Mathematics: Analysis and Approaches SL 5,6 Unit Plan

Topic: Geometry and Trigonometry – Suggested teaching hours: 25

1. The distance between two points in three-dimensional space, and their midpoint; volume and surface area of three-dimensional solids including right-pyramid, right cone, sphere, hemisphere and combination of these solids; the size of an angle between two intersecting lines or between a line and a plane.

2. Use of sine, cosine, and tangent ratios, to find the sides and angles of right-angled triangles; the sine rule, not including the ambiguous case; the cosine rule; area of a triangle and ½ ab sinC.

3. Applications of right and non-right angled trigonometry, including Pythagoras' theorem. Contexts may include use of bearings; angles of elevation and depression; construction of labelled diagrams from written statements.

4. The circle: radian measure of angles; length of an arc; area of a sector.

5. Definition of cosθ, sinθ, in terms of the unit circle; definition of tanθ as $\frac{sin\theta}{cos\theta}$; exact values of trigonometric ratios of 0, $\frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}$ and their multiples; extension of the sine rule to the ambiguous case.

6. The Pythagorean identity $sin^2\theta + cos^2\theta = 1$; double angle identities for sine and cosine; the relationship between trigonometric ratios.

7. The circular functions sinx, cosx, and tanx; amplitude, their periodic nature, and their graphs; composite functions of the form f(x) = a sin(b(x-c))+d; transformations; real-life contexts.

8. Solving trigonometric equations in a finite interval, both graphically and analytically; equations leading to quadratic equations in sinx, cosx, or tanx.