**Week 17 – Coordinate geometry in the (*x*, *y*) plane**

By the end of the unit, students should:

* understand and use the equation of a circle;
* be able to find points of intersection between a circle and a line;
* know and be able to use the properties of chords and tangents.

**Week 18 – The binomial expansion**

By the end of the unit, students should:

* understand and be able to use the binomial expansion of (*a* + *bx*)n for positive integer n;
* be able to find an unknown coefficient of a binomial expansion.

**Weeks 19 & 20 – Sequences and series**

**1.Recurrence and iterations**

By the end of the unit, students should:

* know that a sequence can be generated using a formula for the nth term or a recurrence relation of the form xn + 1 = f(xn);
* understand how a recurrence relation of the form Un = f(Un-1) can generate a sequence;
* know the difference between increasing, decreasing and periodic sequences;
* be able to describe increasing, decreasing and periodic sequences.

**2.** **Arithmetic and geometric sequences and series**

By the end of the unit, students should:

* know what a sequence of numbers is and the meaning of finite and infinite sequences;
* know what a series is;
* know the difference between convergent and divergent sequences;
* know what is meant by arithmetic series and sequences;
* be able to use the standard formulae associated with arithmetic series and sequences;
* know what is meant by geometric series and sequences;
* be able to use the standard formulae associated with geometric series and sequences;
* know the condition for a geometric series to be convergent and be able to find its sum to infinity;
* be able to solve problems involving arithmetic and geometric series and sequences;
* know the proofs and derivations of the sum formulae (for both arithmetic and geometric series).

**3.** **Sigma notation**

By the end of the sub-unit, students should:

* be familiar with Σ notation and how it can be used to generate a sequence and series;
* know how this notation will lead to an arithmetic or geometric series and its sum;
* know that

**Week 21 – Trigonometry**

By the end of the unit, students should:

* be able to solve trigonometric equations within a given interval;
* understand and be able to use tan𝜃 = sin𝜃/cos𝜃;
* understand and be able to use sin2 θ + cos2 θ = 1.

**Week 22 – Differentiation**

By the end of the unit, students should:

* be able to apply differentiation to find gradients, maxima, minima and stationary points;
* be able to identify where functions are increasing or decreasing.

**Week 23 – Integration**

By the end of the unit, students should:

* be able to evaluate definite integrals;
* be able to use a definite integral to find the area under a curve.
* be able to use the trapezium rule to find an approximation to the area under a curve;
* appreciate the trapezium rule is an approximation and realise when it gives an overestimate or underestimate

**Week 24 – Proof**

By the end of the unit, students should:

* understand and be able to use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion;
* be able to use methods of proof, including proof by exhaustion and disproof by counter-example.