basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

2023/24 ANNUAL TEACHING PLANS: TECHNICAL MATHEMATICS: GRADE 11 (TERM 1)

TERM 1	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11
DATE COMPLETED											
CAPS TOPICS	**ANALYTICAL GEOMETRY**		**EXPONENTS AND SURDS**			**LOGARITHMS**		**EQUATIONS AND INEQUALITIES**			**REVISION/ASSESSMENT**
TOPICS/CONCEPTS, SKILLS AND VALUES	Use a Cartesian co-ordinate system to: 1. Revise the equation of a linethrough two given points 2. Determine the equation of a line through one point and parallel or perpendicular to a given line 3. Determine the angle of inclination of a line		1. Apply the laws of exponents to expressions involving rational exponents where: • $x^{\frac{p}{q}} = \sqrt[q]{x^p} x > 0; q \geq 2$ 2. Add, subtract, multiply and divide simple surds 3. Solve exponential equations			1. Demonstrate an understanding of the definition of a logarithm and any laws needed to solve reallife problems 2. Define a logarithm and convertlogarithmic expressions to exponential form and vice versa 3. Convert exponential expressions tologarithmic form 4. Laws of logarithms: • $log_a x\, y = log_a x + log_a y$ • $log_a \frac{x}{y} = log_a x - log_a y$ • $log_a x^n = n\, log_a x$ • $log_a b = \frac{log_c b}{log_c a}$ 5. Combine logarithmic laws to simplify expressions 6. Solve logarithmic equations		**Solve** 1. Quadratic equations (by factorisation and by using the quadratic formula) 2. Quadratic inequalities (interpret solutions graphically) 3. Equations in two unknowns, one of which is linear and the other quadratic algebraically or graphically. 4. Manipulating formulae (change subject of the formulae) 5. Word problems		
PAT & SBA	**ASSIGNMENT & TEST**										

2023/24 ANNUAL TEACHING PLANS: TECHNICAL MATHEMATICS: GRADE 11 (TERM 2)

TERM 2	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11
DATE COMPLETED											
CAPS TOPICS	**NATURE OF ROOTS**	**EUCLIDEAN GEOMETRY**			**FUNCTIONS AND GRAPHS**				**REVISION/ASSESSMENT**		
TOPICS/CONCEPTS, SKILLS AND VALUES	Determine the nature of roots and the conditions for which the roots are real, non-real, equal, unequal, rational, and irrational through the value of $\Delta = b^2 - 4ac$	Accept results established in earlier grades as axioms Then investigate and apply the theorems of the geometry of circles: • The line drawn from the centre of a circle perpendicular to a chord bisects the chord • The perpendicular bisector of a chord passes through the centre of the circle • 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) • Angles subtended by a chord of the circle, on the same side of the chord, are equal • The opposite angles of a cyclic quadrilateral are supplementary • Exterior angle of cyclic quad. is equal to opposite interior angle • Two tangents drawn to a circle from the same point outside the circle are equal in length • Radius is perpendicular to the tangent • 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 **Note**: No formal proofs of these theorems will be examined, only applications in riders			1. Revise the effect of the parameters ***a*** and ***q*** on the graphs. $a, q \in \mathbb{R}$ Investigate the effect of ***p*** on the graphs of the functions defined by: • $y = f(x) = a(x+p)^2 + q$ • $y = f(x) = ax^2 + bx + c$ • $y = \frac{a}{x} + q$ • $y = a.f(x) = a..b^x + q$, $b > 0$ and $b \neq 1$ 2. $x^2 + y^2 = r^2$ • $y = \pm\sqrt{r^2 - x^2}$ • $y = +\sqrt{r^2 - x^2}$ • $y = -\sqrt{r^2 - x^2}$ 3. Determine the equation from given critical points 4. Interpretation from given graphs			
PAT & SBA	**PAT 1 & TEST / JUNE EXAMINATION**										

2023/24 ANNUAL TEACHING PLANS: TECHNICAL MATHEMATICS: GRADE 11 (TERM 3)

TERM 3	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11
DATE COMPLETED											
CAPS TOPICS	**TRIGONOMETRY**				**CIRCLES, ANGLES AND ANGULAR MOVEMENT**				**FINANCE, GROWTH AND DECAY**		**REVISION/ASSESSMENT**
TOPICS/CONCEPTS, SKILLS, AND VALUES	1. Revise the trig ratios in the solving of right-angle triangle in all 4 quadrants (Grade 10). 2. Apply the sine, cosine, and area rules. (No proofs of these rules) 3. Solve problems in two dimensions using the sine, cosine, and area rules (no variables) 4. Draw the graphs of the functions defined by: • $y = asinx + q$ • $y = acosx + q$ • $y = atanx$ • $y = \sin(ax)$ • $y = cos(ax)$ 5. Draw the graphs of the functions defined by and determine the effect of p on: • $y = sin(x + p)$ • $y = cos(x + p)$ 6. Determine the effect of p on $y = tan(x + p)$ 7. Rotating vectors: developing the sine and cosine curve 8. Trigonometric equations for $\theta \in [0°; 360°]$ 9. Reduction formulae: • $180° \pm \theta$ • $360° \pm \theta$ 10. Introduce and apply identities • $tan\theta = \frac{sin\theta}{cos\theta}$ • $\sin^2\theta + \cos^2\theta = 1$ • $1 + \tan^2\theta = \sec^2\theta$ • $1 + \cot^2\theta = cosec^2\theta$			1. Circle: • $x^2 + y^2 = r^2$ with centre $(0;0)$ 2. Degrees and radians: • $\pi rad = 180°$ 3. Angles and arcs: • Arc length: $s = r\theta$ 4. Sectors and segments: • Area of sector $= \frac{rs}{2} = \frac{r^2\theta}{2}$ • Area of segment = Area of sector − Area of triangle $= \frac{r^2\theta}{2} - \frac{1}{2}r^2\sin\theta$ • $4h^2 - 4dh + x^2 = 0$ 5. Angular and circumferential velocity: • $\omega = 2\pi n = 360°n$ • $v = \pi Dn$ • $v = \omega r$			1. Use simple and compound growth/decay formulae: • $A = P(1 \pm in)$ • $A = P(1 \pm i)^n$ to solve problems (including interest, hire purchase, inflation, population growth and other real-life problems) 2. The effect of different periods of compounding growth and decay 3. Effective and nominal interest rate 4. Calculating ***n*** using logs 5. Timelines	
PAT & SBA	**PAT 2 & TEST**										

2023/24 ANNUAL TEACHING PLANS: TECHNICAL MATHEMATICS: GRADE 11 (TERM 4)

TERM 4	WEEK 1	WEEK 2	WEEK 3	WEEKS 4	WEEKS 5	WEEKS 6	WEEKS 7	WEEKS 8	WEEKS 9	WEEKS 10
DATE COMPLETED										
CAPS TOPICS	**MENSURATION**			**REVISION & FINAL EXAMINATION**						
TOPICS/CONCEPTS, SKILLS, AND VALUES	1. Determine the area of an irregular figure using mid-ordinate rule 2. Surface area and volume of right prisms, cylinders, pyramids, cones and spheres, and combinations of these geometric objects. (Formulae to be given) 3. The effect on volume and surface area when multiplying any dimension by factor ***k***									
SBA	**FINAL EXAMS (PAPER 1 & PAPER 2)**									
EXAMINATION										

PAPER 1		**PAPER 2**	
TOPIC	**MARKS**	**TOPIC**	**MARKS**
Algebra (Number system exponents, logarithms, expressions, equations and inequalities including nature of roots)	90 ± 3	Analytical geometry	25 ± 3
Functions & graphs	45 ± 3	Trigonometry	50 ± 3
Finance, growth, and decay	15 ± 3	Euclidean geometry	40 ± 3
		Mensuration and circles, angles, and angular movement	35 ± 3
TOTAL	**150**	**TOTAL**	**150**