

Practice SI Units

ANSWER AND WORK

Directions: Attach additional paper to show all work for problems 8-25. Include cancelling of units. Circle your final answer. Record answers on answer sheet.

SI UNITS: Record the SI Unit for each of the following:

1. Mass **Kg**
2. Length **m**
3. Weight **N**
4. Area **cm²**
5. Volume **cm³, m³, km³**
6. Temperature **K**
7. Density **g/cm³**

METRIC SYSTEM

8. How many millimeters are in 2 centimeters?

$$2 \cancel{\text{cm}} \times \frac{10 \text{ mm}}{1 \cancel{\text{cm}}} = 20 \text{ mm}$$

9. How many meters are in 5 kilometers?

$$5 \cancel{\text{km}} \times \frac{1000 \text{ m}}{1 \cancel{\text{km}}} = 5000 \text{ m}$$

10. How many centimeters are there in 4 meters?

$$4 \cancel{\text{m}} \times \frac{100 \text{ cm}}{1 \cancel{\text{m}}} = 400 \text{ cm}$$

MASS/WEIGHT $W = MA$ m: mass of an object

a: acceleration of gravity (9.8 m/s²)

11. An object has a mass of 2000 Kg on Earth, what is its mass on the Moon?

The mass on the moon is 2000 Kg because mass NEVER changes.

12. An object has a mass of 5 Kg on Earth, what is its Weight on Earth?

$$\begin{aligned}W &= m \times a \\&= 5 \text{ Kg} \times 9.8 \text{ m/s}^2 \\&= 49 \text{ Kg} \cdot \text{m/s}^2 \\&= 49 \text{ N}\end{aligned}$$

13. An object has a weight of 20 Kg on Earth, what is its Weight on Earth?

$$\begin{aligned}W &= m \times a \\&= 20 \text{ Kg} \times 9.8 \text{ m/s}^2 \\&= 196 \text{ Kg} \cdot \text{m/s}^2 \\&= 196 \text{ N}\end{aligned}$$

14. An object has a weight of 50 N on Earth, what is its weight on the Moon?

Relative Gravity on the moon = 1/6 of Earth's, so you will multiply Earth's Weight by 1/6.

$$\begin{aligned}W_{\text{moon}} &= W_{\text{Earth}} \times \text{Relative Gravity}_{\text{Moon}} \\&= 50 \text{ N} \times 1/6 \\&= 8.3 \text{ N}\end{aligned}$$

AREA L x W

15. What is the area of a room that is 10 meters long and 12 meters wide?

$$\begin{aligned}A &= L \times W \\&= 10 \text{ m} \times 12 \text{ m} \\&= 120 \text{ m}^2\end{aligned}$$

16. What is the area of a desk that is 0.2 meters long and 0.4 meters wide?

$$\begin{aligned}A &= L \times W \\&= 0.2 \text{ m} \times 0.4 \text{ m} \\&= 0.08 \text{ m}^2\end{aligned}$$

17. A NFL football field is 48.77 meters wide and 109.73 meters long. What is the area of a football field in the standard SI Unit?

$$\begin{aligned}A &= L \times W \\&= 48.77 \text{ m} \times 109.73 \text{ m} \\&= 5352 \text{ m}^2\end{aligned}$$

VOLUME $L \times W \times H$

18. An aquarium is 120 centimeters long and 50 centimeters wide. It is 20 centimeters deep. What is the volume of the aquarium in the standard SI Unit?

$$\begin{aligned}V &= L \times W \times H \\ &= 120 \text{ cm} \times 50 \text{ cm} \times 20 \text{ cm} \\ &= 120,000 \text{ cm}^3\end{aligned}$$

19. In order to decide what size furnace you need for your schools new gymnasium, you need to calculate the volume of the room. The gym is 20 meters wide and 80 meters long. The ceiling is 10 meters high. What is the volume of the gym in standard SI Units?

$$\begin{aligned}V &= L \times W \times H \\ &= 20 \text{ m} \times 80 \text{ m} \times 10 \text{ m} \\ &= 16,000 \text{ m}^3\end{aligned}$$

20. A standard Olympic size pool is 50 meters long and 25 meters wide. The depth is 1.83 meters. What is the volume of an Olympic size pool in the standard SI Units?

$$\begin{aligned}V &= L \times W \times H \\ &= 50 \text{ m} \times 25 \text{ m} \times 1.83 \text{ m} \\ &= 18,287.5 \text{ m}^3\end{aligned}$$

TEMPERATURE $C + 273 = K$ $(F-32) * (5/9) = C$ $(9/5)(C) + 32 = F$

21. It is 80 degrees Fahrenheit outside, what is the temperature in Celsius?

$$\begin{aligned}C &= (F-32) * (5/9) \\ &= (80-32) * (5/9) \\ &= 48 * 5/9 \\ &= 26.7 \text{ }^\circ\text{C}\end{aligned}$$

22. Your freezer is set for 10 degrees Celsius, what temperature is that in Fahrenheit?

$$\begin{aligned}F &= (9/5) (C) + 32 \\ &= (9/5)(10) + 32 \\ &= 18 + 32 \\ &= 50 \text{ }^\circ\text{F}\end{aligned}$$

23. The temperature on Mars is -200 degrees Fahrenheit, what is the temperature in Kelvin?

$$\begin{aligned}C &= (F-32) * (5/9) \\ &= (-200-32) * (5/9) \\ &= -232 * 5/9 \\ &= -128.89 \text{ }^\circ\text{C}\end{aligned}$$

$$\begin{aligned}K &= C + 273 \\ &= -128.89 + 273 \\ &= 144.11 \text{ K (THIS IS YOUR FINAL ANSWER)}\end{aligned}$$

DENSITY

24. An object has a mass of 50 grams and has a volume of 60 cm³. What is the density of the object? Will the object float or sink?

$$\begin{aligned}D &= M/V \\ &= \frac{50 \text{ g}}{60 \text{ cm}^3} \\ &= 0.83 \text{ g/cm}^3\end{aligned}$$

The Object will float, since 0.83 is less than the density of freshwater (1.0).

25. An object has a mass of 1000 grams and has a volume of 900 cm³, what is the density of the object? Will the object float or sink?

$$\begin{aligned}D &= M/V \\ &= \frac{1000 \text{ g}}{900 \text{ cm}^3} \\ &= 1.11 \text{ g/cm}^3\end{aligned}$$

The Object will sink, since 1.11 is greater than the density of freshwater (1.0).