Chapter 6 LINES AND ANGLES

Exercise: 6.1 **Page No: 76**

1. In Fig. 6.13, lines AB and CD intersect at O. If ∠AOC +∠BOE = 70° and ∠BOD = 40°, find ∠BOE and reflex ∠COE.

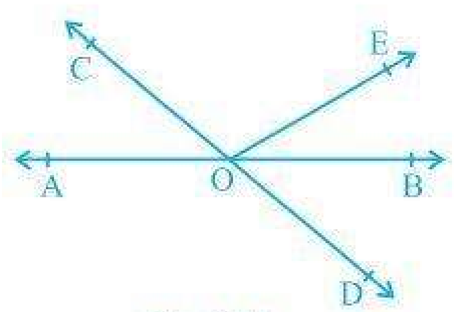


Fig. 6.13

Solution:

From the diagram, we have

(∠AOC +∠BOE +∠COE) and (∠COE +∠BOD +∠BOE) forms a straight line.

So, ∠AOC+∠BOE +∠COE = ∠COE +∠BOD+∠BOE = 180°

Now, by putting the values of ∠AOC + ∠BOE = 70° and ∠BOD = 40° we get

∠COE = 110° and ∠BOE = 30°

So, reflex ∠COE = 360° – 110° = 250°

2. In Fig. 6.14, lines XY and MN intersect at O. If ∠POY = 90° and a : b = 2 : 3, find c.

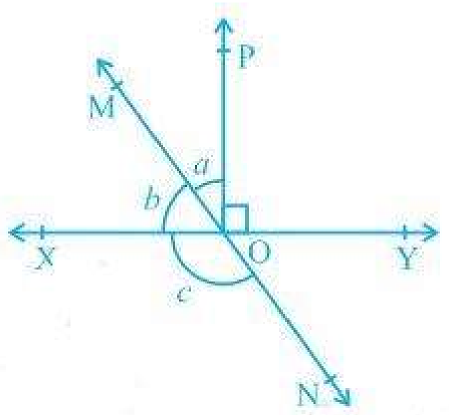


Fig. 6.14

Solution:

We know that the sum of linear pair is always equal to 180°

So,

∠POY +a +b = 180°

Putting the value of ∠POY = 90° (as given in the question), we get,

a+b = 90°

Now, it is given that a:b = 2:3, so

Let a be 2x and b be 3x

∴ 2x+3x = 90°

Solving this, we get

5x = 90°

So, x = 18°

∴ a = 2×18° = 36°

Similarly, b can be calculated, and the value will be

b = 3×18° = 54°

From the diagram, b+c also forms a straight angle, so

b+c = 180°

c+54° = 180°

∴ c = 126°

3. In Fig. 6.15, ∠PQR = ∠PRQ, then prove that ∠PQS = ∠PRT.

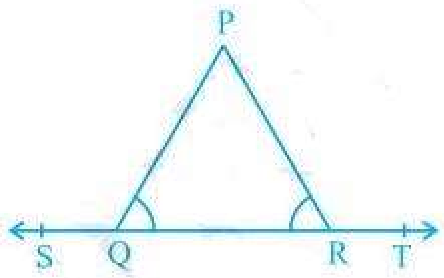


Fig. 6.15

Solution:

Since ST is a straight line, so

∠PQS+∠PQR = 180° (linear pair) and

∠PRT+∠PRQ = 180° (linear pair)

Now, ∠PQS + ∠PQR = ∠PRT+∠PRQ = 180°

Since ∠PQR =∠PRQ (as given in the question)

∠PQS = ∠PRT. (Hence proved).

4. In Fig. 6.16, if x+y = w+z, then prove that AOB is a line.

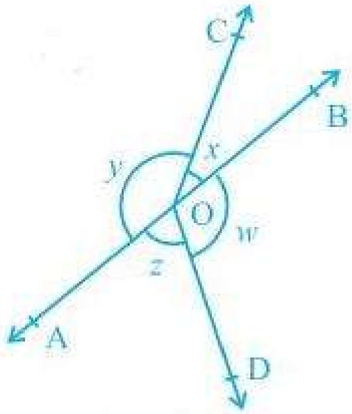


Fig. 6.16

Solution:

To prove AOB is a straight line, we will have to prove x+y is a linear pair

i.e. x+y = 180°

We know that the angles around a point are 360°, so

x+y+w+z = 360°

In the question, it is given that,

x+y = w+z

So, (x+y)+(x+y) = 360°

2(x+y) = 360°

∴ (x+y) = 180° (Hence proved).

5. In Fig. 6.17, POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that ∠ROS = ½ (∠QOS – ∠POS).

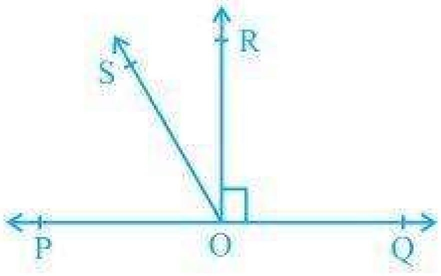


Fig. 6.17

Solution:

In the question, it is given that (OR ⊥ PQ) and ∠POQ = 180°

We can write it as ∠ROP = ∠ROQ = 90°

We know that

∠ROP = ∠ROQ

It can be written as

∠POS + ∠ROS = ∠ROQ

∠POS + ∠ROS = ∠QOS – ∠ROS

∠SOR + ∠ROS = ∠QOS – ∠POS

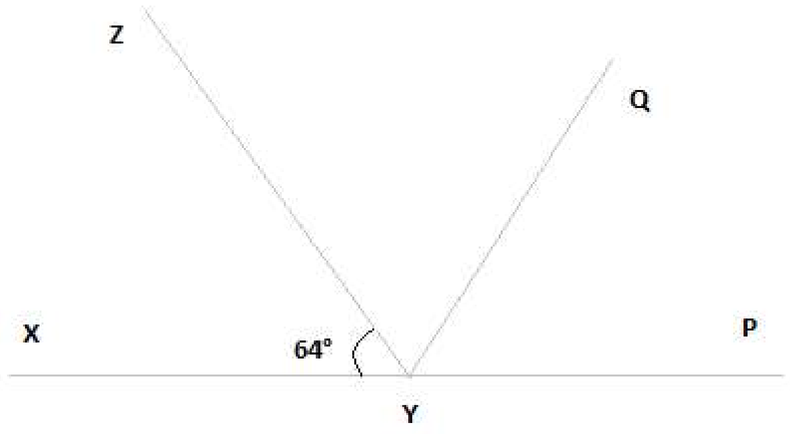
So we get

2∠ROS = ∠QOS – ∠POS

Or, ∠ROS = 1/2 (∠QOS – ∠POS)(Hence proved).

6. It is given that ∠XYZ = 64° and XY is produced to point P. Draw a figure from the given information. If ray YQ bisects ∠ZYP, find ∠XYQ and reflex ∠QYP.

Solution:



Here, XP is a straight line

So, ∠XYZ +∠ZYP = 180°

Putting the value of ∠XYZ = 64°, we get

64° +∠ZYP = 180°

∴ ∠ZYP = 116°

From the diagram, we also know that ∠ZYP = ∠ZYQ + ∠QYP

Now, as YQ bisects ∠ZYP,

∠ZYQ = ∠QYP

Or, ∠ZYP = 2∠ZYQ

∴ ∠ZYQ = ∠QYP = 58°

Again, ∠XYQ = ∠XYZ + ∠ZYQ

By putting the value of ∠XYZ = 64° and ∠ZYQ = 58°, we get.

∠XYQ = 64°+58°

Or, ∠XYQ = 122°

Now, reflex ∠QYP = 180°+XYQ

We computed that the value of ∠XYQ = 122°.

So,

∠QYP = 180°+122°

∴ ∠QYP = 302°