RD Sharma Solutions Class 9 Maths Chapter 8: In RD Sharma Solutions for Class 9 Maths Chapter 8, Lines and Angles, students are provided with a comprehensive guide to understanding the fundamental concepts of geometry. This chapter examine the properties of lines and angles, covering topics such as parallel lines, transversals, angles formed by intersecting lines, and angle sum property of triangles.

With the help of clear explanations and step-by-step solutions, students can easily grasp these concepts and strengthen their problem-solving skills. RD Sharma Solutions for Chapter 8 are crafted to facilitate a deeper understanding of geometry principles, making it easier for students to excel in their mathematics studies. Whether preparing for exams or seeking to enhance their mathematical knowledge, students can rely on these solutions to navigate through the complexities of lines and angles with confidence.

RD Sharma Solutions Class 9 Maths Chapter 8 Lines and Angles PDF

Here we have provided RD Sharma Class 9 Solutions Maths Chapter 8 solutions for the students to help them ace their examinations. Students can refer to these solutions and practice these questions to score better in the exams.

RD Sharma Solutions Class 9 Maths Chapter 8 Lines and Angles PDF

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Below, you'll find solutions to RD Sharma Class 9 Maths Chapter 8, focusing on Lines and Angles. With the help of these solutions, you can improve your problem-solving skills and prepare effectively for exams.

RD Sharma Solutions Class 9 Maths Chapter 8 Lines and Angles Exercise 8.1

Question 1: Write the complement of each of the following angles:

(i)20^0

(ii)35^0

(iii)90^0

(iv) 77^0

(v)30^0

Solution:

(i) The sum of an angle and its complement = 90^0

Therefore, the complement of 20^0 = 90^0 – 20^0 = 70^0

(ii) The sum of an angle and its complement = 90^0

Therefore, the complement of 35° = 90° – 35° = 55

(iii) The sum of an angle and its complement = 90^0

Therefore, the complement of 90^0 = 90^0 – 90^0 = 0^0

(iv) The sum of an angle and its complement = 90^0

Therefore, the complement of 77^0 = 90° – 77^0 = 13^0

(v) The sum of an angle and its complement = 90^0

Therefore, the complement of 30^0 = 90^0 – 30^0 = 60^0

Question 2 : Write the supplement of each of the following angles:

(i) 54^0

(ii) 132^0

(iii) 138^0

Solution:

(i) The sum of an angle and its supplement = 180^0.

Therefore supplement of angle 54^0 = 180^0 – 54^0 = 126^0

(ii) The sum of an angle and its supplement = 180^0.

Therefore supplement of angle 132^0 = 180^0 – 132^0 = 48^0

(iii) The sum of an angle and its supplement = 180^0.

Therefore supplement of angle 138^0 = 180^0 – 138^0 = 42^0

Question 3: If an angle is 28^0 less than its complement, find its measure?

Solution:

Let the measure of any angle is ' a ' degrees

Thus, its complement will be $(90 - a)^0$

So, the required angle = Complement of a – 28

$a = (90 - a) - 28$

$2a = 62$

$a = 31$

Hence, the angle measured is 31^0.

Question 4 : If an angle is 30° more than one half of its complement, find the measure of the angle?

Solution:

Let an angle measured by ' a ' in degrees

Thus, its complement will be $(90 - a)^0$

Required Angle = 30^0 + complement/2

$a = 30^0 + (90 - a)^0 / 2$

$a + a/2 = 30^0 + 45^0$

$3a/2 = 75^0$

$a = 50^0$

Therefore, the measure of required angle is 50^0.

Question 5 : Two supplementary angles are in the ratio 4:5. Find the angles?

Solution:

Two supplementary angles are in the ratio 4:5.

Let us say, the angles are 4a and 5a (in degrees)

Since angle are supplementary angles;

Which implies, $4a + 5a = 180^0$

$9a = 180^0$

$a = 20^0$

Therefore, $4a = 4 (20) = 80^0$ and

$5(a) = 5 (20) = 100^0$

Hence, required angles are 80° and 100⁰.

Question 6 : Two supplementary angles differ by 48⁰. Find the angles?

Solution: Given: Two supplementary angles differ by 48^0.

Consider a^0 be one angle then its supplementary angle will be equal to $(180 – a)^0$

According to the question;

$(180 – a) – x = 48$

$(180 – 48) = 2a$

$132 = 2a$

$132/2 = a$

Or $a = 66^0$

Therefore, $180 – a = 114^0$

Hence, the two angles are 66⁰ and 114⁰.

Question 7: An angle is equal to 8 times its complement. Determine its measure?

Solution: Given: Required angle = 8 times of its complement

Consider a^0 be one angle then its complementary angle will be equal to $(90 – a)^0$

According to the question;

$a = 8$ times of its complement

$a = 8 (90 – a)$

$a = 720 – 8a$

$a + 8a = 720$

9a = 720

a = 80

Therefore, the required angle is 80⁰.

RD Sharma Solutions Class 9 Maths Chapter 8 Lines and Angles Exercise 8.2

Question 1: In the below Fig. OA and OB are opposite rays:

(i) If x = 25⁰, what is the value of y?

(ii) If y = 35⁰, what is the value of x?
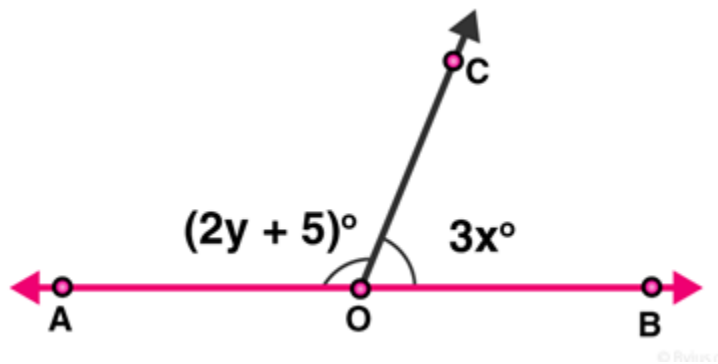
Solution:

(i) Given: x = 25

From figure: $\angle AOC$ and $\angle BOC$ form a linear pair

Which implies, $\angle AOC + \angle BOC = 180^0$

From the figure, $\angle AOC = 2y + 5$ and $\angle BOC = 3x$

$\angle AOC + \angle BOC = 180^0$

(2y + 5) + 3x = 180

(2y + 5) + 3 (25) = 180

2y + 5 + 75 = 180

2y + 80 = 180

2y = 100

y = 100/2 = 50

Therefore, y = 50⁰

(ii) Given: y = 35⁰

From figure: ∠AOC + ∠BOC = 180° (Linear pair angles)

(2y + 5) + 3x = 180

(2(35) + 5) + 3x = 180

75 + 3x = 180

3x = 105

x = 35

Therefore, x = 35⁰

Question 2: In the below figure, write all pairs of adjacent angles and all the linear pairs.
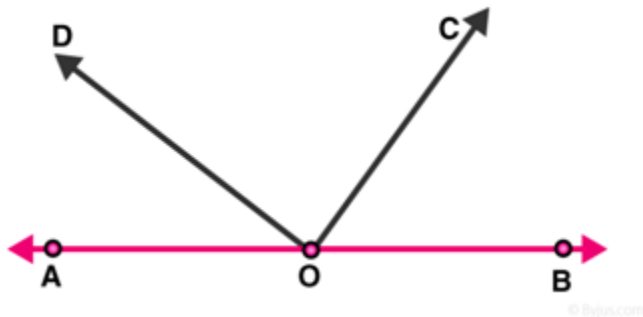
Solution: From figure, pairs of adjacent angles are :

(∠AOC, ∠COB) ; (∠AOD, ∠BOD) ; (∠AOD, ∠COD) ; (∠BOC, ∠COD)

And Linear pair of angles are *(∠AOD, ∠BOD) and (∠AOC, ∠BOC).*

[As ∠AOD + ∠BOD = 180⁰ and ∠AOC+ ∠BOC = 180⁰.]

Question 3 : In the given figure, find x. Further find ∠BOC , ∠COD and ∠AOD.
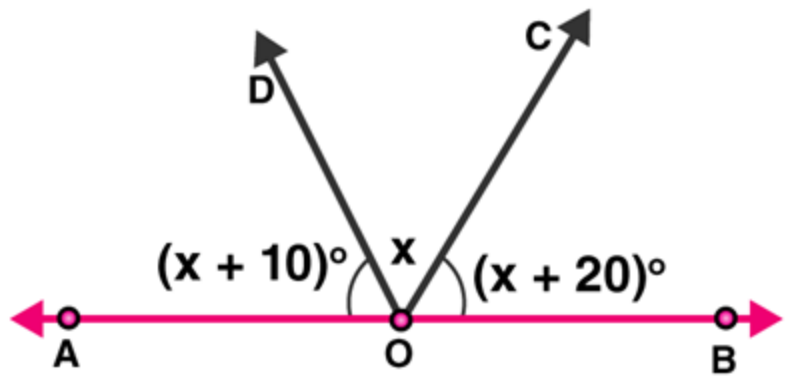
Solution:

From figure, $\angle AOD$ and $\angle BOD$ form a linear pair,

Therefore, $\angle AOD + \angle BOD = 180^0$

Also, $\angle AOD + \angle BOC + \angle COD = 180^0$

Given: $\angle AOD = (x+10)^0$, $\angle COD = x^0$ and $\angle BOC = (x + 20)^0$

$(x + 10) + x + (x + 20) = 180$

$3x + 30 = 180$

$3x = 180 - 30$

$x = 150/3$

$x = 50^0$

Now,

$\angle AOD = (x+10) = 50 + 10 = 60$

$\angle COD = x = 50$

$\angle BOC = (x+20) = 50 + 20 = 70$

Hence, $\angle AOD = 60^0$, $\angle COD = 50^0$ and $\angle BOC = 70^0$

Question 4: In figure, rays OA, OB, OC, OD and OE have the common end point 0. Show that $\angle AOB + \angle BOC + \angle COD + \angle DOE + \angle EOA = 360°$.
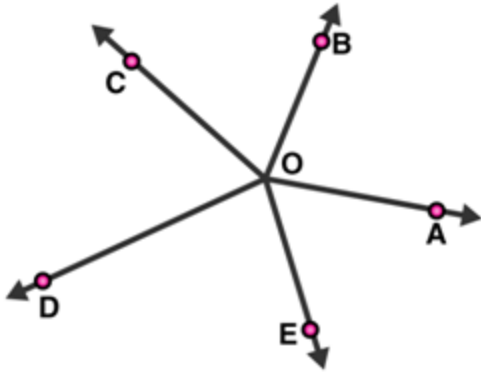
Solution:

Given: Rays OA, OB, OC, OD and OE have the common endpoint O.

Draw an opposite ray OX to ray OA, which make a straight line AX.
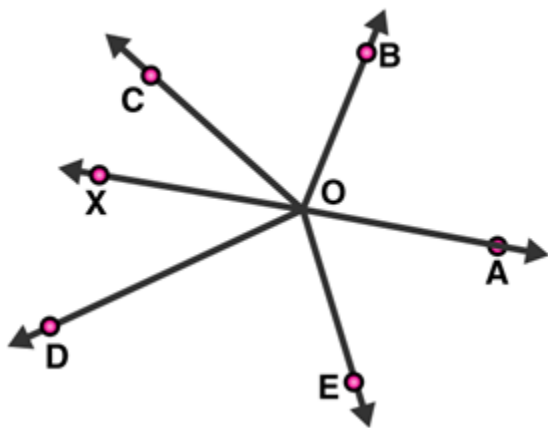
From figure:

∠AOB and ∠BOX are linear pair angles, therefore,

∠AOB +∠BOX = 180⁰

Or, ∠AOB + ∠BOC + ∠COX = 180⁰ ———(1)

Also,

∠AOE and ∠EOX are linear pair angles, therefore,

∠AOE+∠EOX =180°

Or, ∠AOE + ∠DOE + ∠DOX = 180⁰ ——(2)

By adding equations, (1) and (2), we get;

$\angle AOB + \angle BOC + \angle COF + \angle AOE + \angle DOE + \angle DOX = 180^0 + 180^0$

$\angle AOB + \angle BOC + \angle COD + \angle DOE + \angle EOA = 360^0$

Hence Proved.

Question 5 : In figure, $\angle AOC$ and $\angle BOC$ form a linear pair. If a – 2b = 30°, find a and b?
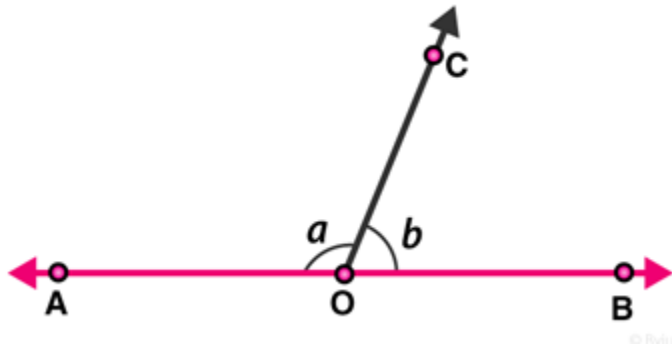
Solution:

Given : $\angle AOC$ and $\angle BOC$ form a linear pair.

=> a + b = 180^0 …..(1)

a – 2b = 30^0 …(2) (given)

On subtracting equation (2) from (1), we get

a + b – a + 2b = 180 – 30

3b = 150

b = 150/3

b = 50^0

Since, a – 2b = 30^0

a – 2(50) = 30

a = 30 + 100

a = 130^0

Therefore, the values of a and b are 130° and 50° respectively.

Question 6: How many pairs of adjacent angles are formed when two lines intersect at a point?

Solution: Four pairs of adjacent angles are formed when two lines intersect each other at a single point.

For example, Let two lines AB and CD intersect at point O.
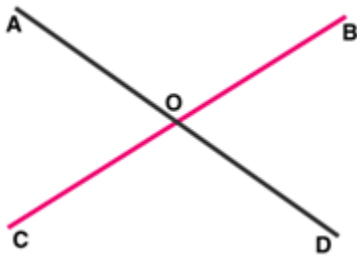
The 4 pair of adjacent angles are :

$(\angle AOD, \angle DOB), (\angle DOB, \angle BOC), (\angle COA, \angle AOD)$ and $(\angle BOC, \angle COA)$.

Question 7: How many pairs of adjacent angles, in all, can you name in figure given?
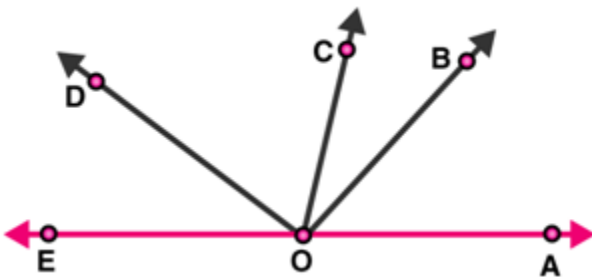
Solution: Number of Pairs of adjacent angles, from the figure, are :

$\angle EOC$ and $\angle DOC$

$\angle EOD$ and $\angle DOB$

$\angle DOC$ and $\angle COB$

$\angle EOD$ and $\angle DOA$

$\angle DOC$ and $\angle COA$

$\angle BOC$ and $\angle BOA$

∠BOA and ∠BOD

∠BOA and ∠BOE

∠EOC and ∠COA

∠EOC and ∠COB

Hence, there are 10 pairs of adjacent angles.

Question 8: In figure, determine the value of x.
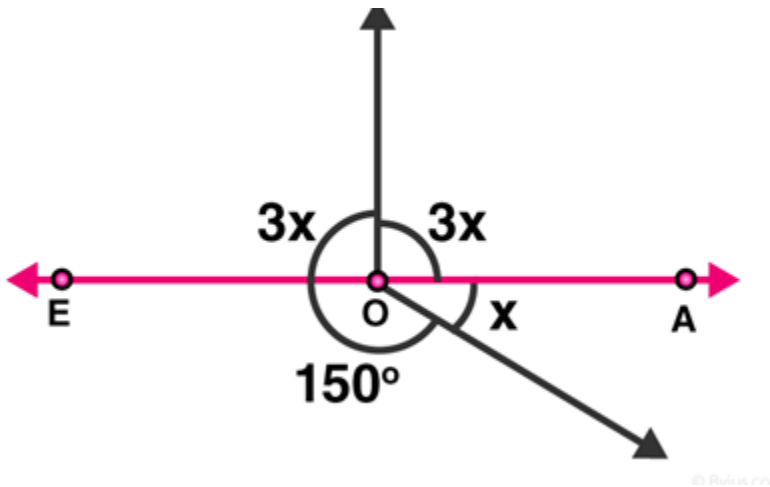
Solution:

The sum of all the angles around a point O is equal to 360°.

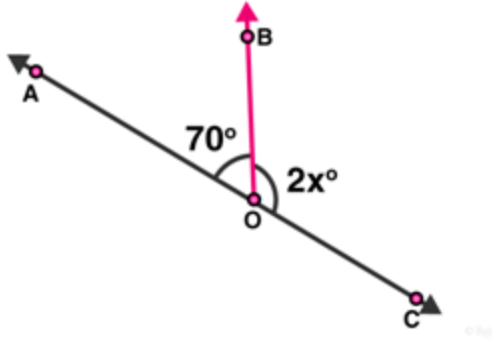Therefore,

3x + 3x + 150 + x = 360^0

7x = 360^0 – 150^0

7x = 210^0

x = 210/7

x = 30^0

Hence, the value of x is 30°.

Question 9: In figure, AOC is a line, find x.

Solution:

From the figure, ∠AOB and ∠BOC are linear pairs,

∠AOB +∠BOC =180°

70 + 2x = 180

2x = 180 – 70

2x = 110

x = 110/2

x = 55

Therefore, the value of x is 55^0.

Question 10: In figure, POS is a line, find x.
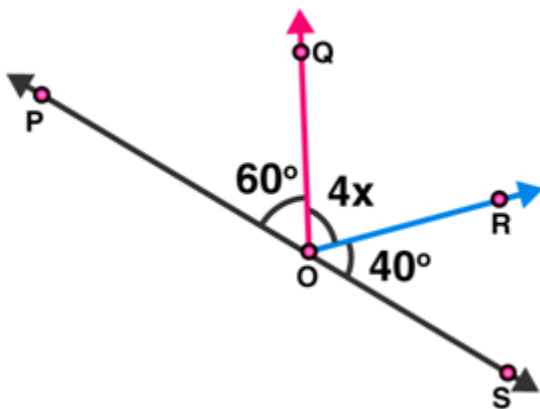
Solution:

From figure, ∠POQ and ∠QOS are linear pairs.

Therefore,

$\angle POQ + \angle QOS = 180^0$

$\angle POQ + \angle QOR + \angle SOR = 180^0$

$60^0 + 4x + 40^0 = 180^0$

$4x = 180^0 - 100^0$

$4x = 80^0$

$x = 20^0$

Hence, the value of x is 20^0.

RD Sharma Solutions Class 9 Maths Chapter 8 Lines and Angles Exercise 8.3

Question 1: In figure, lines l_1, and l_2 intersect at O, forming angles as shown in the figure. If x = 45. Find the values of y, z and u.
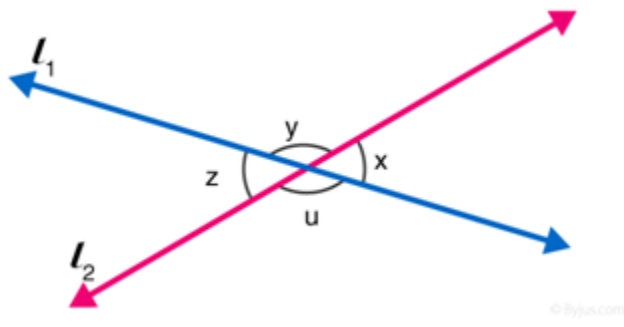
Solution:

Given: $x = 45^0$

Since vertically opposite angles are equal, therefore $z = x = 45^0$

z and u are angles that are a linear pair, therefore, $z + u = 180^0$

Solve, $z + u = 180^0$, for u

$u = 180^0 - z$

$u = 180^0 - 45$

u = 135⁰

Again, x and y angles are a linear pair.

x+ y = 180⁰

y = 180⁰ – x

y =180⁰ – 45⁰

y = 135⁰

Hence, remaining angles are y = 135⁰, u = 135⁰ and z = 45⁰.

Question 2 : In figure, three coplanar lines intersect at a point O, forming angles as shown in the figure. Find the values of x, y, z and u .
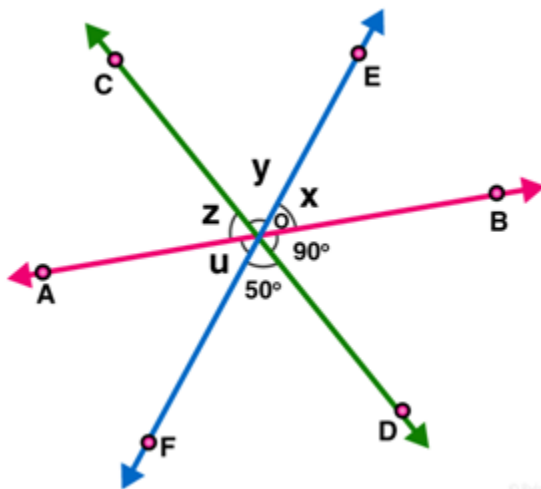
Solution:

(∠BOD, z); (∠DOF, y) are pair of vertically opposite angles.

So, ∠BOD = z = 90⁰

∠DOF = y = 50⁰

[Vertically opposite angles are equal.]

Now, x + y + z = 180 [Linear pair] [AB is a straight line]

x + y + z = 180

x + 50 + 90 = 180

x = 180 – 140

x = 40

Hence values of x, y, z and u are 40⁰, 50⁰, 90⁰ and 40⁰ respectively.

Question 3 : In figure, find the values of x, y and z.
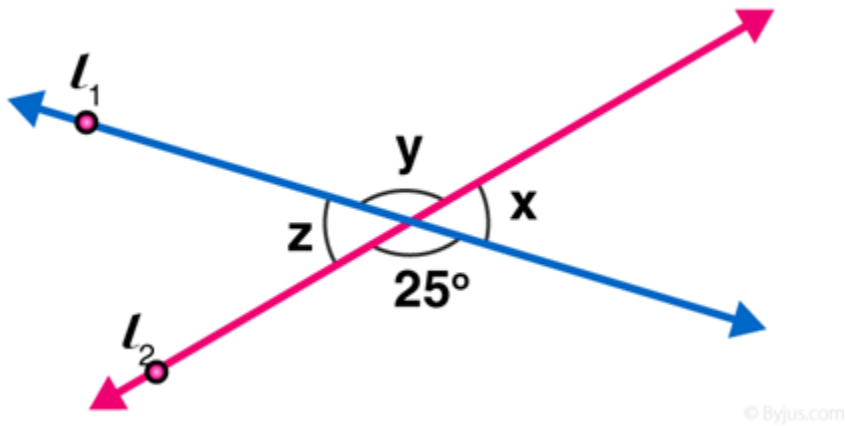
Solution:

From figure,

$y = 25^0$ [Vertically opposite angles are equal]

Now $\angle x + \angle y = 180^0$ [Linear pair of angles]

x = 180 – 25

x = 155

Also, z = x = 155 [Vertically opposite angles]

Answer: *y = 25⁰ and z = 155⁰*

Question 4 : In figure, find the value of x.
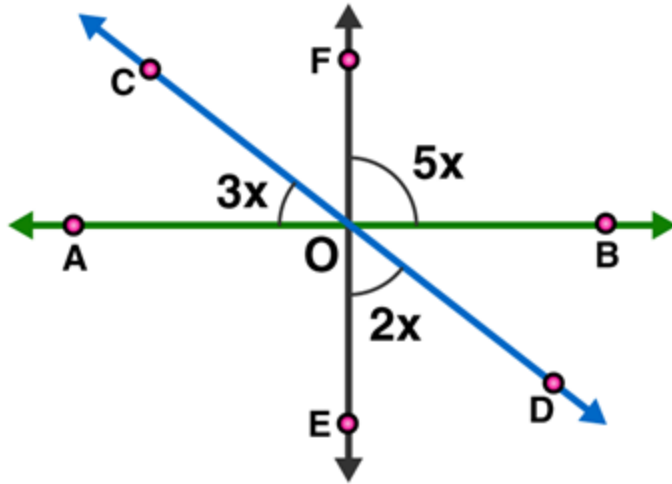
Solution:

∠AOE = ∠BOF = 5x [Vertically opposite angles]

∠COA+∠AOE+∠EOD = 180^0 [Linear pair]

3x + 5x + 2x = 180

10x = 180

x = 180/10

x = 18

The value of x = 18^0

Question 5 : Prove that bisectors of a pair of vertically opposite angles are in the same straight line.

Solution:
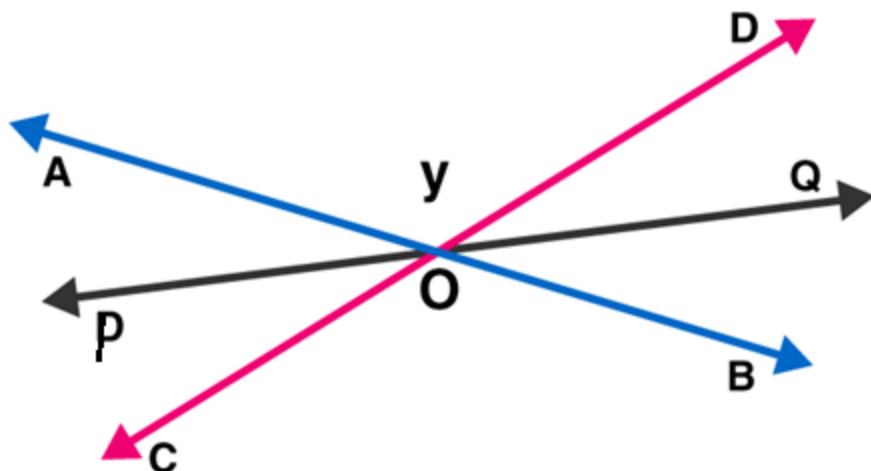
Lines AB and CD intersect at point O, such that

$\angle AOC = \angle BOD$ (vertically angles) …(1)

Also OP is the bisector of AOC and OQ is the bisector of BOD

To Prove: POQ is a straight line.

OP is the bisector of $\angle AOC$:

$\angle AOP = \angle COP$ …(2)

OQ is the bisector of $\angle BOD$:

$\angle BOQ = \angle QOD$ …(3)

Now,

Sum of the angles around a point is 360°.

$\angle AOC + \angle BOD + \angle AOP + \angle COP + \angle BOQ + \angle QOD = 360^0$

$\angle BOQ + \angle QOD + \angle DOA + \angle AOP + \angle POC + \angle COB = 360^0$

$2\angle QOD + 2\angle DOA + 2\angle AOP = 360^0$ (Using (1), (2) and (3))

$\angle QOD + \angle DOA + \angle AOP = 180^0$

$POQ = 180^0$

Which shows that, the bisectors of pair of vertically opposite angles are on the same straight line.
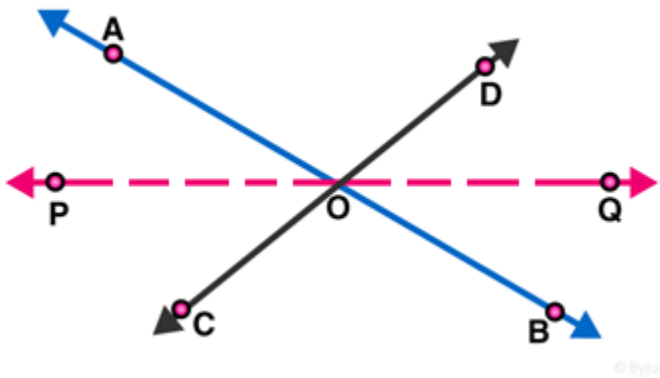
Hence Proved.

Question 6 : If two straight lines intersect each other, prove that the ray opposite to the bisector of one of the angles thus formed bisects the vertically opposite angle.

Solution: Given AB and CD are straight lines which intersect at O.

OP is the bisector of ∠ AOC.

To Prove : OQ is the bisector of ∠BOD

Proof :

AB, CD and PQ are straight lines which intersect in O.

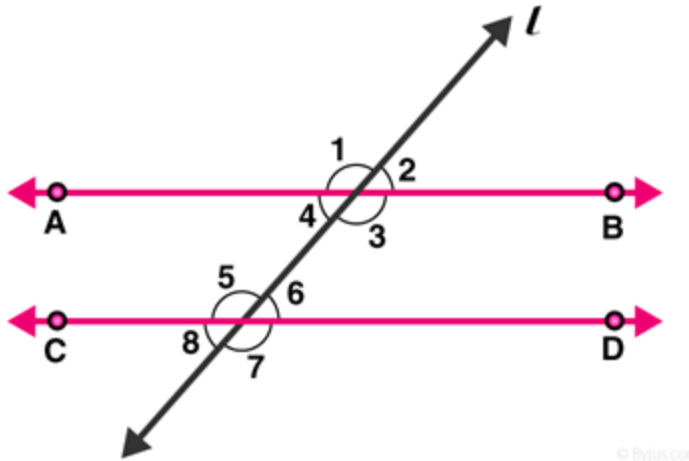Vertically opposite angles: ∠ AOP = ∠ BOQ

Vertically opposite angles: ∠ COP = ∠ DOQ

OP is the bisector of ∠ AOC : ∠ AOP = ∠ COP

Therefore, ∠BOQ = ∠ DOQ

Hence, OQ is the bisector of ∠BOD.

RD Sharma Solutions Class 9 Maths Chapter 8 Lines and Angles Exercise 8.4

Question 1: In figure, AB, CD and ∠1 and ∠2 are in the ratio 3 : 2. Determine all angles from 1 to 8.

Solution:

Let ∠1 = 3x and ∠2 = 2x

From figure: ∠1 and ∠2 are linear pair of angles

Therefore, ∠1 + ∠2 = 180

3x + 2x = 180

5x = 180

x = 180 / 5

=> x = 36

So, ∠1 = 3x = 108^0 and ∠2 = 2x = 72^0

As we know, vertically opposite angles are equal.

Pairs of vertically opposite angles are:

(∠1 = ∠3); (∠2 = ∠4) ; (∠5, ∠7) and (∠6 , ∠8)

∠1 = ∠3 = 108°

∠2 = ∠4 = 72°

∠5 = ∠7

∠6 = ∠8

We also know, if a transversal intersects any parallel lines, then the corresponding angles are equal

∠1 = ∠5 = ∠7 = 108°

∠2 = ∠6 = ∠8 = 72°

Answer: *∠1 = 108°, ∠2 = 72°, ∠3 = 108°, ∠4 = 72°, ∠5 = 108°, ∠6 = 72°, ∠7 = 108° and ∠8 = 72°*

Question 2: In figure, l, m and n are parallel lines intersected by transversal p at X, Y and Z respectively. Find ∠1, ∠2 and ∠3.
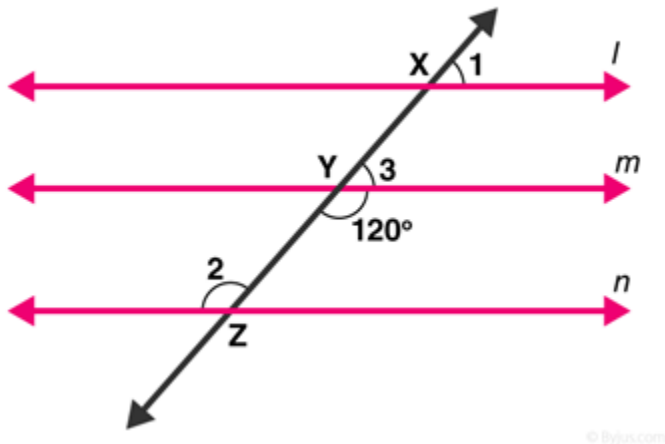
Solution: From figure:

∠Y = 120° [Vertical opposite angles]

∠3 + ∠Y = 180° [Linear pair angles theorem]

=> ∠3= 180 – 120

=> ∠3= 60°

Line l is parallel to line m,

∠1 = ∠3 [Corresponding angles]

∠1 = 60°

Also, line m is parallel to line n,

∠2 = ∠Y [Alternate interior angles are equal]

∠2 = 120°

Answer: *∠1 = 60°, ∠2 = 120° and ∠3 = 60°.*

Question 3: In figure, AB || CD || EF and GH || KL. Find ∠HKL.
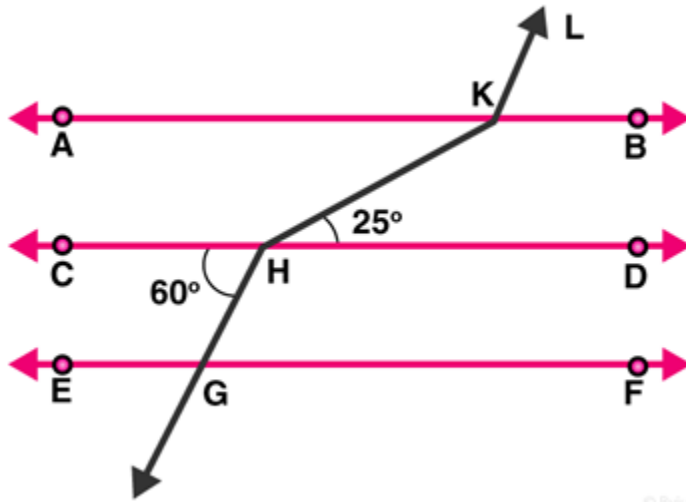
Solution:

Extend LK to meet line GF at point P.
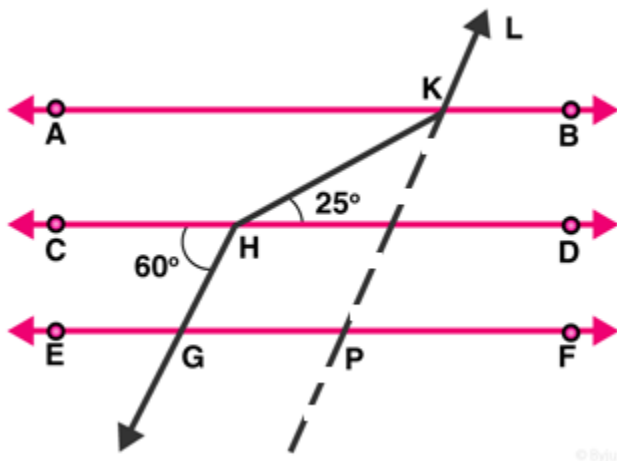
From figure, CD || GF, so, alternate angles are equal.

∠CHG =∠HGP = 60°

∠HGP =∠KPF = 60° [Corresponding angles of parallel lines are equal]

Hence, ∠KPG =180 – 60 = 120°

=> ∠GPK = ∠AKL= 120° [Corresponding angles of parallel lines are equal]

∠AKH = ∠KHD = 25° [alternate angles of parallel lines]

Therefore, ∠HKL = ∠AKH + ∠AKL = 25 + 120 = 145°

Question 4: In figure, show that AB || EF.
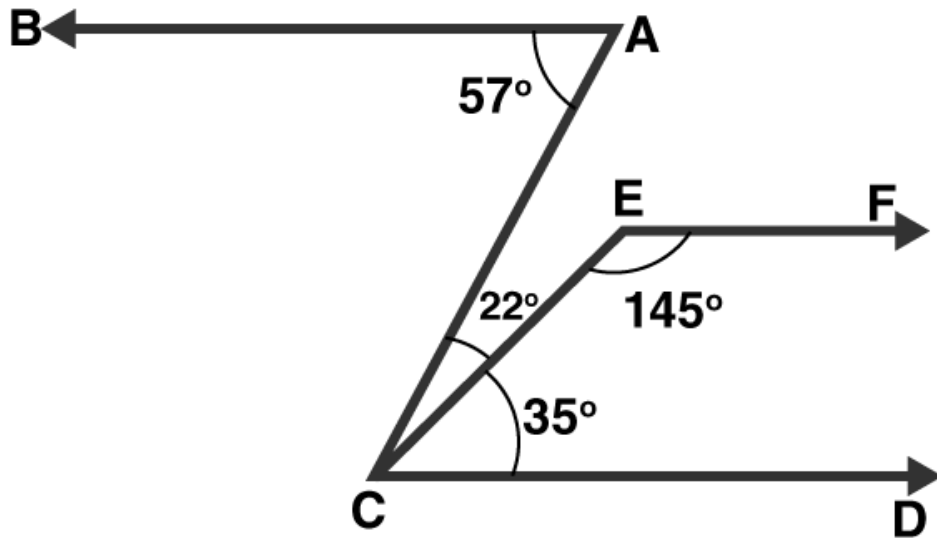
Solution: Produce EF to intersect AC at point N.
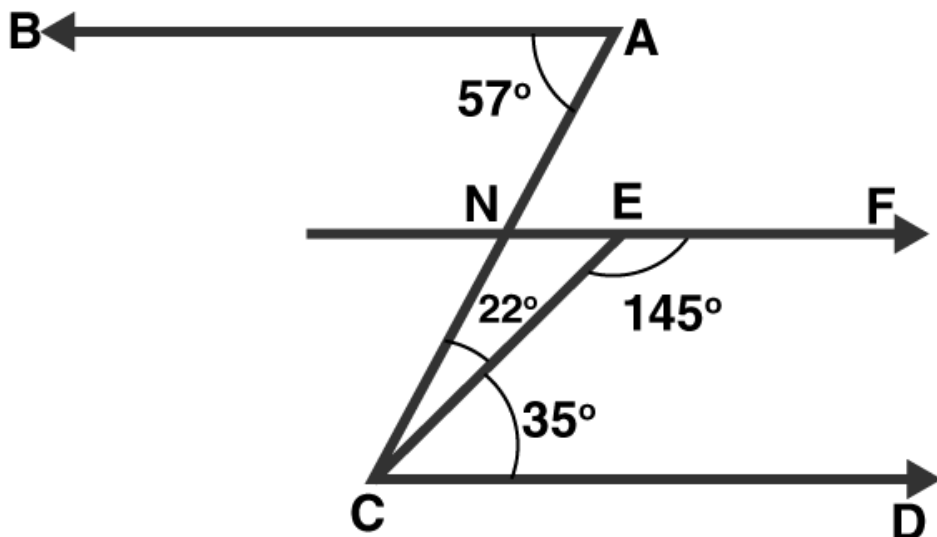
From figure, ∠BAC = 57° and

∠ACD = 22°+35° = 57°

Alternative angles of parallel lines are equal

=> BA || EF …..(1)

Sum of Co-interior angles of parallel lines is 180°

EF || CD

$\angle$DCE + $\angle$CEF = 35 + 145 = 180° …(2)

From (1) and (2)

AB || EF

[Since, Lines parallel to the same line are parallel to each other]

Hence Proved.