NCERT Solutions Class 9 Maths
Chapter 6: Lines and Angles
EXERCISE 6.1

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Quick Summary: In NCERT Solutions Class 9 Maths Chapter 6 Exercise 6.1, students learn fundamental concepts about lines and angles including linear pairs, vertically opposite angles, and angle relationships. This exercise covers essential geometric principles and theorems that form the foundation for advanced geometry topics and are frequently tested in CBSE Class 9 examinations.

Key Takeaways:

- Linear Pair Axiom: If two angles form a linear pair, their sum is 180°
- Vertically Opposite Angles Theorem: When two lines intersect, vertically opposite angles are always equal
- Angles on a straight line sum up to 180° and angles around a point sum up to 360°
- Understanding reflex angles, angle bisectors, and perpendicular relationships is crucial for solving complex geometry problems

Complete Solutions

Question 1

QUESTION

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

SOLUTION

This question tests our understanding of angles formed by intersecting lines, linear pairs, and reflex angles.

Step 1: Identify given information

We are given that lines AB and CD intersect at O. Also, and .

Step 2: Find

Since and are vertically opposite angles, they are equal.

Therefore, .

Step 3: Find

We know that .

Substituting the value of , we get:

Step 4: Find

Since AB is a straight line, (linear pair).

Substituting the values of and , we get:

Step 5: Find reflex

Reflex

Reflex

Final Answer: and reflex

ANSWER

30°, 250°

Question 2

QUESTION

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

SOLUTION

This question tests our understanding of linear pairs and ratios of angles. We need to find the value of angle given that lines XY and MN intersect at O, , and the ratio .

Step 1: Identify the linear pair

Since XY is a straight line, forms a straight angle, which means . Also, can be expressed as the sum of and . Therefore, .

Step 2: Express angles in terms of the given ratio

We are given that . Let and , where is a constant.

Step 3: Use the given information to find

We know that and . Substituting and into the equation from Step 1:

Step 4: Solve for

Combining like terms, we get:

Subtracting from both sides:

Dividing both sides by 5:

Step 5: Find the value of

Since , we have:

Step 6: Find the value of

Since MN is a straight line, and form a linear pair. Therefore, . We know that and . So,

Substituting the value of :

Subtracting from both sides:

Final Answer:

ANSWER

126°

Question 4

QUESTION

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

SOLUTION

This question tests our understanding of angles on a straight line and the properties of angles around a point. We need to prove that AOB is a straight line given that .

Step 1: Recall the properties of angles around a point

The sum of all angles around a point is . In the given figure, the angles , , , and form a complete angle around point O.

Therefore, we can write:

Step 2: Use the given condition

We are given that . We can substitute this into the equation from Step 1.

Replacing with , we get:

Step 3: Simplify the equation

Combining like terms, we have:

Dividing both sides by 2, we get:

Step 4: Interpret the result

Since , angles and form a linear pair. This means that the ray OC stands on the line AOB such that the sum of adjacent angles is .

Step 5: State the conclusion

Therefore, AOB is a straight line.

ANSWER

Sum of all the angles at a point = 360°

Question 5

QUESTION

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 = 1/2 (∠QOS − ∠POS).

SOLUTION

This question requires us to prove a relationship between angles formed by rays on a line, specifically involving perpendicularity and angle subtraction.

Step 1: Understand the given information

We are given that POQ is a line, OR is perpendicular to PQ, and OS lies between OP and OR. This means .

Step 2: Express in terms of and

From the figure, we can see that is the sum of and . Therefore:

Since , we have:

---(1)

Step 3: Express in terms of and

Similarly, can be expressed as the difference between and . Therefore:

Since , we have:

---(2)

Step 4: Solve for from equations (1) and (2)

From equation (1), we can write:

---(3)

From equation (2), we can write:

---(4)

Adding equations (3) and (4), we get:

Step 5: Final Proof

Dividing both sides by 2, we get:

Hence, we have proven that .

ANSWER

∠QOS = ∠SOR + ∠ROQ and ∠POS = ∠POR − ∠SOR.

Question 6

QUESTION

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

This question tests our understanding of angles, angle bisectors, linear pairs, and how to calculate reflex angles.

Step 1: Draw the figure based on the given information

We are given that ∠XYZ = 64° and XY is produced to point P. First, draw a line segment XY. Then, draw a ray YZ such that ∠XYZ = 64°. Extend the line segment XY to point P.

Step 2: Identify the linear pair

Since XY is extended to P, ∠XYP is a straight angle, which means ∠XYP = 180°. Also, ∠XYZ and ∠ZYP form a linear pair. Therefore:

Step 3: Calculate ∠ZYP

We know ∠XYZ = 64°. Substituting this value into the equation above:

Step 4: Use the angle bisector property

Ray YQ bisects ∠ZYP, which means it divides ∠ZYP into two equal angles. Therefore:

Step 5: Calculate ∠XYQ

∠XYQ is the sum of ∠XYZ and ∠ZYQ:

Step 6: Calculate reflex ∠QYP

The reflex angle of ∠QYP is 360° minus ∠QYP:

Final Answer: ∠XYQ = 122° and reflex ∠QYP = 302°

ANSWER

122°, 302°

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📌 Key Formulas

Important Formulas for Exercise 6.1

Formula / Concept	Description
Line	A straight path that extends in both directions without end.
Ray	A part of a line that has one endpoint and extends indefinitely in one direction.
Angle	Formed by two rays originating from the same endpoint, called the vertex.
Adjacent Angles	Two angles that share a common vertex and a common arm, with their non-common arms on opposite sides of the common arm.
Linear Pair Axiom	If a ray stands on a line, then the sum of the two adjacent angles so formed is 180^\circ. These angles are called a linear pair.
\angle 1 + \angle 2 = 180^\circ	If \angle 1 and \angle 2 form a linear pair, their sum is 180^\circ.
Converse of Linear Pair Axiom	If the sum of two adjacent angles is 180^\circ, then their non-common arms form a straight line.
Vertically Opposite Angles Theorem	If two lines intersect each other, then the vertically opposite angles are equal.
\angle AOC = \angle BOD \angle AOD = \angle BOC	When two lines, AB and CD, intersect at a point O, the pairs of vertically opposite angles are equal.
Straight Angle	An angle whose measure is exactly 180^\circ.

Top FAQs

Q1. How many questions are in NCERT Solutions Class 9 Maths Chapter 6 Lines and Angles Exercise 6.1 for CBSE 2025-26?

Exercise 6.1 of NCERT Solutions for Class 9 Maths Chapter 6 Lines and Angles contains exactly 5 questions. These questions focus on basic terms and fundamental concepts like Linear Pair Axiom and Vertically Opposite Angles Theorem, which are essential for CBSE board exam 2025-26 preparation.

Q2. Where can I download free PDF of NCERT Solutions for Class 9 Maths Chapter 6 Lines and Angles Exercise 6.1 with step by step solutions?

You can download free PDF of NCERT Solutions for Class 9 Maths Chapter 6 Lines and Angles Exercise 6.1 from various educational websites offering step by step solutions. These PDFs are updated according to the latest CBSE syllabus 2025-26 and provide detailed explanations for all 5 questions covering Linear Pair Axiom and Vertically Opposite Angles concepts.

Q3. How many marks does Lines and Angles Chapter 6 carry in CBSE Class 9 Maths board exam 2025-26?

Lines and Angles Chapter 6 carries approximately 5 marks in CBSE Class 9 Maths board exam 2025-26 as part of Unit IV - Geometry. Exercise 6.1 focuses on basic terms and foundational concepts that are crucial for solving geometry problems in the examination.

Q4. Which is the most difficult question in Exercise 6.1 of NCERT Solutions Class 9 Maths Chapter 6 Lines and Angles?

Question 5 is generally considered the most difficult in Exercise 6.1 of NCERT Solutions Class 9 Maths Chapter 6 Lines and Angles as it requires application of both Linear Pair Axiom and Vertically Opposite Angles Theorem. However, with step by step solutions and proper understanding of basic concepts, students can solve it easily for CBSE board exam 2025-26.

Q5. What is Linear Pair Axiom explained in NCERT Solutions Class 9 Maths Chapter 6 Lines and Angles Exercise 6.1?

Linear Pair Axiom states that if a ray stands on a line, then the sum of two adjacent angles so formed is 180°. This fundamental concept is introduced in Exercise 6.1 of NCERT Solutions for Class 9 Maths Chapter 6 Lines and Angles and is crucial for solving geometry problems in CBSE board exam 2025-26.

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