



Republic of Rwanda
Ministry of Education



RTB | RWANDA
TVET BOARD

GENBT302

Applied Mathematics

Apply Basics Algebra and Trigonometry

Competence

RQF Level: 3

Learning Hours



60

Credits: 6

Sector: ARTS AND CRAFTS

Trade: Fashion design, Fine and Plastic Arts, Music and Performing Arts

Module Type: General

Issue Date: April 2022

CURRICULUM: GENBT302-TVET CERTIFICATE 3 - ARTS AND CRAFTS

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Purpose statement	This general module describes the knowledge, skills and attitude required to apply the properties of sets, basic algebra and trigonometry. The ability to do basic algebra and trigonometry is absolutely vital to successfully passing any field. At the end of this module, the trainee of Level three will be able to solve graphically and algebraically linear or quadratic equations and inequalities. He/she will also be able to apply fundamentals of trigonometry. As Algebra and trigonometry are tools of different fields, this module will be useful to trainee as a means of both measuring and improving their understanding of Mathematics and he/she will be prepared to perform effectively in any fields that require some knowledge of mathematics especially algebra and trigonometry as well as in critical thinking.				
Delivery modality	Training delivery	100%	Assessment	Total 100%	
	Theoretical content	30%	Formative assessment	30%	
	Practical work:	70%		70%	50%
	<ul style="list-style-type: none"> Group project and presentation 20% Individual project /Work 50% 				
		Summative Assessment		50%	

Elements of Competency and Performance Criteria













Elements of competency	Performance criteria
1. Apply the properties of sets of numbers	1.1. Set of numbers are appropriately described based on their types
	1.2. Operation properties are properly applied on sets of numbers and a given binary operation
	1.3. Operations on the set are properly carried out based on set definition.
2. Solve algebraically or graphically linear and quadratic equations	2.1 A linear equation and inequality are correctly solved in accordance with the required steps
	2.2 The parameter from given equations is properly discussed based on established conditions
	2.3 Two simultaneous linear equations are properly solved in accordance with the required steps
	2.4 A quadratic equation is effectively solved in accordance with the required steps
	3.1 Angles are appropriately described based on rotating an initial side, from a fixed point to terminal considered position.

1. Apply fundamentals of trigonometry	3.2 Trigonometric ratios are appropriately determined based on isosceles right-angled triangle and equilateral triangle.
	3.3 Trigonometric identities are appropriately described based on comparison of trigonometric ratios of two defined angles.
	3.4 Trigonometric equations are correctly solved based on trigonometric ratios.
	3.5 A given triangle is appropriately solved based on Pythagorean Theorem and trigonometric ratios.

Course content

Learning outcomes	At the end of the module the learner will be able to: <ol style="list-style-type: none"> 1. Apply the properties of sets of numbers 2. Solve algebraically or graphically linear and quadratic equations or inequalities 3. Apply fundamentals of trigonometry
Learning outcome 1: Apply the properties of sets of numbers	Learning hours: 20

Indicative content

<ul style="list-style-type: none"> • Description of set of numbers <ul style="list-style-type: none"> ✓ Classification <ul style="list-style-type: none">  Natural numbers  Integers  Primes numbers  Rational numbers  Real numbers ✓ Subset properties • Application of operation properties <ul style="list-style-type: none"> ✓ Verification of properties <ul style="list-style-type: none">  Closure property  Commutative property  Associative property  Identity property  Inverse property ✓ Determination of algebraic structure for a group • Carrying out operations on set <ul style="list-style-type: none"> ✓ Definition of sets by <ul style="list-style-type: none">  Extension  Intension
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- ✓ Presentation of sets by Venn diagram
- ✓ Operations on sets
 - ✚ Intersection of sets
 - ✚ Union of sets
 - ✚ Complement of a set
 - ✚ Difference of 2 sets
 - ✚ Symmetrical difference of 2 sets

Resources required for the learning outcome

Equipment	Computer, Internet, Projector ,Reference books
Materials	Didactic materials
Tools	Video, Pictures
Facilitation techniques	<ul style="list-style-type: none"> • Demonstration and simulation • Brainstorming • Group discussion • Individual and group work • Practical exercise • Individualized Trainer guided •
Formative assessment methods	<ul style="list-style-type: none"> • Written assessment • Performance assessment

Learning outcome 2: Solve algebraically or graphically linear and quadratic equations or inequalities

Learning hours: 20

Indicative content

- **Solving linear equations and inequalities**
 - ✓ Algebraic method
 - ✓ Graphical method
- **Discussion on parameter from a given equation**
- **Solving two simultaneous linear equations**
 - ✓ Algebraic method
 - ✓ Graphical method
- **Solving a quadratic equation**
 - ✓ Algebraic method
 - ✚ Factorizing method
 - ✚ Square root property
 - ✚ Completing the square
 - ✚ Quadratic formula
 - ✓ Graphical method
 - ✚ Construction of a parabola

- ✓ Determination of solutions set

Resources required for the indicative content

Equipment	Reference books
Materials	Didactic materials such as manila paper, Geometric instruments (Ruler, T-square)
Tools	Handouts on worked examples
Facilitation techniques	<ul style="list-style-type: none"> • Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion • Brainstorming
Formative assessment methods	<ul style="list-style-type: none"> • Written assessment • Oral presentation • Performance assessment

Learning outcome 3: Apply fundamentals of trigonometry

Learning hours: 20

Indicative content

- **Description of angles**
 - ✓ Angle definition by rotation
 - ✓ Angles measurement
 - ✚ Radian
 - ✚ Degree
 - ✓ Units conversion
 - ✓ Pythagorean theorem
- **Determination of trigonometric ratios**
 - ✓ Definition of trigonometric ratios
 - ✓ Calculation of trigonometric ratios of special angles
 - ✚ 30°
 - ✚ 45°
 - ✚ 60°
 - ✚ 90°
- **Description of trigonometric identities**
 - ✓ Relationship between trigonometric ratios of some angles
 - ✚ Complementary angles
 - ✚ Supplementary angles
 - ✓ Trigonometric ratios of Sum or difference of two angles
 - ✓ Trigonometric ratios of double angle

- **Solving trigonometric equations**

- ✓ Equations reducible to the form;

- ✓ $\sin(x + \alpha) = k, |k| \leq 1$

- ✓ $\cos(x + \alpha) = k, |k| \leq 1$

- ✓ $\tan(x + \alpha) = b$

- ✓ $\sin nx = k$

- ✓ $\cos nx = k$

- ✓ Equation of the form $a \sin x + b \cos x = c$

- **Solving a given triangle**

- ✓ Sine law

- ✓ Cosine law

Resources required for the indicative content

Equipment	Computer, Reference books, Internet
Materials	Didactic materials such as manila paper, Scientific calculator
Tools	Hand-out notes
Facilitation techniques	<ul style="list-style-type: none"> • Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	<ul style="list-style-type: none"> • Written assessment • Oral presentation • Performance assessment

References:

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