basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

# 2021 ATP: Grade 11 – Term 1: TECHNICAL MATHEMATICS

| TERM 1 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| CAPS Topics | Exponents and surds | | | Equations and inequalities | | | Nature of roots | Logarithms | | Analytical Geometry |
| Topics /Concepts, Skills and Values | 1. Apply the laws of exponents to expressions involving rational exponents. 2. Add, subtract, multiply and divide simple surds | | | Solve 1. quadratic equations (by factorisation and by using the quadratic formula); 2. equations in two unknowns, one of which is linear and the other quadratic algebraically or graphically. | | | • Explore the nature of roots through the value of $b^2 - 4ac$. | • Demonstrate an understanding of the definition of a logarithm and any laws needed to solve real life problems | | • Use a Cartesian co-ordinate system to determine:   - the equation of a line through two given points;   - the equation of a line through one point and parallel or perpendicular to a given line; and the angle of inclination of a line. |
| SBA | Investigation or project | | | | | | | Test | | |

## 2021 ATP: Grade 11 – Term 2: TECHNICAL MATHEMATICS

| TERM 2 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **CAPS Topics** | Analytical Geometry (continuation) | Functions and graphs | | | | Euclidean Geometry | | | Trigonometry | |
| | • Use a Cartesian co-ordinate system to determine:<br>- the equation of a line through one point and parallel or perpendicular to a given line; and the angle of inclination of a line. | 1. Revise the effect of the parameters $a$ and $q$ on the graphs. Investigate the effect of $p$ on the graphs of the functions defined by:<br>1.1. $y = f(x) = a(x+p)^2 + q$<br>1.2. $y = f(x) = ax^2 + bx + c$<br>1.3. $y = \dfrac{a}{x} + q$<br>1.4. $y = a.f(x) = a.b^x + q$, $b > 0$ and $b \neq 1$<br><br>2. $x^2 + y^2 = r^2$<br>$y = \pm\sqrt{r^2 - x^2}$<br>$y = +\sqrt{r^2 - x^2}$<br>$y = -\sqrt{r^2 - x^2}$ | | | | Accept results established in earlier grades as axioms and also that a tangent to a circle is perpendicular to the radius, drawn to the point of contact.<br>   Then investigate and apply the theorems of the geometry of circles:<br>• The line drawn from the centre of a circle perpendicular to a chord bisects the chord;<br>• The perpendicular bisector of a chord passes through the centre of the circle;<br>• The angle subtended by an arc at the centre of a circle is double the size of the angle subtended by the same arc at the circle (on the same side of the chord as the centre);<br>• Angles subtended by a chord of the circle, on the same side of the chord, are equal;<br>• The opposite angles of a cyclic quadrilateral are supplementary;<br>• Exterior angle of cyclic quad. is equal to opposite interior angle;<br>• Two tangents drawn to a circle from the same point outside the circle are equal in length;<br>• Radius is perpendicular to the tangent; and<br>• The angle between the tangent to a circle and the chord drawn from the point of contact is equal to the angle in the alternate segment. | | | 1. Revise the trig ratios in the solving of right-angle triangle in all 4 quadrants (Grade 10).<br>2. Apply the sine, cosine and area rules.<br>3. Solve problems in two dimensions using the sine, cosine and area rules<br>4. Draw the graphs of the functions defined by:<br>$y = k\sin x,$<br>$y = k\cos x,$<br>$y = \sin(kx),$ and<br>$y = \cos(kx).$ | |
| **SBA** | Assignment | | | | | Test | | | | |

## 2021 ATP: Grade 11 – Term 3: TECHNICAL MATHEMATICS

| TERM 3 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **CAPS Topics** | Trigonometry | | Circles, angles and angular movement | | | | Finance, growth and decay | | Mensuration | |
| | 5. Draw the graphs of the functions defined by $y = \sin(x + p)$ and $y = \cos(x + p)$<br>6. Developing the sine and cosine curve.<br>7.Trigonometric equations.<br>8. Introduce and apply identities | | • Angles and arcs<br>• Degrees and radians<br>• Sectors and segments<br>• Angular and circumferential velocity. | | | | Use simple and compound growth/decay formulae $A = P(1 \pm in)$ and $A = P(1 \pm i)^n$ to solve problems (including interest, hire purchase, inflation, population growth and other real life problems).<br><br>The effect of different periods of compounding growth and decay (including effective and nominal interest rates). | | Solve problems involving volume and surface area of solids<br>studied in earlier grades and combinations of those objects<br>to form more complex shaped solids.<br><br>1. Surface area and volume of right prisms, cylinders, pyramids, cones and spheres, and combinations of these geometric objects.<br>2. The effect on volume and surface area when multiplying any dimension by factor k.<br>3. Determine the area of an irregular figure using mid-ordinate rule. | |
| **SBA** | Test | | | | | | Test | | | |

## 2021 ATP: Term 4: TECHNICAL MATHEMATICS GRADE 11

| TERM 4 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | EXAM |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Revision | | | | Final Examination | | | | | | |
| **SBA** | Test (on revised content) | | | | | | | | | | |

**TOTAL NUMBER OF SBA TASKS  7**

Term 1  **Investigation / Project (15%) and Test (10%),**
Term 2  **Assignment (15%) and Test (10%)**
Term 3  **Test (10 %) and Test (10%)**
Term 4  **Final Examination**

| Paper 1     3 hours | |
|---|---|
| Algebraic expressions, equations, inequalities and nature of roots | 90 |
| Functions and graphs | 45 |
| Finance, growth and decay | 15 |
| **TOTAL MARK** | **150** |

| Paper 2     3 hours | |
|---|---|
| Euclidean Geometry | 40 |
| Analytical Geometry | 25 |
| Trigonometry | 50 |
| Mensuration, Circles, angles and angular movement | 35 |
| **TOTAL MARK** | **150** |