

Grade 12 Mathematics: Paper 2 Key Topics Summary

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Paper 2 Topics at a Glance

Mathematics Paper 2 (3 hours, 150 marks) covers: Statistics, Analytical Geometry, Trigonometry, and Euclidean Geometry.

Quick Reference: Statistics

Mean:	$\bar{x} = \frac{\sum x_i}{n}$
Variance:	$\sigma^2 = \frac{\sum (x_i - \bar{x})^2}{n}$
Std Dev:	$\sigma = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n}}$
Regression:	$\hat{y} = a + bx$ (use STAT on calc)
IQR:	$Q_3 - Q_1$

Quick Reference: Analytical Geometry

Distance:	$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Midpoint:	$(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$
Gradient:	$\frac{y_2 - y_1}{x_2 - x_1}$
Circle:	$(x - a)^2 + (y - b)^2 = r^2$
Inclination:	$m = \tan \alpha$

Quick Reference: Trigonometry

$\sin(A \pm B)$:	$\sin A \cos B \pm \cos A \sin B$
$\cos(A \pm B)$:	$\cos A \cos B \mp \sin A \sin B$
$\sin 2A$:	$2 \sin A \cos A$
$\cos 2A$:	$\cos^2 A - \sin^2 A$
Sine rule:	$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
Cosine rule:	$a^2 = b^2 + c^2 - 2bc \cos A$
Area:	$\frac{1}{2}ab \sin C$

Geometry Theorem Quick List

- Angle at centre = 2 x angle at circumference
- Angles in same segment are equal
- Opp angles of cyclic quad add to 180 deg
- Exterior angle of cyclic quad = interior opposite angle
- Tangent ⊥ radius; two tangents from ext point are equal
- Proportion theorem: $DE \parallel BC \rightarrow \frac{AD}{DB} = \frac{AE}{EC}$
- Midpoint theorem: line joining midpoints $\parallel$ third side, = half length

Exam Tips

For stats: use STAT/REG mode on calculator; write formula, sub values, give answer

- For geometry: mark all info on diagram; state reasons clearly
- For trig: prove identities from one side only (usually LHS)
- For analytical geometry: find all required info (midpoints, gradients) before proving