

Chapter 1 Class 11 - Sets - Mix Questions Worksheet 2 by teachoo

Chapter: [Chapter 1 Class 11 Maths – Sets](#)

Name: _____

School: _____

Roll Number: _____

1. (2 marks) A restaurant offers a "Build Your Own Bowl" with three base options: Rice (R), Quinoa (Q), and Salad (S). The set of all possible bowl combinations is the power set of $\{R, Q, S\}$. Is the specific combination $\{\text{Rice, Quinoa}\}$ an element of this power set or a subset of this power set? Explain.

2. (2 marks) A logistics company is searching its database for a shipping container that is currently in 'Transit' and simultaneously listed as 'Available' for booking. Let S be the set of all such containers found. What type of set is S likely to be? Explain your reasoning.

3. (2 marks) A clothing store has two discount racks. Rack A contains items that are 'Cotton'. Rack B contains items that are 'Blue'. Is a blue polyester shirt an element of the set $B - A$? Explain why or why not.

4. (3 marks) A software license can be purchased with two add-ons: 'Cloud Storage' (C) and 'Technical Support' (S). A customer can choose any combination of these add-ons.

- (i) List all the possible purchase combinations as a set of subsets of $\{C, S\}$.
- (ii) The company changes its policy: the 'Cloud Storage' add-on now automatically includes 'Technical Support'. How does this change the relationship between the sets C and S ?
- (iii) Under this new policy, which of the original purchase combinations is no longer offered?

5. (3 marks) Let U be all the vehicles in a city. Let $C = \{ \text{cars} \}$, $E = \{ \text{electric vehicles} \}$, and $F = \{ \text{vehicles with four wheels} \}$.

- (i) Describe the set $C \cap E$ in words.
- (ii) Is $C \subset F$? Why or why not?
- (iii) A new "green tax" is applied to all four-wheeled vehicles that are not electric. Write the set of taxed vehicles using set notation.

6. (3 marks) Two project teams, A and B, are formed. A manager observes that any student who is on Team A is also on Team B.

- (i) Write this relationship using subset notation.
- (ii) Simplify the expression $A \cup B$. What does this set now represent?
- (iii) Simplify the expression $A \cap B$. What does this set now represent?

7. (3 marks) Let $A = \{x: x \text{ is a planet in Earth's solar system}\}$ and $B = \{y: y \text{ is a planet with rings}\}$. Find $A - B$ and $B - A$. What does the content of these resulting sets tell you about planets? (Known planets with rings are Jupiter, Saturn, Uranus, Neptune).

8. (5 marks) A power plant has two safety systems, A and B. Let U be the set of all possible operating temperatures.

- Set A is the range of temperatures where system A is effective.
- Set B is the range of temperatures where system B is effective.

The plant is in a 'Critical' state if at least one safety system is ineffective.

- Write the set of 'Critical' temperatures in terms of A and B. (Hint: think about complements).
- Use De Morgan's Law to write an equivalent expression for the 'Critical' set. Explain what this new expression means in plain English.
- What does the set $(A - B) \cup (B - A)$ represent in terms of the plant's safety?
- If System A is a newer model such that it works in all temperatures that System B works in, plus some others, what is the relationship between sets A and B? Which set of temperatures would you test to verify the unique advantages of System A?

9. (5 marks) Consider the set of all triangles, U.

- $A = \{\text{set of all acute-angled triangles}\}$
- $B = \{\text{set of all obtuse-angled triangles}\}$
- $C = \{\text{set of all right-angled triangles}\}$

Describe the following sets and their relationship.

- $A \cap C$
- $A \cup B \cup C$
- Are the sets A, B, and C mutually disjoint? Explain with a geometric reason.

- (iv) What is the complement of $(A \cup B \cup C)$ with respect to U ?
- (v) Draw a Venn diagram showing the relationship between A, B , and C within the universal set U .

20. (5 marks) A company's policy states that to be promoted, an employee must either be 'Certified' (Set C) or have 'High Performance' (Set H). A manager claims this is the same as saying an employee must be 'Certified' and have 'High Performance'. Is the manager correct?

- Let U be all employees.
- The policy is: Promotion set $P_1 = C \cup H$.
- The manager's claim is: Promotion set $P_2 = C \cap H$.

Disprove the manager's claim by providing a clear counterexample of an employee who would be in set P_1 but not in set P_2 .

Important links

- Answer of this worksheet - <https://www.teachoo.com/25607/5369/Mix-Questions---Worksheet-2/category/Teachoo-Questions---Mix/>
- Full Chapter with Explanation, Activity, Worksheets and more – <https://www.teachoo.com/subjects/cbse-maths/class-11th/ch1-11th-sets/>
- Maths Class 11 - <https://www.teachoo.com/subjects/cbse-maths/class-11th/>

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