CHAPTER TEST: LINES AND ANGLES

Mathematics | Class IX (2026/LINANG/09/003)

Time: 1.5 Hours **Max. Marks: 40**

General Instructions:

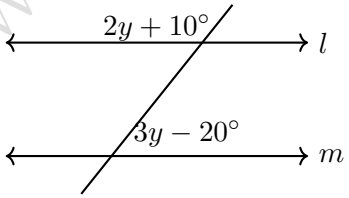
1. All questions are compulsory.
2. Section A contains 8 MCQs (1 mark each).
3. Section B contains 4 Very Short Answer questions (2 marks each).
4. Section C contains 3 Short Answer questions (3 marks each).
5. Section D contains 2 Long Answer questions (5 marks each).
6. Section E contains 1 Case Study (5 marks total).

SECTION A (8 x 1 = 8 Marks)

1. If an angle is five times its supplement, then the angle is:

   (i) 150°
   (ii) 30°
   (iii) 144°
   (iv) 135°

2. In the figure below, $l \parallel m$. The value of y is:



   (i) 30°
   (ii) 38°
   (iii) 45°
   (iv) 10°

3. If the difference between two complementary angles is 20°, then the angles are:

   (i) $50^\circ, 30^\circ$
   (ii) $55^\circ, 35^\circ$
   (iii) $60^\circ, 40^\circ$
   (iv) $100^\circ, 80^\circ$

4. Two lines AB and CD intersect at O. If $\angle AOC + \angle COB + \angle BOD = 270^\circ$, then $\angle DOA$ is:

(i) 70°

(ii) 80°

(iii) 90°

(iv) 180°

5. An angle which is equal to its own supplement is:

   (i) 45°

   (ii) 90°

   (iii) 180°

   (iv) 0°

6. If a transversal intersects two lines such that the sum of interior angles on the same side is 179°, the lines:

   (i) Are parallel

   (ii) Intersect on the side where sum is 179°

   (iii) Are perpendicular

   (iv) Intersect on the opposite side

7. If $\angle A$ and $\angle B$ form a linear pair and $\angle A - \angle B = 60°$, then $\angle A$ is:

   (i) 120°

   (ii) 60°

   (iii) 150°

   (iv) 110°

8. The number of line segments that can be drawn through two distinct points is:

   (i) Zero

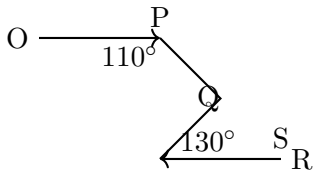
   (ii) One

   (iii) Two

   (iv) Infinite

SECTION B (4 x 2 = 8 Marks)

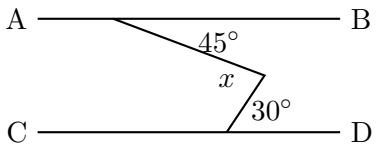
1. In the figure below, $OP \parallel RS$. Determine $\angle PQR$.



2. Define "Linear Pair Axiom" and illustrate it with a neat diagram.

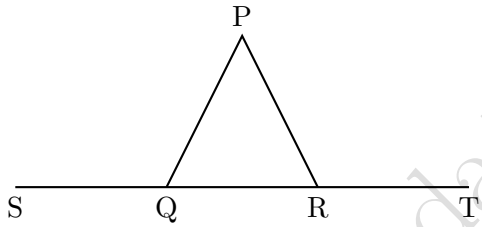
3. If the bisectors of two adjacent angles are perpendicular to each other, prove that the non-common arms of the angles are in a straight line.

4. In the given figure, $AB \parallel CD$, find the value of x.



SECTION C (3 x 3 = 9 Marks)

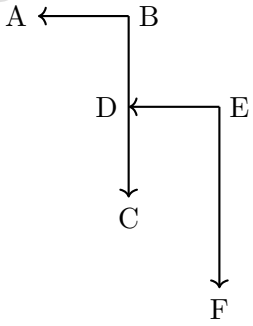
1. If two parallel lines are intersected by a transversal, prove that the bisectors of any two alternate interior angles are parallel.
2. In the following figure, $\angle PQR = \angle PRQ$, then prove that $\angle PQS = \angle PRT$.



3. If a transversal intersects two lines such that a pair of alternate interior angles is equal, then prove that the two lines are parallel.

SECTION D (2 x 5 = 10 Marks)

1. In the given figure, $BA \parallel ED$ and $BC \parallel EF$. Show that $\angle ABC = \angle DEF$.

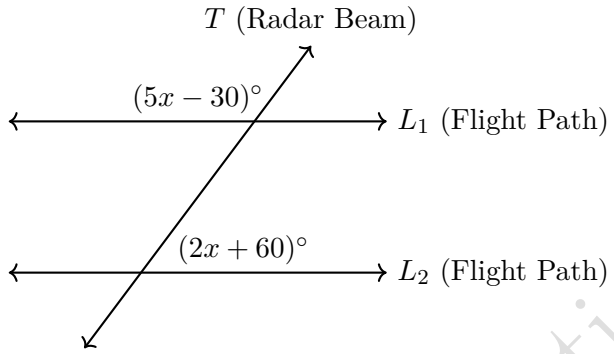


2. Two lines l and m are parallel to each other. A transversal n intersects them at points P and Q respectively. Prove that the interior angles on the same side of the transversal are supplementary. Use this result to find the angles of a parallelogram if one of its angles is $75°$.

SECTION E (5 x 1 = 5 Marks)

1. **Case Study: Aircraft Navigation**
   In aviation, pilots use "headings" which are angles measured clockwise from North. Suppose an aircraft is flying along path L_1. Due to strong crosswinds, the pilot adjusts the flight path to L_2, which is parallel to L_1 but shifted by several miles. A radar beam T from

a ground station acts as a transversal, intersecting both flight paths L_1 and L_2. The ground controller notes that the angle between the radar beam and the first flight path is $(5x - 30)^\circ$ and the alternate interior angle with the second flight path is $(2x + 60)^\circ$. For safe navigation, these angles must be perfectly calculated to avoid collision with other aircraft in the corridor. The geometry of parallel lines allows the controller to predict the aircraft's position even if one radar sensor fails.



Based on the above information, answer the following:

(a) Find the value of x.

(b) What is the measure of the angle $(5x - 30)^\circ$?

(c) What is the measure of the co-interior angle relative to $(2x + 60)^\circ$?

(d) If $x = 40$, would the lines L_1 and L_2 still be parallel based on the given alternate interior angles?

(e) What is the sum of the two interior angles on the same side of the radar beam T?

— End of Question Paper —