Chapter 1 Class 11 - Sets
- Mix Questions Worksheet 1
by *teachoo*

Chapter: **Chapter 1 Class 11 Maths – Sets**

Name: _____

School: _____

Roll Number: _____

1. (2 marks) A smartphone's settings allow users to enable 'Low Power Mode' (L) and 'Airplane Mode' (A). Let L be the set of states where Low Power Mode is ON, and A be the set of states where Airplane Mode is ON. Describe the phone's state where Airplane Mode is ON, but Low Power Mode is OFF, using set notation.

2. (2 marks) Consider the universal set $U = \{$ all living things $\}$. Let $P = \{$ all plants $\}$ and $T = \{$ all trees $\}$. Draw a Venn diagram to represent the relationship between $U, P,$ and T.

3. (2 marks) A music playlist is a set of songs. Playlist A is {"Song X", "Song Y", "Song Z"}. Playlist B is {"Song Y", "Song Z", "Song X"}. Does Playlist A equal Playlist B in the context of set theory? Justify your answer based on the properties of sets.

4. (2 marks) An online course platform has two main skill tracks: 'Data Science' (D) and 'Web Development' (W). To get a "Generalist Certificate", a student must complete at least one course from either track. Represent the set of students eligible for this certificate using set notation.

5. (2 marks) An artist draws an infinite number of straight lines on a canvas, all of which must pass through a single point (the origin). Is the set of all these lines finite or infinite? Justify your answer conceptually.

6. (3 marks) At a science fair, three project categories are available: Biology (B), Chemistry (C), and Physics (P).

- Team Alpha presents a project in Chemistry and Physics only.

- Team Beta presents a project that spans all three categories.

- Team Gamma presents a project in Biology only.

(i) Draw a Venn Diagram and place Team Alpha, Team Beta, and Team Gamma in the correct regions.

(ii) Write the set notation for the region where Team Beta is located.

(iii) In words, describe the projects that belong to the set $(B \cup C)'$.

7. (3 marks) A city's public transport authority categorizes its routes. Let T be the set of routes served by trains and B be the set of routes served by buses. A transport planner needs to identify all routes that are served only by bus.

(i) Write the set notation for the planner's search.

(ii) If the planner's search yields no routes ($B - T = \phi$), what does this imply about the relationship between the bus and train routes?

(iii) Describe this implication in a simple sentence for a city resident.

8. (3 marks) A company defines two levels of employee access. 'Level 1' (Set A) is granted to employees whose ID number x is an integer satisfying $x^2 \leq 36$. 'Level 2' (Set B) is granted to employees whose ID number y is also a solution to the equation $y^2 - 4y - 12 = 0$. Is the set of employees with Level 2 access a proper subset of those with Level 1 access? Show your reasoning.

9. (5 marks) A media company surveyed 150 students about their content consumption habits for three platforms: YouTube (Y), Netflix (N), and Instagram (I). Every student used at least one platform. The data revealed:

- 90 students use YouTube.

- 70 students use Instagram.

- 50 students use Netflix.

- 35 use YouTube and Instagram.

- 25 use Instagram and Netflix.

- 20 use YouTube and Netflix. Using set theory principles:

(i)   Draw a Venn diagram to model the situation.
(ii)   Find the number of students who use all three platforms.
(iii) Find the number of students who use only YouTube.
(iv)   Find the number of students who use exactly two platforms.

10. (5 marks) Let U be the set of all smartphones on the market. Let F be the set of phones with a Foldable screen and P be the set of phones with a Pen-stylus. Market analysis shows that any phone with a Foldable screen does not have a Pen-stylus.

(i)   Express this market reality using set notation (hint: think about intersection).

(ii)   Draw a Venn diagram representing U, F, and P .

(iii)   A tech blogger wants to review phones that are either Foldable or have a Pen-stylus. Describe this group of phones in words, considering the market reality.

(iv)   What does the set $(F \cup P)'$ represent in this context?

(v)   If a new phone is launched that has both a foldable screen and a stylus, how does this change the relationship between sets F and P ?