

EXERCISE 16.1

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1. Explain the concept of congruence of figures with the help of certain examples.

Solution:

Congruent objects or figures are exact copies of each other or we can say mirror images of each other. The relation of two objects being congruent is called congruence.

Consider Ball 1 and Ball 2. These two balls are congruent.



Ball 1

Ball 2

Now consider the two stars below. Star A and Star B are exactly the same in size, colour and shape. These are congruent stars



Star A

Star B

2. Fill in the blanks:

- (i) Two line segments are congruent if
- (ii) Two angles are congruent if
- (iii) Two square are congruent if
- (iv) Two rectangles are congruent if
- (v) Two circles are congruent if

Solution:

- (i) They are of equal lengths
- (ii) Their measures are the same or equal.
- (iii) Their sides are equal or they have the same side length
- (iv) Their dimensions are same that is lengths are equal and their breadths are also equal.
- (v) They have same radii

3. In Fig. 6, $\angle POQ \cong \angle ROS$, can we say that $\angle POR \cong \angle QOS$

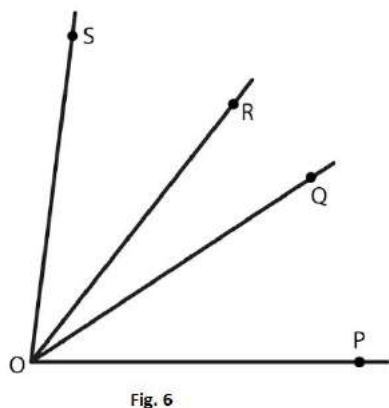


Fig. 6

Solution:

Given that

$$\angle POQ \cong \angle ROS$$

$$\text{Also } \angle ROQ \cong \angle ROQ$$

Therefore adding $\angle ROQ$ to both sides of $\angle POQ \cong \angle ROS$,

$$\text{We get, } \angle POQ + \angle ROQ \cong \angle ROQ + \angle ROS$$

$$\text{Therefore, } \angle POR \cong \angle QOS$$

4. In fig. 7, $a = b = c$, name the angle which is congruent to $\angle AOC$

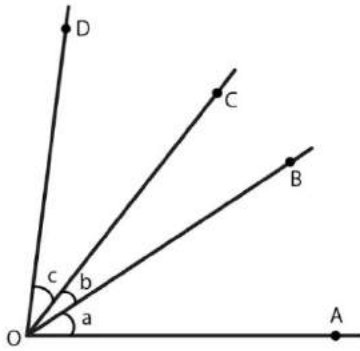


Fig. 7

Solution:

From the figure we have

$$\angle AOB = \angle BOC = \angle COD$$

Therefore, $\angle AOB = \angle COD$

$$\text{Also, } \angle AOB + \angle BOC = \angle BOC + \angle COD$$

$$\angle AOC = \angle BOD$$

$$\text{Hence, } \angle BOD \cong \angle AOC$$

5. Is it correct to say that any two right angles are congruent? Give reasons to justify your answer.

Solution:

Two right angles are congruent to each other because they both measure 90° .

We know that two angles are congruent if they have the same measure.

6. In fig. 8, $\angle AOC \cong \angle PYR$ and $\angle BOC \cong \angle QYR$. Name the angle which is congruent to $\angle AOB$.

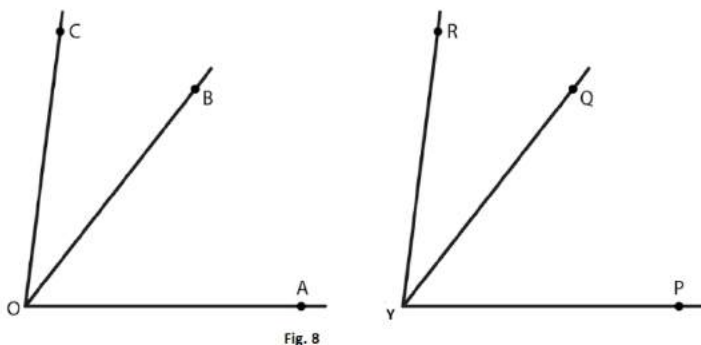


Fig. 8

Solution:

Given that $\angle AOC \cong \angle PYR$

Also given that $\angle BOC \cong \angle QYR$

Now, $\angle AOC = \angle AOB + \angle BOC$ and $\angle PYR = \angle PYQ + \angle QYR$

By putting the value of $\angle AOC$ and $\angle PYR$ in $\angle AOC \cong \angle PYR$

We get, $\angle AOB + \angle BOC \cong \angle PYQ + \angle QYR$

$\angle AOB \cong \angle PYQ$ ($\angle BOC \cong \angle QYR$)

Hence, $\angle AOB \cong \angle PYQ$

7. Which of the following statements are true and which are false;

(i) All squares are congruent.

(ii) If two squares have equal areas, they are congruent.

(iii) If two rectangles have equal areas, they are congruent.

(iv) If two triangles have equal areas, they are congruent.

Solution:

(i) False.

Explanation:

All the sides of a square are of equal length. However, different squares can have sides of different lengths. Hence all squares are not congruent.

(ii) True.

Explanation:

Two squares that have the same area will have sides of the same lengths. Hence they will be congruent.

(iii) False

Explanation:

Area of a rectangle = length $\times$ breadth

Two rectangles can have the same area. However, the lengths of their sides can vary and hence they are not congruent.

(iv) False

Explanation:

Area of a triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

Two triangles can have the same area but the lengths of their sides can vary and hence they cannot be congruent.