RS Aggarwal Solutions Class 9 Maths Chapter 7: RS Aggarwal Solutions Class 9 Maths Chapter 7 - Lines and Angles is a helpful guide for students learning about lines and angles. In this chapter, you'll learn about different types of angles and properties of lines.

The solutions provided in this guide are easy to follow, with clear explanations for each problem. By practicing with these solutions, you can improve your understanding of geometry and become more confident in solving related problems.

RS Aggarwal Solutions Class 9 Maths Chapter 7 - Lines and Angles PDF

You can access the RS Aggarwal Solutions for Class 9 Maths Chapter 7 - Lines and Angles PDF through the provided link. These solutions provide detailed explanations and step-by-step guidance to help you understand and solve the exercises in your textbook. By using these solutions, you can enhance your understanding of lines and angles, sharpen your problem-solving skills, and prepare effectively for exams.

RS Aggarwal Solutions Class 9 Maths Chapter 7 - Lines and Angles PDF

RS Aggarwal Solutions Class 9 Maths Chapter 7 - Lines and Angles

Below, you'll find detailed solutions for RS Aggarwal Class 9 Maths Chapter 7 - Lines and Angles. These solutions are designed to help you understand the concepts better and solve problems step by step. They'll assist you in improving your problem-solving skills and preparing for exams effectively. Whether you're revising concepts or practicing exercises, these solutions will be a useful resource to support your learning in mathematics.

RS Aggarwal Solutions Class 9 Chapter 7 Lines and Angles Exercise- 4.1

Question 1.

Solution:

(i) Angle: Two rays having a common end point form an angle.
(ii) Interior of an angle: The interior of ∠AOB is the set of all points in its plane, which lie on the same side of OA as B and also on same side of OB as A.
(iii) Obtuse angle: An angle whose measure is more than 90° but less than 180°, is called an obtuse angle.
(iv) Reflex angle: An angle whose measure is more than 180° but less than 360° is called a reflex angle.
(v) Complementary angles: Two angles are said to be complementary, if the sum of their measures is 90o.
(vi) Supplementary angles: Two angles are said to be supplementary, if the sum of their measures is 180°.

Question 2

Solution:
∠A = 36°27'46"
∠B = 28° 43'39"
Adding, ∠A + ∠B = 64° 70' 85"
We know that 60" = 1' and 60' = 1°
∠A+ ∠B = 65° 11' 25"

Question 3.

Solution:

Let ∠A = 36° and ∠B = 24° 28′ 30″

Their difference = 36° – 24° 28′ 30″

	Deg	Min	Sec	
	36°	0′	0″	
–	24°	28′	30″	[1° = 60′; 1′ = 60″]
	11°	31′	30″	

Thus the difference between two angles is ∠A – ∠B = 11° 31′ 30″

Question 4.

Solution:

We know that two angles are complementary of their sum is 90°. Each of these two angles is complement to the other, therefore.

(i) Complement of 58° = 90° – 58° = 32°

(ii) Complement of 16° = 90° – 16° = 74°

(iii) Complement of 2/3 of a right angle i.e.

of 2/3x 90° or 60° = 90° – 60° = 30°

= 2/3of right angle,

(iv) Complement of 46° 30′

= 90° – 46° 30′

= 43° 30′

(v) Complement of 52° 43′ 20″= 90° – 52° 43′ 20″

= 37° 16′ 40″

(vi) Complement of 68° 35′ 45″

= 90° – 68° 35′ 45″

= 21° 24′ 15″

Question 5.

Solution:
We know that two angles are said to be supplement to each other of their sum is 180° therefore

(i) Supplement of 68° = 180° – 68° =112°

(ii) Supplement of 138° = 180° – 138° = 42°

(iii) Supplement of 3/5of a right angle or 3/5 x 90° or 54°
= 180° – 54° = 126°

(iv) Supplement of 75° 36′ = 180° – 75° 36′ = 104° 24′

(v) Supplement of 124° 20′ 40″
= 180° – 124° 20′ 40″
= 55° 39′ 20″

(vi) Supplement of 108° 48′ 32″ = 180° – 108″ 48′ 32″ = 71° 11′ 28″ Ans.

Question 6.

Solution:
(i) Let the required angle be x°
Then, its complement = 90° – x°

$$\therefore \quad x^\circ = 90^\circ - x^\circ$$
$$\Rightarrow \quad x + x = 90$$
$$\Rightarrow \quad 2x = 90$$
$$\Rightarrow \quad x = \frac{90}{2} = 45$$

∴ The measure of an angle which is equal to its complement is 45°.

(ii) Let the required angle be x°
Then, its supplement = 180° – x°

$$\therefore \quad x^\circ = 180^\circ - x^\circ$$
$$\Rightarrow \quad x + x = 180$$
$$\Rightarrow \quad 2x = 180$$
$$\Rightarrow \quad x = \frac{180}{2} = 90$$

∴ The measure of an angle which is equal to its supplement is 90°.

Question 7.

Solution:
Let the required angle be x^o
Then its complement is $90^o - x^o$

$\Rightarrow \quad x^o = (90^o - x^o) + 36^o$

$\Rightarrow \quad x^o + x^o = 90^o + 36^o$

$\Rightarrow \quad 2x^o = 126^o$

$\Rightarrow \quad x = \frac{126}{2} = 63$

∴ The measure of an angle which is 36^o more than its complement is 63^o.

Question 8.

Solution:
Let the required angle be x^o
Then its supplement is $180^o - x^o$

$\Rightarrow \quad x^o = (180^o - x^o) - 25^o$

$\Rightarrow \quad x^o + x^o = 180^o - 25^o$

$\Rightarrow \quad 2x = 155$

$\Rightarrow \quad x = \frac{155}{2} = 77\frac{1}{2}$

∴ The measure of an angle which is 25^o less than its supplement is $77\frac{1}{2}^o = 77.5^o$.

Question 9.

Solution:
Let the required angle be x^o
Then, its complement = $90^o - x^o$

$\Rightarrow \quad x^o = 4(90^o - x^o)$

$\Rightarrow \quad x^o = 360^o - 4x^o$

$\Rightarrow \quad 5x = 360$

$\Rightarrow \quad x = \frac{360}{5} = 72$

∴ The required angle is 72^o.

Question 10.

Solution:
Let the required angle be x°
Then, its supplement is $180^\circ - x^\circ$

$$\Rightarrow \quad x^\circ = 5\left(180^\circ - x^\circ\right)$$
$$\Rightarrow \quad x^\circ = 900^\circ - 5x^\circ$$
$$\Rightarrow \quad x + 5x = 900$$
$$\Rightarrow \quad 6x = 900$$
$$\Rightarrow \quad x = \frac{900}{6} = 150.$$

$\therefore$ The required angle is 150°.

Question 11.

Solution:
Let the required angle be x°
Then, its complement is $90^\circ - x^\circ$ and its supplement is $180^\circ - x^\circ$
That is we have,

$$180^\circ - x^\circ = 4(90^\circ - x^\circ)$$
$$180^\circ - x^\circ = 360^\circ - 4x^\circ$$
$$4x^\circ - x^\circ = 360^\circ - 180^\circ$$
$$3x = 180$$
$$x = \frac{180}{3} = 60^\circ$$

$\therefore$ The required angle is 60°.

Question 12.

Solution:
Let the required angle be x°
Then, its complement is $90^\circ - x^\circ$ and its supplement is $180^\circ - x^\circ$

$$\therefore \quad 90^\circ - x^\circ = \frac{1}{3}\left(180^\circ - x^\circ\right)$$
$$\Rightarrow \quad 90 - x = 60 - \frac{1}{3}x$$
$$\Rightarrow \quad x - \frac{1}{3}x = 90 - 60$$
$$\Rightarrow \quad \frac{2}{3}x = 30$$
$$\Rightarrow \quad x = \frac{30 \times 3}{2} = 45$$

$\therefore$ The required angle is 45°.

Question 13.

Solution:
Let the two required angles be x° and 180° – x°.

Then,

$$\frac{x^\circ}{180^\circ - x^\circ} = \frac{3}{2}$$

⇒ 2x = 3(180 – x)
⇒ 2x = 540 – 3x
⇒ 3x + 2x = 540
⇒ 5x = 540
⇒ x = 108
Thus, the required angles are 108° and 180° – x° = 180 ° – 108° = 72°.

Question 14.

Solution:
Let the two required angles be x° and 90° – x°.
Then

$$\frac{x^\circ}{90^\circ - x^\circ} = \frac{4}{5}$$

⇒ 5x = 4(90 – x)
⇒ 5x = 360 – 4x
⇒ 5x + 4x = 360
⇒ 9x = 360

⇒ x =   = 40
Thus, the required angles are 40° and 90° – x° = 90 ° – 40° = 50°.

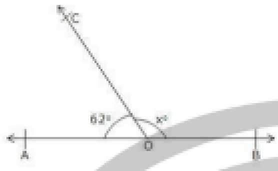
Question 15. Fi

Solution:
Let the required angle be x°.
Then, its complementary and supplementary angles are (90° – x) and (180° – x) respectively.
Then, 7(90° – x) = 3 (180° – x) – 10°
⇒ 630° – 7x = 540° – 3x – 10°
⇒ 7x – 3x = 630° – 530°
⇒ 4x = 100°
⇒ x = 25°
Thus, the required angle is 25°.

RS Aggarwal Solutions Class 9 Chapter 7 Lines and Angles Exercise- 4.2

Question 1.

Solution:



Since ∠BOC and ∠COA form a linear pair of angles, we have
∠BOC + ∠COA = 180°
⇒ $x^o + 62^o = 180^o$
⇒ x = 180 – 62
∴ $x = 118^o$

Question 2.

Solution:
Since, ∠BOD and ∠DOA form a linear pair.
∠BOD + ∠DOA = 180°
∴ ∠BOD + ∠DOC + ∠COA = 180°
⇒ $(x + 20)^o + 55^o + (3x – 5)^o = 180^o$
⇒ x + 20 + 55 + 3x – 5 = 180
⇒ 4x + 70 = 180
⇒ 4x = 180 – 70 = 110
⇒ x = 27.5
∴ ∠AOC = $(3 × 27.5 – 5)^o$ = 82.5-5 = 77.5°
And, ∠BOD = $(x + 20)^o$ = 27.5° + 20° = 47.5°.

Question 3.

Solution:

Since ∠BOD and ∠DOA from a linear pair of angles.
⇒ ∠BOD + ∠DOA = 180°
⇒ ∠BOD + ∠DOC + ∠COA = 180°
⇒ $x^o + (2x – 19)^o + (3x + 7)^o = 180^o$
⇒ 6x – 12 = 180
⇒ 6x = 180 + 12 = 192
⇒ x = 192/6= 32
⇒ x = 32
⇒ ∠AOC = $(3x + 7)^o = (3\ 32 + 7)^o = 103^o$
⇒ ∠COD = $(2x – 19)^o = (2\ 32 – 19)^o = 45^o$
and ∠BOD = $x^o = 32^o$

Question 4..

Solution:

x: y: z = 5: 4: 6

The sum of their ratios = 5 + 4 + 6 = 15

But x + y + z = 180°

[Since, XOY is a straight line]

So, if the total sum of the measures is 15, then the measure of x is 5.

If the sum of angles is 180°, then, measure of x = × 180 = 60

And, if the total sum of the measures is 15, then the measure of y is 4.

If the sum of the angles is 180°, then, measure of y = × 180 = 48

And ∠z = 180° – ∠x – ∠y

= 180° – 60° – 48°

= 180° – 108° = 72°

∴ x = 60, y = 48 and z = 72.

Question 5.

Solution:

AOB will be a straight line, if two adjacent angles form a linear pair.

∴ ∠BOC + ∠AOC = 180°

⇒ (4x – 36)° + (3x + 20)° = 180°

⇒ 4x – 36 + 3x + 20 = 180

⇒ 7x – 16 = 180°

⇒ 7x = 180 + 16 = 196

⇒ x = 196/7= 28

∴ The value of x = 28.

Question 6.

Solution:
Since ∠AOC and ∠AOD form a linear pair.
∴ ∠AOC + ∠AOD = 180°
⇒ 50° + ∠AOD = 180°
⇒ ∠AOD = 180° – 50° = 130°
∠AOD and ∠BOC are vertically opposite angles.
∠AOD = ∠BOC
⇒ ∠BOC = 130°
∠BOD and ∠AOC are vertically opposite angles.
∴ ∠BOD = ∠AOC
⇒ ∠BOD = 50°

Question 7.

Solution:
Since ∠COE and ∠DOF are vertically opposite angles, we have,
∠COE = ∠DOF
⇒ ∠z = 50°
Also ∠BOD and ∠COA are vertically opposite angles.
So, ∠BOD = ∠COA
⇒ ∠t = 90°
As ∠COA and ∠AOD form a linear pair,
∠COA + ∠AOD = 180°
⇒ ∠COA + ∠AOF + ∠FOD = 180° [∠t = 90°]
⇒ t + x + 50° = 180°
⇒ 90° + x° + 50° = 180°
⇒ x + 140 = 180
⇒ x = 180 – 140 = 40
Since ∠EOB and ∠AOF are vertically opposite angles
So, ∠EOB = ∠AOF
⇒ y = x = 40
Thus, x = 40 = y = 40, z = 50 and t = 90

Question 8.

Solution:
Since ∠COE and ∠EOD form a linear pair of angles.
⇒ ∠COE + ∠EOD = 180°
⇒ ∠COE + ∠EOA + ∠AOD = 180°
⇒ 5x + ∠EOA + 2x = 180
⇒ 5x + ∠BOF + 2x = 180
[∴ ∠EOA and BOF are vertically opposite angles so, ∠EOA = ∠BOF]
⇒ 5x + 3x + 2x = 180
⇒ 10x = 180
⇒ x = 18
Now ∠AOD = 2x° = 2 × 18° = 36°
∠COE = 5x° = 5 × 18° = 90°
and, ∠EOA = ∠BOF = 3x° = 3 × 18° = 54°

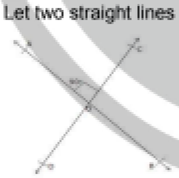
Question 9.

Solution:
Let the two adjacent angles be 5x and 4x.
Now, since these angles form a linear pair.

So, 5x + 4x = 180°
⇒ 9x = 180°
⇒ x = 180/9= 20
∴ The required angles are 5x = 5x = 5 20° = 100°
and 4x = 4 × 20° = 80°

Question 10.

Solution:
Let two straight lines AB and CD intersect at O and let ∠AOC = 90°.



Now, ∠AOC = ∠BOD [Vertically opposite angles]
⇒ ∠BOD = 90°
Also, as ∠AOC and ∠AOD form a linear pair.
⇒ 90° + ∠AOD = 180°
⇒ ∠AOD = 180° – 90° = 90°
Since, ∠BOC = ∠AOD [Verticallty opposite angles]
⇒ ∠BOC = 90°
Thus, each of the remaining angles is 90°.

Question 11.

Solution:
Since, ∠AOD and ∠BOC are vertically opposite angles.
∴ ∠AOD = ∠BOC
Now, ∠AOD + ∠BOC = 280° [Given]
⇒ ∠AOD + ∠AOD = 280°
⇒ 2∠AOD = 280°
⇒ ∠AOD = 280/2= 140°
⇒ ∠BOC = ∠AOD = 140°
As, ∠AOC and ∠AOD form a linear pair.

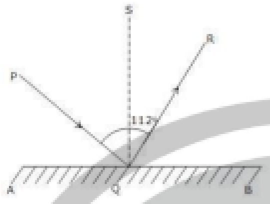
So, ∠AOC + ∠AOD = 180°
⇒ ∠AOC + 140° = 180°
⇒ ∠AOC = 180° – 140° = 40°
Since, ∠AOC and ∠BOD are vertically opposite angles.
∴ ∠AOC = ∠BOD
⇒ ∠BOD = 40°
∴ ∠BOC = 140°, ∠AOC = 40° , ∠AOD = 140° and ∠BOD = 40°.

Question 12.

Solution:
Since ∠COB and ∠BOD form a linear pair
So, ∠COB + ∠BOD = 180°
⇒ ∠BOD = 180° – ∠COB …. (1)
Also, as ∠COA and ∠AOD form a linear pair.
So, ∠COA + ∠AOD = 180°
⇒ ∠AOD = 180° – ∠COA
⇒ ∠AOD = 180° – ∠COB …. (2)
[Since, OC is the bisector of ∠AOB, ∠BOC = ∠AOC]
From (1) and (2), we get,
∠AOD = ∠BOD (Proved)

Question 13.

Solution:



Let QS be a perpendicular to AB.
Now, ∠PQS = ∠SQR
Because angle of incident = angle of reflection
⇒ ∠PQS = ∠SQR = 56°
Since QS is perpendicular to AB, ∠PQA and ∠PQS are complementary angles.
Thus, ∠PQA + ∠PQS = 90°
⇒ ∠PQA + 56° = 90°
⇒ ∠PQA = 90° – 56° = 34°

Question 14.

Solution:
Given. Two lines AB and CD intersect each other at O.
OE is the bisector of ∠BOD and EO is produced to F.
To Prove : OF bisects ∠AOC.
Proof : AB and CD intersect each other at O
∠AOC = ∠BOD
(Vertically opposite angles)
OE is the bisector of ∠BOD
∠1 = ∠2
But ∠1 = ∠3
and ∠2 = ∠4 (Vertically opposite angles)
and ∠1 = ∠2 (proved)
∠3 = ∠4
Hence, OF is the bisector of ∠AOC.
Hence proved.

Question 15.

Solution:

Given ∠AOC and ∠BOC are supplementary angles
OE is the bisector of ∠BOC and OF is the bisector of ∠AOC
To Prove : ∠EOF = 90°
Proof : ∠1 = ∠2
∠3 = ∠4
{OE and OF are the bisectors of ∠BOC and ∠AOC respectively}
But ∠AOC + ∠BOC = 180°
(Linear pair)
=> ∠1 + ∠2 + ∠3 + ∠4 = 180°
=> ∠1 + ∠1 + ∠3 + ∠3 = 180°
=> 2∠1 + 2∠3 = 180°
=> 2(∠1 + ∠3) = 180°
=> ∠1 + ∠3 = 180°/2 = 90°

=> ∠EOF = 90°
Hence proved.

RS Aggarwal Solutions Class 9 Chapter 7 Lines and Angles Exercise- 4.3

Question 1.

Solution:

Since AB and CD are given to be parallel lines and t is a transversal.
So, ∠5 = ∠1 = 70o [Corresponding angles are equal]

∠3 = ∠1 = 70o [Vertically opp. Angles]

∠3 + ∠6 = 180o [Co-interior angles on same side]

∴ ∠6 = 180o – ∠3
= 180o – 70o = 110o
∠6 = ∠8 [Vertically opp. Angles]
⇒ ∠8 = 110o
⇒ ∠4 + ∠5 = 180o [Co-interior angles on same side]

∠4 = 180o – 70o = 110o
∠2 = ∠4 = 110o [Vertically opposite angles]
∠5 = ∠7 [Vertically opposite angles]
So, ∠7 = 70o
∴ ∠2 = 110o, ∠3 = 70o, ∠4 = 110o, ∠5 = 70o, ∠6 = 110o

, ∠7 = 70o and ∠8

= 110o

Question 2.

Solution:

Since ∠2 : ∠1 = 5 : 4.
Let ∠2 and ∠1 be 5x and 4x respectively.
Now, ∠2 + ∠1 = 180, because ∠2 and ∠1 form a linear pair.

So, 5x + 4x = 180o
⇒ 9x = 180o
⇒ x = 20o
∴ ∠1 = 4x = 4 × 20o = 80o
And ∠2 = 5x = 5 × 20o = 100o
∠3 = ∠1 = 80o [Vertically opposite angles]
And ∠4 = ∠2 = 100o

[Vertically opposite angles]
∠1 = ∠5 and ∠2 = ∠6 [Corresponding angles]
So, ∠5 = 80o and ∠6 = 100o
∠8 = ∠6 = 100o [Vertically opposite angles]
And ∠7 = ∠5 = 80o [Vertically opposite angles]

Thus, ∠1 = 80o, ∠2 = 100o, ∠3 = ∠80o, ∠4 = 100o, ∠5 = 80o, ∠6 = 100o

∠7 = 80o and ∠8 = 100o

Question 3.

Solution:

Given: AB || CD and AD || BC
To Prove: ∠ADC = ∠ABC
Proof: Since AB || CD and AD is a transversal. So sum of consecutive interior angles is 180o
.

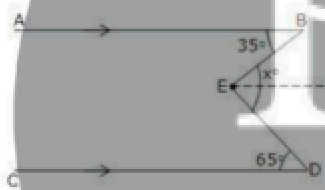
⇒ ∠BAD + ∠ADC = 180o ....(i)
Also, AD || BC and AB is transversal.
So, ∠BAD + ∠ABC = 180o ....(ii)
From (i) and (ii) we get:
∠BAD + ∠ADC = ∠BAD + ∠ABC
⇒ ∠ADC = ∠ABC (Proved)

Question 4.

Question 4.

Solution:

(i) Through E draw EG || CD. Now since EG||CD and ED is a transversal.



So, ∠GED = ∠EDC = 65° [Alternate interior angles]

Since EG || CD and AB || CD,

EG||AB and EB is transversal.

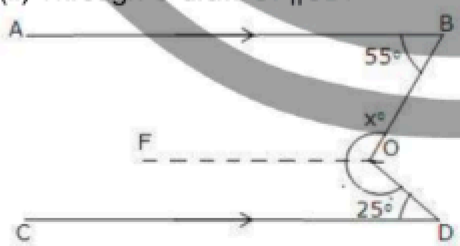
So, ∠BEG = ∠ABE = 35° [Alternate interior angles]

So, ∠DEB = x°

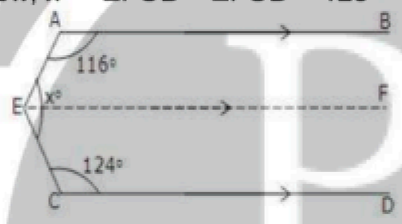
⇒ ∠BEG + ∠GED = 35° + 65° = 100°.

Hence, x = 100.

(ii) Through O draw OF||CD.



Now since OF || CD and OD is transversal.
∠CDO + ∠FOD = 180°
[sum of consecutive interior angles is 180°]
⇒ 25° + ∠FOD = 180°
⇒ ∠FOD = 180° – 25° = 155°
As OF || CD and AB || CD [Given]
Thus, OF || AB and OB is a transversal.
So, ∠ABO + ∠FOB = 180° [sum of consecutive interior angles is 180°]
⇒ 55° + ∠FOB = 180°
⇒ ∠FOB = 180° – 55° = 125°
Now, x° = ∠FOB + ∠FOD = 125° + 155° = 280°.



Now since EF || CD and EC is transversal.
∠FEC + ∠ECD = 180°
[sum of consecutive interior angles is 180°]
⇒ ∠FEC + 124° = 180°
⇒ ∠FEC = 180° – 124° = 56°
Since EF || CD and AB ||CD
So, EF || AB and AE is a trasveral.
So, ∠BAE + ∠FEA = 180°
[sum of consecutive interior angles is 180°]
∴ 116° + ∠FEA = 180°
⇒ ∠FEA = 180° – 116° = 64°
Thus, x° = ∠FEA + ∠FEC
= 64° + 56° = 120°.
Hence, x = 120.

Question 5.

Solution:

Since AB || CD and BC is a transversal.

So, ∠ABC = ∠BCD [alternate interior angles]

⇒ $70^o = x^o + \angle ECD$ ….(i)

Now, CD || EF and CE is transversal.

So, ∠ECD + ∠CEF = 180° [sum of consecutive interior angles is 180°]

∴ $\angle ECD + 130^o = 180^o$

⇒ $\angle ECD = 180^o - 130^o = 50^o$

Putting ∠ECD = 50° in (i) we get,

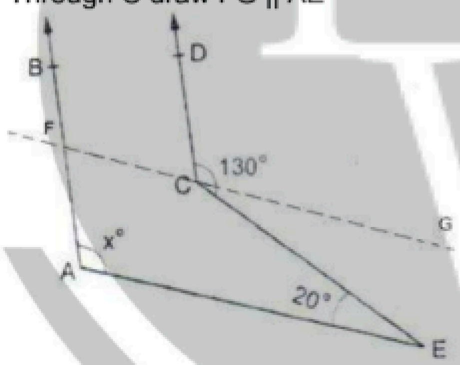
$70^o = x^o + 50^o$

⇒ $x = 70 - 50 = 20$

Question 6.

Solution:

Through C draw FG || AE



Now, since CG || BE and CE is a transversal.

So, ∠GCE = ∠CEA = 20° [Alternate angles]

∴ $\angle DCG = 130^o - \angle GCE$

$= 130^o - 20^o = 110^o$

Also, we have AB || CD and FG is a transversal.

So, ∠BFC = ∠DCG = 110° [Corresponding angles]

As, FG || AE, AF is a transversal.

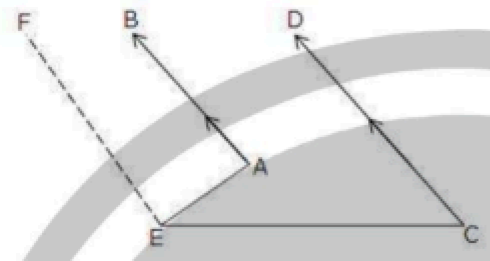
∠BFG = ∠FAE [Corresponding angles]

∴ $x^o = \angle FAE = 110^o$.

Hence, x = 110

Question 7.

Solution:
Given: AB || CD
To Prove: ∠BAE – ∠DCE = ∠AEC



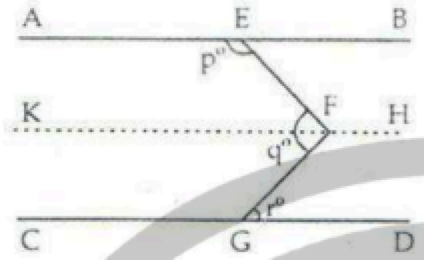
Construction : Through E draw EF || AB
Proof : Since EF || AB, AE is a transversal.
So, ∠BAE + ∠AEF = 180° ….(i)
[sum of consecutive interior angles is 180°]
As EF || AB and AB || CD [Given]
So, EF || CD and EC is a transversal.
So, ∠FEC + ∠DCE = 180° ….(ii)
[sum of consecutive interior angles is 180°]
From (i) and (ii) we get,
∠BAE + ∠AEF = ∠FEC + ∠DCE
⇒ ∠BAE – ∠DCE = ∠FEC – ∠AEF = ∠AEC [Proved]

Question 8.

Solution:
Since AB || CD and BC is a transversal.
So, ∠BCD = ∠ABC = x° [Alternate angles]
As BC || ED and CD is a transversal.
∠BCD + ∠EDC = 180°
⇒ ∠BCD + 75° =180°
⇒ ∠BCD = 180° – 75° = 105°
∠ABC = 105° [since ∠BCD = ∠ABC]
∴ x° = ∠ABC = 105°
Hence, x = 105.

Question 9.

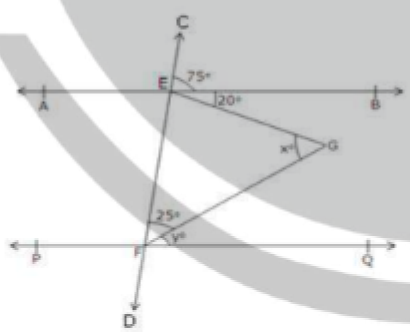
Solution:
Through F, draw KH || AB || CD



Now, KF || CD and FG is a transversal.
⇒ ∠KFG = ∠FGD = r° …. (i)
[alternate angles]
Again AE || KF, and EF is a transversal.
So, ∠AEF + ∠KFE = 180°
∠KFE = 180° – p° …. (ii)
Adding (i) and (ii) we get,
∠KFG + ∠KFE = 180 – p + r
⇒ ∠EFG = 180 – p + r
⇒ q = 180 – p + r
i.e., p + q – r = 180

Question 10.

Solution:



Since AB || PQ and EF is a transversal.
So, ∠CEB = ∠EFQ [Corresponding angles]
⇒ ∠EFQ = 75°
⇒ ∠EFG + ∠GFQ = 75°
⇒ 25° + y° = 75°
⇒ y = 75 – 25 = 50
Also, ∠BEF + ∠EFQ = 180° [sum of consecutive interior angles is 180°]
∠BEF = 180° – ∠EFQ

$= 180^o - 75^o$
$\angle BEF = 105^o$
$\therefore \angle FEG + \angle GEB = \angle BEF = 105^o$
$\Rightarrow \angle FEG = 105^o - \angle GEB = 105^o - 20^o = 85^o$
In ΔEFG we have,
$x^o + 25^o + \angle FEG = 180^o$
$\Rightarrow x^\circ + 25^\circ + 85^\circ = 180^\circ$
$\Rightarrow x^\circ + 110^\circ = 180^\circ$
$\Rightarrow x^\circ = 180^\circ - 110^\circ$
$\Rightarrow x^\circ = 70^\circ$
Hence, x = 70.

Question 11.

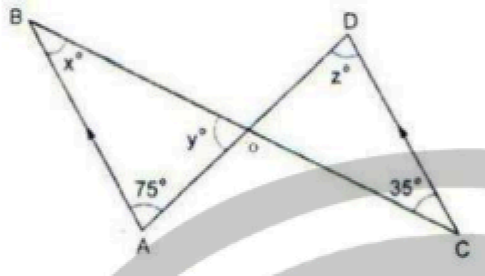
Solution:
Since AB || CD and AC is a transversal.
So, $\angle BAC + \angle ACD = 180^o$ [sum of consecutive interior angles is 180^o]
$\Rightarrow \angle ACD = 180^o - \angle BAC$
$= 180^o - 75^o = 105^o$
$\Rightarrow \angle ECF = \angle ACD$ [Vertically opposite angles]
$\angle ECF = 105^o$
Now in ΔCEF,
$\angle ECF + \angle CEF + \angle EFC = 180^o$
$\Rightarrow 105^o + x^o + 30^o = 180^o$
$\Rightarrow x = 180 - 30 - 105 = 45$
Hence, x = 45.

Question 12.

Solution:
Since AB || CD and PQ a transversal.
So, $\angle PEF = \angle EGH$ [Corresponding angles]
$\Rightarrow \angle EGH = 85^o$
$\angle EGH$ and $\angle QGH$ form a linear pair.
So, $\angle EGH + \angle QGH = 180^o$
$\Rightarrow \angle QGH = 180^o - 85^o = 95^o$
Similarly, $\angle GHQ + 115^o = 180^o$
$\Rightarrow \angle GHQ = 180^o - 115^o = 65^o$
In ΔGHQ, we have,
$x^o + 65^o + 95^o = 180^o$
$\Rightarrow x = 180 - 65 - 95 = 180 - 160$
$\therefore x = 20$

Question 13.

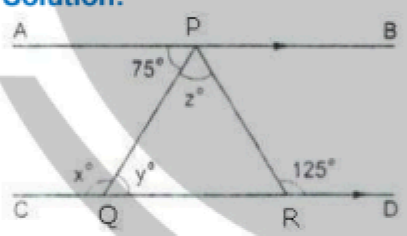
Solution:



Since AB || CD and BC is a transversal.
So, ∠ABC = ∠BCD
⇒ x = 35
Also, AB || CD and AD is a transversal.
So, ∠BAD = ∠ADC
⇒ z = 75
In ΔABO, we have,
∠AOB + ∠BAO + ∠BOA = 180°
⇒ x° + 75° + y° = 180°
⇒ 35 + 75 + y = 180
⇒ y = 180 – 110 = 70
∴ x = 35, y = 70 and z = 75.

Question 14.

Solution:



Since AB || CD and PQ is a transversal.
So, y = 75 [Alternate angle]
Since PQ is a transversal and AB || CD, so x + APQ = 180°
[Sum of consecutive interior angles]
⇒ x° = 180° – APQ
⇒ x = 180 – 75 = 105
Also, AB || CD and PR is a transversal.
So, ∠APR = ∠PRD [Alternate angle]
⇒ ∠APQ + ∠QPR = ∠PRD [Since ∠APR = ∠APQ + ∠QPR]
⇒ 75° + z° = 125°
⇒ z = 125 – 75 = 50
∴ x = 105, y = 75 and z = 50.

Question 15.

Solution:

$\angle PRQ = x^o = 60^o$ [vertically opposite angles]
Since EF || GH, and RQ is a transversal.
So, $\angle x = \angle y$ [Alternate angles]
$\Rightarrow y = 60$
AB || CD and PR is a transversal.
So, $\angle PRD = \angle APR$ [Alternate angles]
$\Rightarrow \angle PRQ + \angle QRD = \angle APR$ [since $\angle PRD = \angle PRQ + \angle QRD$]
$\Rightarrow x + \angle QRD = 110^o$
$\Rightarrow \angle QRD = 110^o - 60^o = 50^o$
In ΔQRS, we have,
$\angle QRD + t^o + y^o = 180^o$
$\Rightarrow 50 + t + 60 = 180$
$\Rightarrow t = 180 - 110 = 70$
Since, AB || CD and GH is a transversal
So, $z^o = t^o = 70^o$ [Alternate angles]
$\therefore x = 60$, $y = 60$, $z = 70$ and $t = 70$

Question 16.

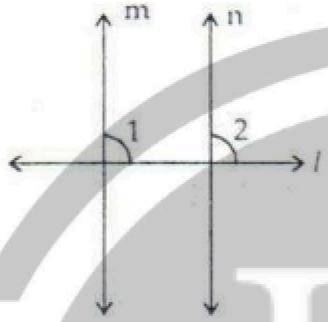
Solution:

(i) Lines l and m will be parallel if $3x - 20 = 2x + 10$
[Since, if corresponding angles are equal, lines are parallel]
$\Rightarrow 3x - 2x = 10 + 20$
$\Rightarrow x = 30$
(ii) Lines will be parallel if $(3x + 5)^o + 4x^o = 180^o$
[if sum of pairs of consecutive interior angles is 180^o, the lines are parallel]
So, $(3x + 5) + 4x = 180$
$\Rightarrow 3x + 5 + 4x = 180$
$\Rightarrow 7x = 180 - 5 = 175$
$\Rightarrow x = 25$

Question 17.

Solution:

Given: Two lines m and n are perpendicular to a given line l.



To Prove: m || n

Proof : Since m ⊥ l

So, ∠1 = 90°

Again, since n ⊥ l

∠2 = 90°

∴ ∠1 = ∠2 = 90°

But ∠1 and ∠2 are the corresponding angles made by the transversal l with lines m and n and they are proved to be equal.

Thus, m || n.

RS Aggarwal Solutions Class 9 Chapter 7 Lines and Angles Exercise- 4.3

Question 1.

Solution:

Since AB and CD are given to be parallel lines and t is a transversal.

So, ∠5 = ∠1 = 70o [Corresponding angles are equal]

∠3 = ∠1 = 70o [Vertically opp. Angles]

∠3 + ∠6 = 180o [Co-interior angles on same side]

∴ ∠6 = 180o – ∠3
= 180o – 70o = 110o
∠6 = ∠8 [Vertically opp. Angles]
⇒ ∠8 = 110o
⇒ ∠4 + ∠5 = 180o [Co-interior angles on same side]

∠4 = 180o – 70o = 110o
∠2 = ∠4 = 110o

[Vertically opposite angles]
∠5 = ∠7 [Vertically opposite angles]
So, ∠7 = 70o
∴ ∠2 = 110o , ∠3 = 70o , ∠4 = 110o , ∠5 = 70o, ∠6 = 110o , ∠7 = 70o and ∠8

= 110o

Question 2.

Solution:

Since ∠2 : ∠1 = 5 : 4.
Let ∠2 and ∠1 be 5x and 4x respectively.
Now, ∠2 + ∠1 = 180 because ∠2 and ∠1 form a linear pair.

So, 5x + 4x = 180o
⇒ 9x = 180o
⇒ x = 20o
∴ ∠1 = 4x = 4 × 20o = 80o
And ∠2 = 5x = 5 × 20o = 100o
∠3 = ∠1 = 80o [Vertically opposite angles]
And ∠4 = ∠2 = 100o

[Vertically opposite angles]
∠1 = ∠5 and ∠2 = ∠6 [Corresponding angles]
So, ∠5 = 80o and ∠6 = 100o
∠8 = ∠6 = 100o [Vertically opposite angles]
And ∠7 = ∠5 = 80o

[Vertically opposite angles]

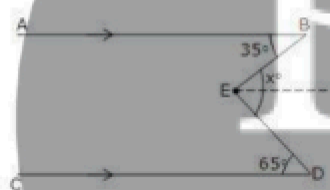
Thus, ∠1 = 80o , ∠2 = 100o, ∠3 = ∠80o, ∠4 = 100o, ∠5 = 80o, ∠6 = 100o,∠7 = 80o and ∠8 = 100o

Question 3.

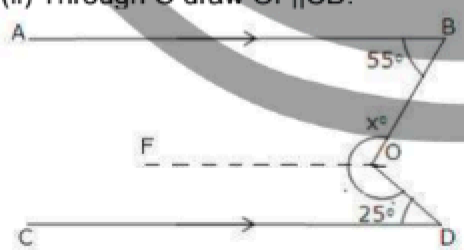
Solution:
Given: AB || CD and AD || BC
To Prove: ∠ADC = ∠ABC
Proof: Since AB || CD and AD is a transversal. So sum of consecutive interior angles is 180°.
⇒ ∠BAD + ∠ADC = 180° ….(i)
Also, AD || BC and AB is transversal.
So, ∠BAD + ∠ABC = 180° ….(ii)
From (i) and (ii) we get:
∠BAD + ∠ADC = ∠BAD + ∠ABC
⇒ ∠ADC = ∠ABC (Proved)

Question 4.

Solution:
(i) Through E draw EG || CD. Now since EG||CD and ED is a transversal.



So, ∠GED = ∠EDC = 65° [Alternate interior angles]
Since EG || CD and AB || CD,
EG||AB and EB is transversal.
So, ∠BEG = ∠ABE = 35° [Alternate interior angles]
So, ∠DEB = x°
⇒ ∠BEG + ∠GED = 35° + 65° = 100°.
Hence, x = 100.
(ii) Through O draw OF||CD.



Now since OF || CD and OD is transversal.
∠CDO + ∠FOD = 180°
[sum of consecutive interior angles is 180°]
⇒ 25° + ∠FOD = 180°
⇒ ∠FOD = 180° – 25° = 155°
As OF || CD and AB || CD [Given]
Thus, OF || AB and OB is a transversal.
So, ∠ABO + ∠FOB = 180° [sum of consecutive interior angles is 180°]
⇒ 55° + ∠FOB = 180°
⇒ ∠FOB = 180° – 55° = 125°
Now, x° = ∠FOB + ∠FOD = 125° + 155° = 280°.

Now since EF || CD and EC is transversal.
∠FEC + ∠ECD = 180°
[sum of consecutive interior angles is 180°]
⇒ ∠FEC + 124° = 180°
⇒ ∠FEC = 180° – 124° = 56°
Since EF || CD and AB ||CD
So, EF || AB and AE is a trasveral.
So, ∠BAE + ∠FEA = 180°
[sum of consecutive interior angles is 180°]
∴ 116° + ∠FEA = 180°
⇒ ∠FEA = 180° – 116° = 64°
Thus, x° = ∠FEA + ∠FEC
= 64° + 56° = 120°.
Hence, x = 120.

Question 5.

Solution:

Since AB || CD and BC is a transversal.

So, ∠ABC = ∠BCD [alternate interior angles]

⇒ $70^\circ = x^\circ + \angle ECD$ ….(i)

Now, CD || EF and CE is transversal.

So, ∠ECD + ∠CEF = 180° [sum of consecutive interior angles is 180°]

∴ ∠ECD + 130° = 180°

⇒ ∠ECD = 180° – 130° = 50°

Putting ∠ECD = 50° in (i) we get,

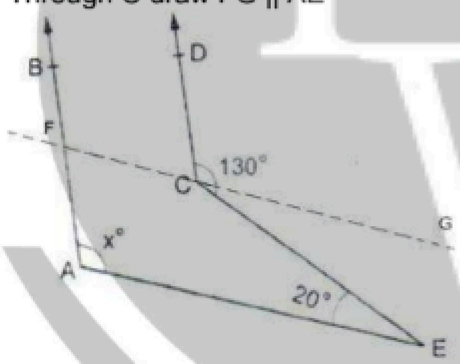
$70^\circ = x^\circ + 50^\circ$

⇒ x = 70 – 50 = 20

Question 6.

Solution:

Through C draw FG || AE



Now, since CG || BE and CE is a transversal.

So, ∠GCE = ∠CEA = 20° [Alternate angles]

∴ ∠DCG = 130° – ∠GCE

= 130° – 20° = 110°

Also, we have AB || CD and FG is a transversal.

So, ∠BFC = ∠DCG = 110° [Corresponding angles]

As, FG || AE, AF is a transversal.

∠BFG = ∠FAE [Corresponding angles]

∴ x° = ∠FAE = 110°.

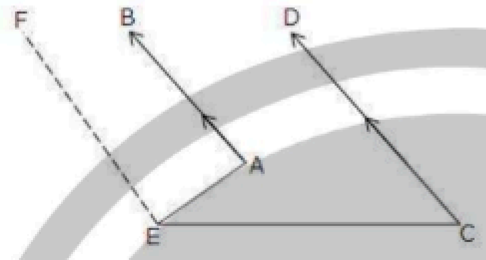
Hence, x = 110

Question 7.

Solution:

Given: AB || CD

To Prove: ∠BAE – ∠DCE = ∠AEC



Construction : Through E draw EF || AB

Proof : Since EF || AB, AE is a transversal.

So, ∠BAE + ∠AEF = 180^{O} ….(i)

[sum of consecutive interior angles is 180º]

As EF || AB and AB || CD [Given]

So, EF || CD and EC is a transversal.

So, ∠FEC + ∠DCE = 180º ….(ii)

[sum of consecutive interior angles is 180º]

From (i) and (ii) we get,

∠BAE + ∠AEF = ∠FEC + ∠DCE

⇒ ∠BAE – ∠DCE = ∠FEC – ∠AEF = ∠AEC [Proved]

Question 8.

Solution:

Since AB || CD and BC is a transversal.

So, ∠BCD = ∠ABC = xº [Alternate angles]

As BC || ED and CD is a transversal.

∠BCD + ∠EDC = 180º

⇒ ∠BCD + 75º =180º

⇒ ∠BCD = 180º – 75º = 105º

∠ABC = 105º [since ∠BCD = ∠ABC]

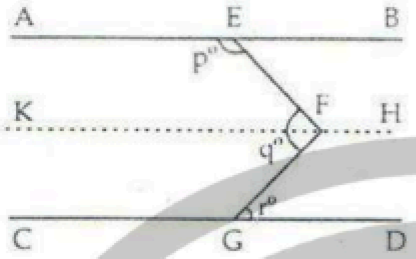
∴ xº = ∠ABC = 105º

Hence, x = 105.

Question 9.

Solution:

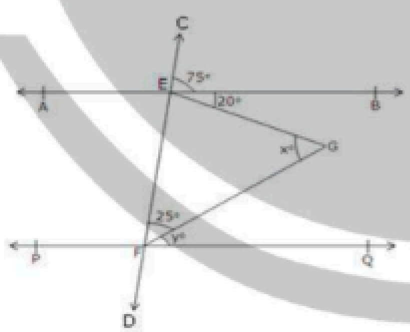
Through F, draw KH || AB || CD



Now, KF || CD and FG is a transversal.
⇒ ∠KFG = ∠FGD = r° …. (i)
[alternate angles]
Again AE || KF, and EF is a transversal.
So, ∠AEF + ∠KFE = 180°
∠KFE = 180° – p° …. (ii)
Adding (i) and (ii) we get,
∠KFG + ∠KFE = 180 – p + r
⇒ ∠EFG = 180 – p + r
⇒ q = 180 – p + r
i.e., p + q – r = 180

Question 10.

Solution:



Since AB || PQ and EF is a transversal.
So, ∠CEB = ∠EFQ [Corresponding angles]
⇒ ∠EFQ = 75°
⇒ ∠EFG + ∠GFQ = 75°
⇒ 25° + y° = 75°
⇒ y = 75 – 25 = 50
Also, ∠BEF + ∠EFQ = 180° [sum of consecutive interior angles is 180°]
∠BEF = 180° – ∠EFQ

$= 180^\circ - 75^\circ$
$\angle BEF = 105^\circ$
$\therefore \angle FEG + \angle GEB = \angle BEF = 105^\circ$
$\Rightarrow \angle FEG = 105^\circ - \angle GEB = 105^\circ - 20^\circ = 85^\circ$
In ΔEFG we have,
$x^\circ + 25^\circ + \angle FEG = 180^\circ$
$\Rightarrow x^\circ + 25^\circ + 85^\circ = 180^\circ$
$\Rightarrow x^\circ + 110^\circ = 180^\circ$
$\Rightarrow x^\circ = 180^\circ - 110^\circ$
$\Rightarrow x^\circ = 70^\circ$
Hence, x = 70.

Question 11.

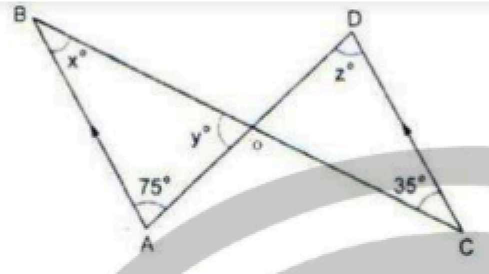
Solution:
Since AB || CD and AC is a transversal.
So, $\angle BAC + \angle ACD = 180^\circ$ [sum of consecutive interior angles is 180°]
$\Rightarrow \angle ACD = 180^\circ - \angle BAC$
$= 180^\circ - 75^\circ = 105^\circ$
$\Rightarrow \angle ECF = \angle ACD$ [Vertically opposite angles]
$\angle ECF = 105^\circ$
Now in ΔCEF,
$\angle ECF + \angle CEF + \angle EFC = 180^\circ$
$\Rightarrow 105^\circ + x^\circ + 30^\circ = 180^\circ$
$\Rightarrow x = 180 - 30 - 105 = 45$
Hence, x = 45.

Question 12.

Solution:
Since AB || CD and PQ a transversal.
So, $\angle PEF = \angle EGH$ [Corresponding angles]
$\Rightarrow \angle EGH = 85^\circ$
$\angle EGH$ and $\angle QGH$ form a linear pair.
So, $\angle EGH + \angle QGH = 180^\circ$
$\Rightarrow \angle QGH = 180^\circ - 85^\circ = 95^\circ$
Similarly, $\angle GHQ + 115^\circ = 180^\circ$
$\Rightarrow \angle GHQ = 180^\circ - 115^\circ = 65^\circ$
In ΔGHQ, we have,
$x^\circ + 65^\circ + 95^\circ = 180^\circ$
$\Rightarrow x = 180 - 65 - 95 = 180 - 160$
$\therefore x = 20$

Question 13.

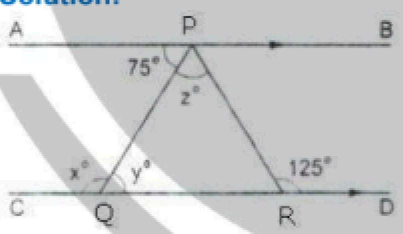
Solution:



Since AB || CD and BC is a transversal.
So, ∠ABC = ∠BCD
⇒ x = 35
Also, AB || CD and AD is a transversal.
So, ∠BAD = ∠ADC
⇒ z = 75
In ΔABO, we have,
∠AOB + ∠BAO + ∠BOA = 180°
⇒ x° + 75° + y° = 180°
⇒ 35 + 75 + y = 180
⇒ y = 180 – 110 = 70
∴ x = 35, y = 70 and z = 75.

Question 14.

Solution:



Since AB || CD and PQ is a transversal.
So, y = 75 [Alternate angle]
Since PQ is a transversal and AB || CD, so x + APQ = 180°
[Sum of consecutive interior angles]
⇒ x° = 180° – APQ
⇒ x = 180 – 75 = 105
Also, AB || CD and PR is a transversal.
So, ∠APR = ∠PRD [Alternate angle]
⇒ ∠APQ + ∠QPR = ∠PRD [Since ∠APR = ∠APQ + ∠QPR]
⇒ 75° + z° = 125°
⇒ z = 125 – 75 = 50
∴ x = 105, y = 75 and z = 50.

Question 15.

Solution:

∠PRQ = x° = 60° [vertically opposite angles]
Since EF || GH, and RQ is a transversal.
So, ∠x = ∠y [Alternate angles]
⇒ y = 60
AB || CD and PR is a transversal.
So, ∠PRD = ∠APR [Alternate angles]
⇒ ∠PRQ + ∠QRD = ∠APR [since ∠PRD = ∠PRQ + ∠QRD]
⇒ x + ∠QRD = 110°
⇒ ∠QRD = 110° – 60° = 50°
In ΔQRS, we have,
∠QRD + t° + y° = 180°
⇒ 50 + t + 60 = 180
⇒ t = 180 – 110 = 70
Since, AB || CD and GH is a transversal
So, z° = t° = 70° [Alternate angles]
∴ x = 60 , y = 60, z = 70 and t = 70

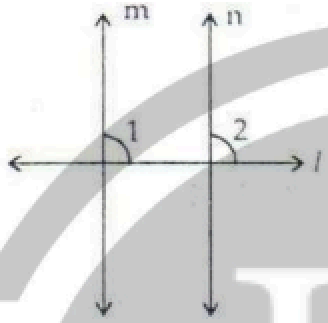
Question 16.

Solution:

(i) Lines l and m will be parallel if 3x – 20 = 2x + 10
[Since, if corresponding angles are equal, lines are parallel]
⇒ 3x – 2x = 10 + 20
⇒ x = 30
(ii) Lines will be parallel if (3x + 5)° + 4x° = 180°
[if sum of pairs of consecutive interior angles is 180°, the lines are parallel]
So, (3x + 5) + 4x = 180
⇒ 3x + 5 + 4x = 180
⇒ 7x = 180 – 5 = 175
⇒ x = 25

Question 17.

Solution:
Given: Two lines m and n are perpendicular to a given line l.



To Prove: m || n
Proof : Since m ⊥ l
So, ∠1 = 90°
Again, since n ⊥ l
∠2 = 90°
∴ ∠1 = ∠2 = 90°
But ∠1 and ∠2 are the corresponding angles made by the transversal l with lines m and n and they are proved to be equal.
Thus, m || n.

Benefits of RS Aggarwal Solutions Class 9 Maths Chapter 7 - Lines and Angles

RS Aggarwal Solutions for Class 9 Maths Chapter 7 - Lines and Angles provide several benefits to students:

Detailed Coverage: The solutions cover all the topics and concepts included in the chapter, ensuring a thorough understanding of the subject matter.

Step-by-Step Approach: Each solution is presented in a step-by-step manner, making it easier for students to follow and learn.

Clarity of Concepts: The solutions provide clear explanations and reasoning behind each step, helping students grasp the underlying concepts more effectively.

Practice Material: The solutions include ample practice questions and examples to help students reinforce their learning and improve their problem-solving skills.

Preparation for Exams: By practicing with RS Aggarwal Solutions, students can better prepare for their exams and gain confidence in tackling questions related to lines and angles.