



CORE CURRICULUM PRODUCTS

FET PHASE

GRADE 10

(Content of additional subjects available on request)

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MATHEMATICS (PACEs 1109–1120)

The student:

- Learns about functional notation, graphs and determines the equation of a linear function, graphs and determines the equation of a hyperbole function, graphs and determines the equation of an exponential function, graphs and determines the equation of a parabola function.
- Identifies different types of angles, constructs congruent line segments, angles, and their bisectors, knows the properties of equality, recognizes special pairs of angles, identifies different types of triangles, understands SSS, SAS and ASA postulates, constructs triangles.
- Understands deductive reasoning, learns how to write a formal proof, learns to prove triangles congruent using SSS, SAS, ASA and AAS postulates, realizes that corresponding parts of congruent triangles are congruent, uses the LL, LA, HA and HL theorems in proofs, recognizes auxiliary lines, recognizes and learns to prove overlapping triangles congruent.
- Learns to use indirect proofs to prove theorems, memorizes the theorems dealing with parallel lines, perpendicular lines and triangles, identifies angles formed when a transversal intersects parallel lines, learns relationships between angles when a transversal intersects parallel lines, know which angles must be congruent for two lines to be parallel when intersected by a transversal, identifies the converse of a theorem, learns the sum of the angles of a triangle and resulting corollaries, reviews construction of angles and perpendicular lines, learns how to construct parallel lines.
- Learns about different classifications of polygons, recognizes different types of quadrilaterals, knows the properties of parallelograms, proves that quadrilaterals are parallelograms, learns the characteristics of rectangles and rhombuses, learns theorems related to parallel lines, transversals and midpoints, learns how to divide a segment into any number of congruent segments, discovers characteristics of trapezoids and isosceles trapezoids.
- Draws and describes a locus of points and intersection of loci, identifies parts of circles, learns postulate's of circles, calculates the circumference, area, length of an arc and area of a sector in circles, learns about central angles and types of arcs, proves arcs and chords of circles congruent, learns about types of tangents, applies theorems of tangency to proofs.
- Learns about inscribed and circumscribed circles, finds the measure of an inscribed angle, finds the measures of angles formed by tangents and secants, learns about circle constructions.
- Reviews ratios and proportions from Algebra, learns about the properties of proportions, uses the AA Similarity Theorem, uses the right Triangle Similarity Corollary, proves triangles similar, learns about segment proportionalities, discovers relationships between triangles and parallel lines, understands the SAS and SSS Similarity Theorems.

- Finds the geometric mean of proportion, learns to simplify radicals, discovers the significance of altitudes in right triangles, constructs a geometric mean, applies the Pythagorean Theorem to right triangles, uses the 30-60 Right Triangle Theorem and Isosceles Right Triangle Theorem, applies the trigonometric ratios to find the lengths of sides and the measures of angles of right triangles.
- Learns how to find the perimeter of a polygon, finds the area of a rectangle, parallelogram, triangle, rhombus and trapezoid, learns about polyhedron, finds the lateral area and total area of a prism, pyramid, cylinder, cone and sphere, finds the volume of a prism, pyramid, cylinder, cone and sphere.
- Learns about the coordinate plane, uses the distance and midpoint formulas, uses the slope of a line in graphing equations, applies the slope intercept form to graph equations, determines from the slope if lines are parallel or perpendicular, learns how to graph circles, applies the coordinate system in geometric proofs.
- Learns about transformations, learns to reflect figures over lines and across points, memorizes the properties of isometries, uses the transformations of translation, rotation and glide reflection, identifies line, rotational and point symmetry, learns about dilations.

ENGLISH (PACEs 1109-1120)

Prerequisite: English I

The student:

- Writes using four kinds of paragraphs and correct sentence structure.
- Reviews the characteristics of writing a biography and an autobiography and learns to make note and source cards while using reference books at the library.
- Studies the elements of a book and examines the author's style while reading, studying, and answering questions about God's Tribesman by James and Marti Hefley and The Hiding Place by Corrie ten Boom and John and Elizabeth Sherrill.
- Identifies and reviews basic grammar.
- Expands vocabulary through learning and writing new words.
- Classifies and diagrams the seven basic sentence patterns of simple and complex sentences.
- Discovers the purpose and type of newspaper articles and writes a newspaper article.
- Determines the purpose and appropriate forms of business and social letters and letters of application.
- Gains practical application of library skills.
- Learns to identify and appreciate poetic forms.
- Is encouraged in character development through examples given in each PACE.

GRADE 11

MATHEMATICS (PACES 1121–1132)

The student:

- Calculates simple interest and find the value of investment, uses simple interest formulae to solve real life hire purchase problems, calculates compound interest and find the value of an investment, uses compound interest formulae to solve real life inflation problems, finds the interest rate in simple and compound interest formulae, works with nominal and effective interest rates, calculates compound decrease, applies compound decrease formulae to solve real life depreciation problems, constructs timelines to solve real life financial problems, learns to be good stewards of the money God gives us.
- Solves problems relating to: straight line graphs, finding the equation of a straight line, parallel and perpendicular lines, simultaneous equations.
- Reviews: laws of exponents, product or quotient of polynomials, squares of binomials, factoring of polynomials, fractional exponents, equalities & inequalities, division of polynomials.
- Learns about algebraic fractions applied with all four operations in expressions and equations, rational numbers as decimals.
- Learns about relations and functions, inverse of a relation, linear equations, relations and slope, linear inequalities, direct variation, quadratic functions and graphs, axis of symmetry and the vertex, minimum and maximum points, completing the square, axis of symmetry and the vertex from $y = a(x - h)^2 + k$.
- Learns about square roots, roots of radicals, rational and irrational numbers, operating with radicals, rationalizing denominators, radicals & exponents, radicals & equations, radicals within radicals, complex numbers, imaginary and real numbers.
- Solves quadratics by factoring, fractional equations & quadratics, completing the square to solve quadratics, the quadratic formula, the discriminant and nature of roots, quadratic equations and using its roots, evaluating polynomial functions $f(x)$, synthetic substitution, the remainder theorem, the factor theorem.
- Coordinates analytical geometry, the distance formula and circle centre at $(j;k)$, the parabola with its vertex, directrix, focus and position and graph; quadratic-linear system of equations.
- Determines if a relation is a function, reviews function notation, reviews linear equations and functions, graphs hyperbole equations, determines the equation of a hyperbole function, graph parabola equations, determine the equation of a parabola function, solves problems relating to functions.
- Learns about permutations and factorial notation, probability.
- Recognizes angles in standard position, finds coterminal angles for a specific case, determines the distance a point is away from the origin, determines the distance between two points, determines the co-ordinates of the midpoint between two points, determines the trigonometric ratios of angles in standard position, determines the reference angle for positive or negative values, develops the remaining trigonometric ratios given one ratio, applies trigonometric ratios to real world problems.
- Sketches trigonometry sin, cos and tan functions, solves problems relating to trig functions, sketches trig functions with amplitude, period and vertical changes.

ENGLISH (PACEs 1121-1132)

Prerequisites: English I and II

The student:

- Identifies sentence fragments, run-ons, and complete sentences.
- Studies different periods of American literature.
- Recognizes and reviews grammar.
- Continues to build knowledge of capitalization and punctuation rules.
- Increases writing skills—descriptive, narrative, expository, and persuasive elements of a paragraph; plans and writes an essay.
- Develops setting, character, and plot for a short story.
- Researches, plans, and writes a term paper in a step-by-step process.
- Verifies and clarifies facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.
- Reads *In His Steps* by Charles M. Sheldon and answers questions.
- Studies excerpts from *The Oregon Trail*.
- Analyses characteristics of satire, parody, allegory; pastoral themes used in poetry, prose, plays, novels, short stories, essays; and other basic genres.
- Is encouraged in character development through examples given in each PACE.

GRADE 12

MATHEMATICS (PACEs 1133–1144)

The student:

- Revises the distance, midpoint and gradient formulas, solves problems relating to the distance, midpoint and gradient of a line, learns how to solve problems relating to parallel, perpendicular and collinear lines, calculates the inclination of a straight line, calculates the equation of a straight line, calculates the equation of an altitude, perpendicular bisector and median of a triangle, solves analytical geometry problems.
- Learns the equation of the circle with the centre at origin, learns the equation of the circle at any point $(a; b)$, solves analytical problems relating to the circle, learns how to find the equation of the circle, finds the equation of the tangent to the circle, learns to find the coordinates of the centre of the circle $(a; b)$ and the length of the radius, solves analytical geometry problems involving circles and straight lines, finds the length of the tangent of a circle from a given point, uses all analytical geometry formulae to solve problems relating to circles, lines, parallelograms and kites.
- Learns about number patterns and patterns in nature, learns to identify the a , d , n and T_n values in a linear number pattern, solves problems relating to linear number patterns, learns to solve the a , b and c values in quadratic number patterns, solves the problems relating to quadratic number patterns, solves everyday problems involving number patterns, learns the rules of symmetry, learns the rules of inverses, solves problems relating to function notation, symmetries and inverses.
- Understands what a logarithm is, evaluates logarithms, changes a logarithmic expression into an exponential expression and vice versa, solves logarithmic equations, understands that a logarithmic function is the inverse of an exponential function, recognize different types of logarithmic functions, graphs exponential functions and their inverses and solve problems relating to functions and their inverses, knows the properties of logarithms and use these properties to simplify logarithmic expressions, solves exponential equations using logarithms, applies knowledge of exponents and logarithms to solve practical problems.
- Understands and solves problems relating to arithmetic sequences, finds the value of any term in an arithmetic sequence, understands and solves problems relating to geometric sequences, finds the value of any term in a geometric sequence, solves problems relating to arithmetic and geometric means, understands and solves problems relating to arithmetic series, understands sigma notation and uses it to abbreviate an arithmetic series, finds the sum of an arithmetic series, understands and solves problems relating to geometric series, uses sigma notation to abbreviate a geometric series, finds the sum of a geometric series, understands what an infinite geometric series is, finds the sum of an infinite geometric series, converts repeating decimals to fractions in lowest terms, determines if a sequence is convergent or divergent, finds the limit of a convergent sequence.
- Understands the terminology used for compound interest and annuities, calculates the future amount of a single deposit, calculates the single present amount of a future amount, calculates the interest rate required to produce a certain present or future amount, calculates the future amount of an annuity, calculates the equal payment amount to accumulate a certain future amount, calculates the present amount of an annuity, calculates the monthly payment required to pay off a loan.
- Analyses a numerical data set by using measures of central tendency, makes

and interprets data from box-and whisker diagrams, calculates the standard deviation of a numerical data set, calculates the cumulative frequency and sketch the corresponding ogive, draws scatter plots and the line of best fit, calculates the correlation coefficient and equation of the least squares regression line, revises concepts of probability of single events, revises Venn diagrams, determines the probability of independent events, determines the probability that event A or event B occurs.

- Solves a right triangle, understands angle of elevation and angle of depression, understands the different trigonometric methods used to give direction, solves problems by applying the different trigonometric methods used to give direction, uses the law of cosines to solve SAS and SSS triangles, uses the law of sines to solve AAS, ASA, and ASS triangles, finds the area of an SAS, ASA, or an SSS triangle.
- Learns the six trigonometric ratios and applies all the ratios to the problems throughout this module, uses trig identities to simplify trig expressions, solves problems relating to reduction formulae with positive and negative angles, solves problems involving double angle identities, solves problems involving compound angle identities.
- Understands the definitions of terms used in calculus, uses and applies limits, calculate average gradient, understands how derivatives are introduced, understands the first principles of differentiation, works with standard forms of differentiation, works with differentiation and functional notation, applies differentiation to various problems.
- Understands and solves cubic equations, understands and sketch differential graphs, understands and interprets cubic graphs, determines equations of cubic graphs, performs practical applications of differentiation.
- Understands basic concepts related to angles in a circle and circle geometry, gains mastery in the recall of the geometric theorems and basic concepts through the practice of performing calculations with reasons, knows how to perform calculations involving the theorem of Pythagoras where applicable, develops logical thought patterns essential to careful analysis and synthesis of geometric problems, understands the importance of watching what we say and understanding that the words we speak carry power.

ENGLISH (PACEs 1133-1144)

Prerequisites: English I, II, and III

The student:

- Is introduced to the different periods of British literature.
- Builds a vocabulary notebook.
- Improves writing skills in exposition, description, narration, and persuasion.
- Learns about parallelism.
- Writes character trait stories and answers essay questions accurately.
- Reviews and practices grammar—capitalization and punctuation.
- Uses the dictionary as a reference tool.
- Learns about denotation and connotation.
- Paraphrases and writes summaries while reading *The Rime of the Ancient Mariner* by Samuel Taylor Coleridge and *Silas Marner* by George Eliot (special edition).
- Analyzes Shakespeare's life and *Macbeth*.
- Continues the study of speech—topic selection, preparation, speaking methods, and speech delivery.
- Is encouraged in character development through examples given in each PACE.