NCERT Solutions Class 10 Maths
Chapter 6: Triangles
Exercise 6.1

Quick Summary: In NCERT Solutions Class 10 Maths Chapter 6 Exercise 6.1, students learn the fundamental concepts of similar figures and their properties. This exercise covers similarity conditions, Basic Proportionality Theorem, and distinguishing between similar and congruent figures, which are essential for CBSE Class 10 board exams and form the foundation for advanced geometry topics.

Key Takeaways:

- Basic Proportionality Theorem (Thales' Theorem): If a line is parallel to one side of a triangle, it divides the other two sides proportionally
- Two figures are similar if they have the same shape but different sizes, with corresponding angles equal and corresponding sides proportional
- Similarity vs Congruence: Congruent figures are identical in size and shape (≅), while similar figures have same shape but may differ in size (~)
- All circles are similar, all squares are similar, but not all triangles or quadrilaterals are similar unless specific conditions are met

Complete Solutions

Question 1

Fill in the blanks using the correct word given in brackets:

1. All circles are _____. (congruent, similar)
2. All squares are _____. (similar, congruent)
3. All _____ triangles are similar. (isosceles, equilateral)
4. Two polygons of the same number of sides are similar, if (a) their corresponding angles are _____ and (b) their corresponding sides are _____. (equal, proportional)

SOLUTION

This question tests our understanding of similarity and congruence of geometric shapes, specifically circles, squares, triangles, and general polygons.

(i) All circles are _____. (congruent, similar)

Step 1: Understand Congruence and Similarity

Congruent figures are exactly the same in shape and size. **Similar** figures have the same shape but can be different sizes.

Step 2: Analyze Circles

All circles have the same shape. However, their radii can be different, leading to different sizes. Therefore, all circles are similar.

Answer: Similar

(ii) All squares are _____. (similar, congruent)

Step 1: Analyze Squares

All squares have four sides and four right angles. This means they have the same shape. However, the side lengths can vary, leading to different sizes. Therefore, all squares are similar.

Answer: Similar

(iii) All _____ triangles are similar. (isosceles, equilateral)

Step 1: Analyze Isosceles Triangles

Isosceles triangles have two equal sides and two equal angles. The third angle can vary. Therefore, not all isosceles triangles are similar.

Step 2: Analyze Equilateral Triangles

Equilateral triangles have all three sides equal and all three angles equal to . Since all equilateral triangles have the same angles, they are always similar.

Answer: Equilateral

(iv) Two polygons of the same number of sides are similar, if (a) their corresponding angles are _____ and (b) their corresponding sides are _____. (equal, proportional)

Step 1: Recall the conditions for polygon similarity

For two polygons to be similar, two conditions must be met:

(a) Their corresponding angles must be equal.

(b) Their corresponding sides must be proportional (i.e., the ratio of corresponding sides must be the same).

Answer: Equal, Proportional

ANSWER

(i) Similar

(ii) Similar

(iii) Equilateral

(iv) Equal, Proportional

Question 2

Give two different examples of pair of:

(i) similar figures.

(ii) non-similar figures.

SOLUTION

This question asks us to provide examples of similar and non-similar figures. The key concept here is understanding the conditions for similarity: same shape but not necessarily the same size.

(i) Similar Figures

Step 1: Recall the definition of similar figures.

Two figures are similar if they have the same shape, but may differ in size. This means their corresponding angles are equal, and their corresponding sides are in proportion.

Step 2: Provide the first example.

Consider two squares. Let's say one square has a side length of 2 units, and the other has a side length of 4 units. All squares have equal angles (90 degrees), and the ratio of their corresponding sides is constant (2:4 or 1:2). Therefore, they are similar.

Step 3: Provide the second example.

Consider two circles. All circles are similar, regardless of their radii. This is because they all have the same shape, and the ratio of their radii determines their relative size. For example, a circle with radius 1 and a circle with radius 3 are similar.

Final Answer (i): Two squares of different side lengths; Two circles of different radii.

(ii) Non-Similar Figures

Step 1: Recall the definition of non-similar figures.

Two figures are non-similar if they do not have the same shape. This means either their corresponding angles are not equal, or their corresponding sides are not in proportion, or both.

Step 2: Provide the first example.

Consider a square and a triangle. A square has four sides and four right angles, while a triangle has three sides and angles that can vary. They clearly do not have the same shape, so they are not similar.

Step 3: Provide the second example.

Consider a rectangle and a parallelogram. While both are quadrilaterals, a rectangle has all angles equal to 90 degrees, whereas a parallelogram can have angles that are not 90 degrees. Unless the parallelogram is also a rectangle, they are not similar because their corresponding angles are not equal.

Final Answer (ii): A square and a triangle; A rectangle and a parallelogram (that is not a rectangle).

> **ANSWER**

Question 3

QUESTION

State whether the following quadrilaterals are similar or not (see Fig. 6.8).

> **SOLUTION**
>
> The question asks us to determine if the two quadrilaterals in Fig. 6.8 are similar or not. Recall that for two figures to be similar, two conditions must be met: (i) their corresponding angles must be equal, and (ii) their corresponding sides must be in the same ratio (or proportion).
>
> **Step 1: Observe the given figures**
>
> We have two quadrilaterals. Let's call the first one ABCD and the second one PQRS. By visual inspection, it appears that ABCD is a square, meaning all its angles are 90 degrees. PQRS, on the other hand, appears to be a rhombus, where all sides are equal, but the angles are not necessarily 90 degrees.
>
> **Step 2: Check the angles**
>
> In quadrilateral ABCD, . In quadrilateral PQRS, it is clear from the figure that the angles are not 90 degrees. For example, and are obtuse angles (greater than 90 degrees), while and are acute angles (less than 90 degrees).
>
> **Step 3: Check the sides**
>
> Let's assume the side length of the square ABCD is 'a'. By visual inspection, it appears that all sides of the rhombus PQRS are equal. Let's assume the side length of the rhombus PQRS is . Then the ratio of corresponding sides would be:
>
> So, the sides are in proportion.
>
> **Step 4: Conclusion**
>
> Although the sides are in proportion, the corresponding angles are not equal. For the quadrilaterals to be similar, *both* conditions must be satisfied. Since the angles are not equal, the quadrilaterals are not similar.
>
> **Final Answer:** No

> **ANSWER**
>
> No

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📝 Key Formulas

Important Formulas for Exercise 6.1

Formula / Concept	Description
Similar Figures	Two geometric figures are said to be similar if they have the same shape but not necessarily the same size. The symbol for similarity is \sim.
Congruent Figures	Two figures are congruent if they have the same shape and the same size. All congruent figures are similar, but the converse is not always true.
Conditions for Similarity of Polygons	Two polygons with the same number of sides are similar if: (i) their corresponding angles are equal, and (ii) their corresponding sides are in the same ratio (or proportion).
Scale Factor (Ratio of Similarity)	The constant ratio of the corresponding sides of two similar polygons is called the scale factor.
Basic Proportionality Theorem (B.P.T.) or Thales's Theorem	If a line is drawn parallel to one side of a triangle to intersect the other two sides at distinct points, then the other two sides are divided in the same ratio.
Mathematical Representation of B.P.T.	In \triangle ABC, if a line DE is drawn such that DE \parallel BC, intersecting sides AB and AC at D and E respectively, then: (AD)/(DB) = (AE)/(EC)
Converse of Basic Proportionality Theorem	If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.

⁊ Top FAQs

Q1. How many questions are in NCERT Solutions Class 10 Maths Chapter 6 Triangles Exercise 6.1 for CBSE board exam 2025-26?

Exercise 6.1 of NCERT Solutions for Class 10 Maths Chapter 6 Triangles contains exactly 3 questions. These questions focus on the fundamental concept of similar figures and help students understand the basic properties of triangles, which is important for CBSE board exam 2025-26 preparation.

Q2. Where can I download free PDF of NCERT Solutions for Class 10 Maths Chapter 6 Triangles Exercise 6.1 with step by step solutions?

You can download the free PDF of NCERT Solutions for Class 10 Maths Chapter 6 Triangles Exercise 6.1 from the official NCERT website or various educational portals offering step by step solutions. These PDFs are updated according to the latest CBSE syllabus 2025-26 and provide detailed explanations for all three questions in Exercise 6.1.

Q3. How many marks does Chapter 6 Triangles carry in CBSE Class 10 Maths board exam 2025-26?

Chapter 6 Triangles carries approximately 6 marks in the CBSE Class 10 Maths board exam 2025-26 as part of Unit V - Geometry. The entire Geometry unit, which includes circles and constructions along with triangles, contributes significantly to the total marks, making NCERT Solutions for Class 10 Maths Chapter 6 Exercise 6.1 essential for exam preparation.

Q4. Which is the most difficult question in NCERT Solutions Class 10 Maths Chapter 6 Triangles Exercise 6.1 for CBSE 2025-26?

Question 3 of Exercise 6.1 in NCERT Solutions Class 10 Maths Chapter 6 Triangles is generally considered the most challenging as it requires deep conceptual understanding of similar figures. Students need to practice step by step solutions and apply logical reasoning to identify and justify similarity between different shapes for CBSE board exam 2025-26.

Q5. What is Basic Proportionality Theorem (Thales Theorem) in NCERT Solutions Class 10 Maths Chapter 6 Triangles Exercise 6.1?

The Basic Proportionality Theorem (Thales Theorem) states that if a line is drawn parallel to one side of a triangle intersecting the other two sides, then it divides those sides in the same ratio. This theorem is a key concept covered in NCERT Solutions for Class 10 Maths Chapter 6 Triangles and forms the foundation for understanding similarity, which is crucial for CBSE board exam 2025-26.

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