EXERCISE 16.1 PAGE NO: 16.3

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, ∠POQ ≅∠ROS, can we say that ∠POR ≅∠QOS

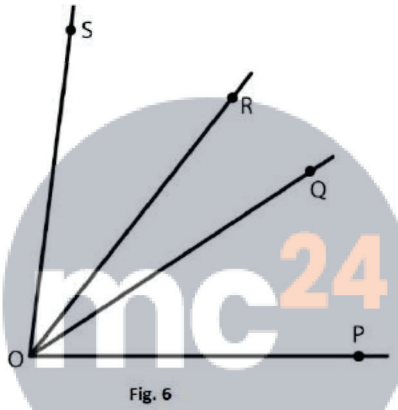

Fig. 6

Solution:
Given that
∠POQ ≅∠ROS
Also ∠ROQ ≅∠ROQ
Therefore adding ∠ROQ to both sides of ∠POQ ≅∠ROS,
We get, ∠POQ + ∠ROQ ≅∠ROQ + ∠ROS
Therefore, ∠POR ≅∠QOS

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

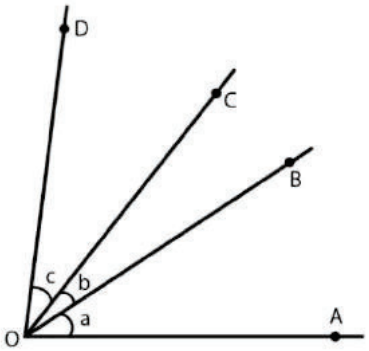

Fig. 7

Solution:

From the figure we have

∠ AOB = ∠ BOC = ∠ COD

Therefore, ∠ AOB = ∠COD

Also, ∠ AOB + ∠ BOC = ∠ BOC + ∠ COD

∠ AOC = ∠ BOD

Hence, ∠ BOD ≅∠ 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^{o}.

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

6. In fig. 8, ∠AOC ≅∠PYR and ∠BOC ≅∠QYR. Name the angle which is congruent to ∠AOB.

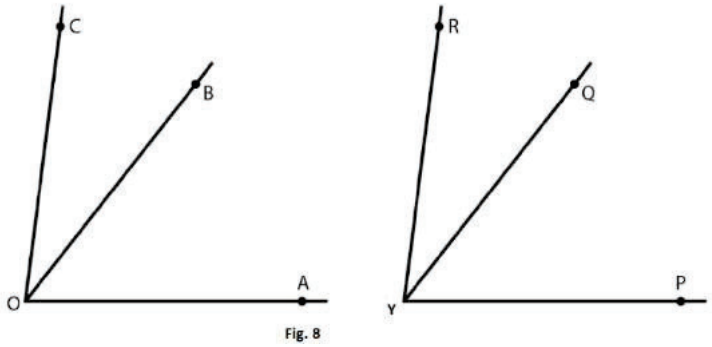

Fig. 8

Solution:

Given that∠AOC ≅∠PYR

Also given that ∠BOC ≅∠QYR

Now, ∠AOC = ∠AOB + ∠BOC and ∠PYR =∠PYQ +∠QYR
By putting the value of ∠AOC and ∠PYR in ∠AOC ≅∠PYR
We get, ∠AOB + ∠BOC ≅∠PYQ + ∠QYR
∠AOB ≅∠PYQ (∠BOC ≅∠QYR)
Hence, ∠AOB ≅∠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 x 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 = 1/2 x base x height
Two triangles can have the same area but the lengths of their sides can vary and hence they cannot be congruent.