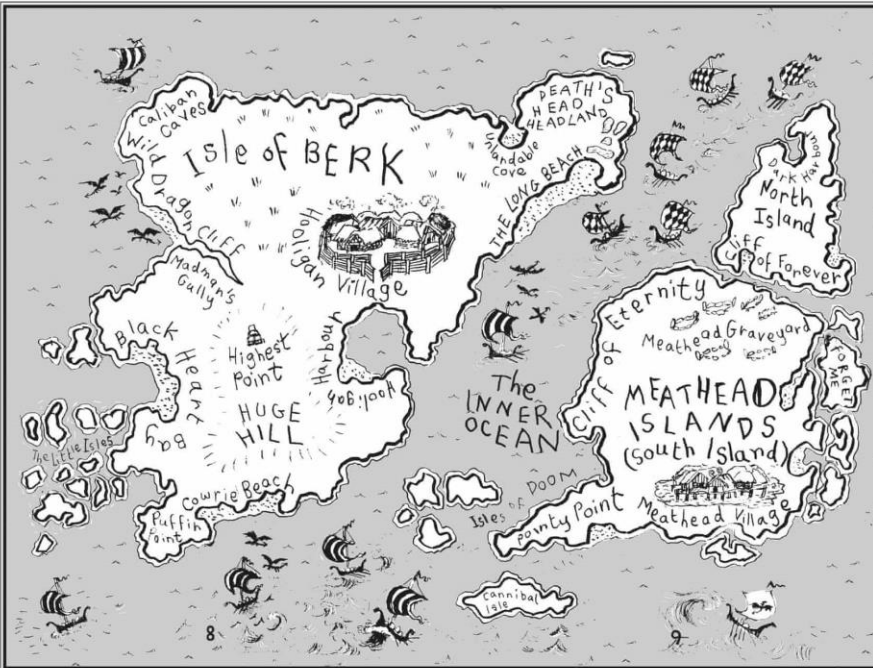


Problem 1. A 30-foot-tall palm tree casts a 40-foot shadow. How long is the shadow of a 6-foot-tall person at the same time?

Problem 2. How far from the tree can a 4-foot child stand and still be in the shade?

Problem 3. How tall should the palm tree be to cast a 50-foot shade?

Marvelous Maps

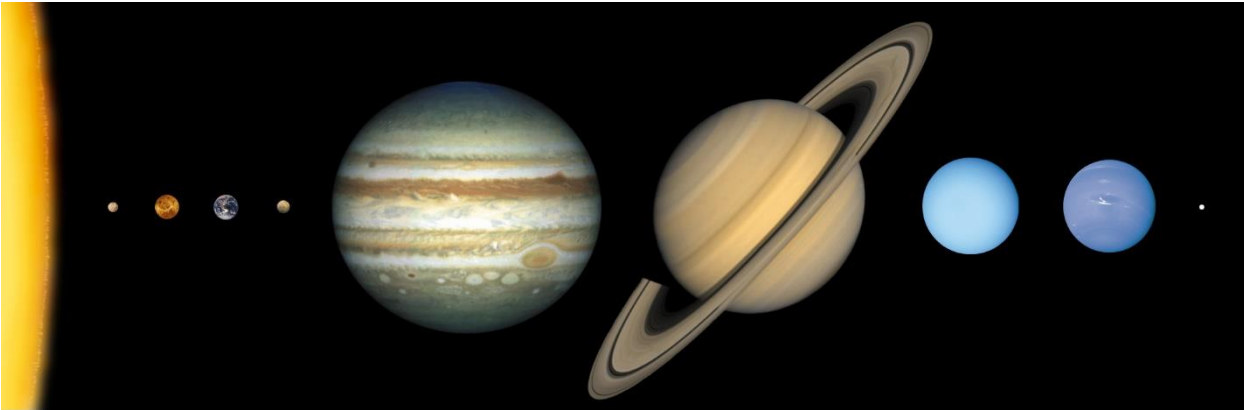


Question 1. If the Berk map is drawn at 1 inch: 50 miles scale, and the distance on the map from the Hooligan Village to the Caliban Caves is 1.5 inches, what is the distance in miles between Hooligan Village and the Caliban Caves?

Question 2. What is the distance in inches between the Hooligan Village and the Caliban Caves on a map with the scale 1 inch: 75 miles?

Question 3. The distance between the Highest Point and the Hooligan Village is half of the distance between the Hooligan Village and the Caliban Caves. What scale would the map be drawn such that the distance on the map between the Highest Point and the Hooligan Village is about 1 inch?

Source: <https://solarsystem.nasa.gov/resources/686/solar-system-sizes/>



Solar System

Planet Sizes

- Mercury – 1,516mi (2,440km) radius; about 1/3 the size of Earth
- Venus – 3,760mi (6,052km) radius; only slightly smaller than Earth
- Earth – 3,959mi (6,371km) radius
- Mars – 2,106mi (3,390km) radius; about half the size of Earth
- Jupiter – 43,441mi (69,911km) radius; 11x Earth's size
- Saturn – 36,184mi (58,232km) radius; 9x larger than Earth
- Uranus – 15,759mi (25,362km) radius; 4x Earth's size
- Neptune – 15,299mi (24,622km) radius; only slightly smaller than Uranus

Question 1. What scale should a map of the solar system be drawn for the smallest planet to be $\frac{1}{4}$ inch in diameter?

Question 2. What is the diameter of the largest planet on a map with the scale calculated in question 1?

Question 3. The distance between the Sun and Neptune is 2,794.4 million miles. A solar system map has a rectangular shape with the Sun drawn to scale on the left side and Neptune on the right side. What is the width of this map if it is drawn at the same scale as the one you calculated in question 1?