La Scuola d'Italia / Huson / Physics
20 October 2025

First & last name:
Grade: SOLUTIONS

1.3 Homework: Precision, Scientific notation, Significant figures

1. Round each value to three significant figures.

   (a) The population of Rome:
   2,746,984 $\approx$ 2,750,000

   (b) The population of New York City:
   8,804,190 $\approx$ 8,800,000

   When we round a calculated value, copy the calculator display followed by three dots, then round:

   $$\pi = 3.1415926\ldots \approx 3.14$$

2. Round each value to three sig figs.

   (a) $\sqrt{2}$ = ~~1.4142~~
   1.4142135...
   $\approx$ 1.41

   (b) $\sqrt{3}$ = ~~1.73~~ 1.732050...
   $\approx$ 1.73

3. Write down the number of significant digits in each value.

   (a) 8 1

   (b) 27.5 3

   (c) 0.0064 2

   (d) 0.0120 3

   (e) 105.5 4

   (f) 1.7320 5

4. Write in scientific notation, rounding to three sig figs.

   (a) The average distance from the Earth to the Sun: 92,555,000 miles.
   9.26×10^{7}

   (b) The mean distance of the earth to the moon: 384,400 kilometers.
   3.84×10^{5}

5. Write in scientific notation, rounding to three sig figs.

   (a) The thickness of a typical human hair: 0.000075 meters.
   7.5×10^{-5}

   (b) The weight of a fruit fly: 0.0015 grams.
   1.5×10^{-3}

6. The Earth's mass is 5.972×10^{24} kg and the moon's mass is 7.348×10^{22} kg. What is the ratio of the Earth's mass to the moon's mass? Round to three significant figures.

$$\frac{5.972 \times 10^{24}}{7.348 \times 10^{22}} = \frac{5.972}{7.348} \times 10^{2} = 81.273816\ldots \approx 81.3$$

7. Convert between inches and centimeters, rounding to three sig figs. (1 in. = 2.54 cm)

   (a) The diameter of a 16 inch pizza in centimeters.

$$16 \text{ in.} \times \frac{2.54 \text{ cm}}{1 \text{ in}} = 40.64 \approx 40.6 \text{ cm}$$

   (b) Forty centimeters of salame piccante in inches.

$$40 \text{ cm} \times \frac{1 \text{ in}}{2.54 \text{ cm}} = 15.748 \approx 15.7 \text{ inches}$$

8. Convert between feet and meters, rounding to three sig figs. (1 m $\approx$ 3.28 ft)

   (a) The height of the Empire State Building: 1454 feet

$$1454 \text{ ft} \cdot \frac{1 \text{ m}}{3.28 \text{ ft}} = 443.2926\ldots \approx 443. \text{ m}$$

   (b) The height of the Leaning Tower of Pisa: 55.863 meters

$$55.8633 \text{ m} \times \frac{3.28 \text{ ft}}{1 \text{ m}} = 183.23064\ldots \approx 183 \text{ ft}$$

9. Challenge: Running a "four minute mile" is a famous athletic achievement. What is this pace in meters per second? (1 mile = 1609 meters)

$$\frac{1 \text{ mile}}{4 \text{ minutes}} \times \frac{1609 \text{ m}}{1 \text{ mile}} \times \frac{1 \text{ minute}}{60 \text{ seconds}} = 6.70417\ldots \approx 6.70 \text{ m/s}$$