

GRADE 10 | 2024

Analytical Geometry and Euclidean Geometry

Mathematics

CAPS ALIGNED

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1. Analytical Geometry (Coordinate Geometry)

FORMULA: Distance: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Midpoint: $M = ((x_1 + x_2)/2, (y_1 + y_2)/2)$

Gradient: $m = (y_2 - y_1)/(x_2 - x_1)$

Equation of a line: $y = mx + c$ or $y - y_1 = m(x - x_1)$

EXAMPLE: Distance and midpoint

A(1,3) and B(5,7):

$d = \sqrt{(5-1)^2 + (7-3)^2} = \sqrt{32} = 4\sqrt{2}$

$M = ((1+5)/2, (3+7)/2) = (3, 5)$

2. Euclidean Geometry: Circle Properties

Lines and Chords

- Perpendicular from centre to a chord bisects the chord
- Line from centre to midpoint of a chord is perpendicular to the chord
- Equal chords are equidistant from the centre

Angles in a Circle

- Angle at centre = 2 x angle at circumference (same arc)
- Angles in the same segment are equal
- Angle in a semicircle = 90 degrees (diameter subtends right angle)

3. Cyclic Quadrilateral

FORMULA: Opposite angles of a cyclic quadrilateral add up to 180 degrees
(a cyclic quad is one whose four vertices lie on a circle)

KEY POINT: Always state the REASON for each step in a geometry proof. This is where marks are earned.