

Class: IX
Sub: Mathematics
Chapter 6: Lines & Angles

CASE STUDY 1

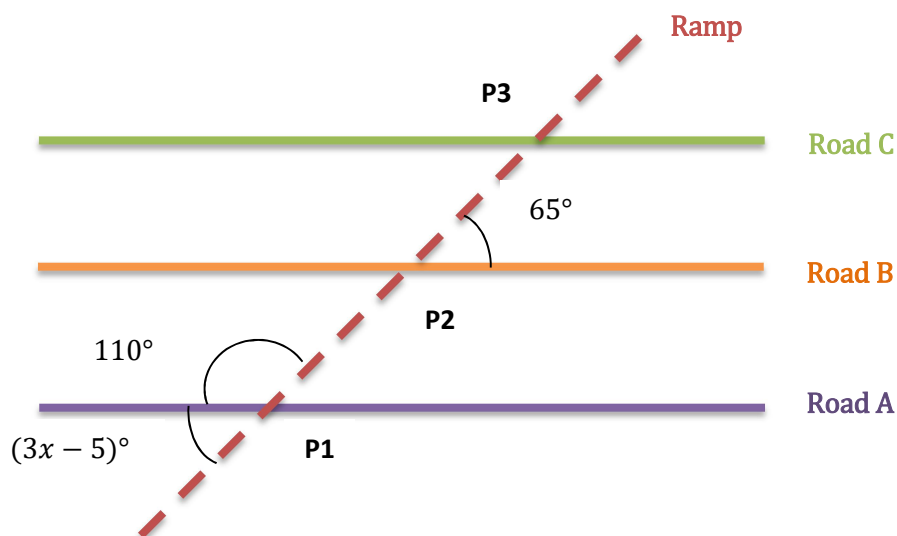


Diagram for Traffic Surveillance of Trigganagar

In the modern city of **Trigganagar**, the Municipal Planning Division is installing **smart surveillance cameras** at intersections along three **parallel roads**: **Road A**, **Road B**, and **Road C**. A **diagonal flyover ramp** intersects these roads. The intersections are designated **P1**, **P2**, and **P3**.

From the above diagram, we come to know about the following details:

- Roads A, B, and C are **equally spaced parallel lines**.
- A **ramp** cuts all three roads, forming a **65° angle** with **Road B** at **point P2**, measured on the **upper side** of the transversal.
- The **camera** at **P3** on Road C must match the **alternate exterior angle** of P2.
- At P1 (Road A), the angle formed **on the lower side** is **(3x - 5)°**, and it forms a **linear pair** with a **110° angle**.

Based on the above information answer the following questions:

1. What is the value of **x** if the angle at P1 forms a **linear pair** with 115°?

(a)	20	(b)	30	(c)	25	(d)	35
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2. What is the **alternate exterior angle** at P3 to the 65° at P2?

(a)	115°	(b)	25°	(c)	65°	(d)	75°
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3. The camera at P2 has been wrongly installed with an angle of **70°** instead of 65°. What is the **implication**?

(a)	The ramp must be reconstructed.
(b)	The roads are not parallel.
(c)	The camera needs recalibration.
(d)	The angle between Roads A and C has changed.

4. If the angle at P1 (lower side) is calculated to be $(3x - 5)^\circ$ and $x = 25$, what is the nature of the angle?

(a)	Obtuse Angle	(b)	Right Angle	(c)	Acute Angle	(d)	Reflex Angle
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5. A final check shows two angles on the same side of the transversal between Roads A and C measure $3x^\circ$ and $(2x - 10)^\circ$, respectively. What should x be so that they will be **co-interior angles**?

(a)	34°	(b)	38°	(c)	57°	(d)	58°
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Assertion – Reason Based Questions:

1. Assertion (A): Two adjacent angles always form a linear pair.

Reason (R): In a linear pair, two non-common arms are opposite rays.

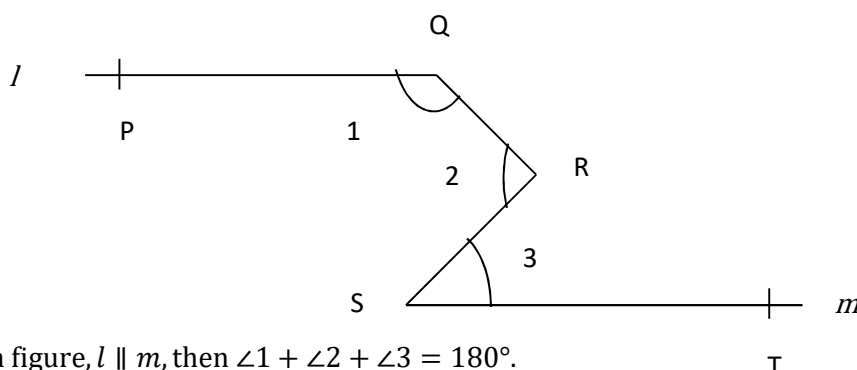
2. Assertion (A): Sum of the pair of angles (like $135^\circ, 45^\circ$) is supplementary.

Reason (R): Two angles, the sum of whose measures is 180° , are called supplementary angles.

3. Assertion (A): If a line is perpendicular to one of two given parallel lines, then it is also perpendicular to the other line.

Reason (R): If two parallel lines are intersected by a transversal, then the bisector of any pair of alternate interior angles are parallel.

4.



Assertion (A): In the given figure, $l \parallel m$, then $\angle 1 + \angle 2 + \angle 3 = 180^\circ$.

Reason (R): If a transversal intersects two parallel lines, then each pair of alternate interior angles are equal.

5. Assertion (A): In the figure below, if ABC is a straight line, $\angle CBD = 72^\circ$.

Reason (R): If a ray stands on a line, the sum of two adjacent angles formed is 180° .

