REPUBLIC OF KENYA

NATIONAL OCCUPATIONAL STANDARDS

FOR

CARPENTRY AND JOINERY CRAFTSPERSON

KNQF LEVEL 5

PROGRAMME CODE:0722 554B

TVET CDACC
P.O BOX 15745-00100
NAIROBI

APPLY BASIC MATHEMATICS

UNIT CODE:CON/OS/CAJ/CC/01/5/B

UNIT DESCRIPTION:

This unit describes the competencies required in order to apply basic mathematics. It involves applying algebra, performing geometrical calculations, carrying out mensuration, applying statistics, applying graphs and charts, applying number series and indices and logarithms. It also entails applying Ratios, applying matrices, applying probability, performing commercial calculations, applying trigonometry and applying vectors.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements.(***Bold and italicized terms are elaborated in the Range)***
1. Apply Algebra	1.1 Calculations involving Indices are performed as per the concept 1.2 Linear equations are represented based on the concept 1.3 Scientific calculator is used in solving mathematical problems in line with manufacturer's manual 1.4 Simultaneous equations are performed as per the rules 1.5 Simple algebraic equations are solved as per the concept 1.6 Simple algebraic equations are formed as per the concept 1.7 Transpose formulae is applied as per the concept 1.8 Quadratic equations are solved
2. Perform geometrical calculations	2.1 Calculated areas of figures as per the given formulae 2.2 Applied Pythagoras' theorem based on the concept
3. Carry out Mensuration	3.1 Identified various ***units of measurements*** as per the course requirements 3.2 Converted units from one form to another

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	3.3 Perimeter and areas of ***figures*** are obtained as per the correct formulae 3.4 Volume and Surface area of solids are obtained 3.5 Area of irregular figures are obtained
4. Apply Statistics	4.1 Identified grouped and ungrouped data 4.2 Organized ungrouped data as per the concept 4.3 Represented data in frequency tables 4.4 Calculated the median of grouped and ungrouped data 4.5 Tabulated statistical data 4.6 Represented data in a chart form 4.7 Interpreted data from a given chart
5. Apply graphs and charts	5.1 Plotted a ***linear graph*** for given set of data 5.2 Read and used information from a given linear graph 5.3 Plotted parabolic curves 5.4 Solved simultaneous and quadratic equations by the graphical method 5.5 Presented data in appropriate charts
6. Apply number series	6.1 Distinguished between a sequence and series 6.2 Solved problems involving series 6.3 Calculated simple and compound interest
7. Apply Indices and Logarithms	7.1 Converted numbers from one base to another 7.2 Applied the laws of indices in solving exponential equations 7.3 Applied the laws of logarithms in solving logarithmic equations
8. Apply Ratios	8.1 Differentiated between rational and irrational numbers 8.2 Expressed ratios as percentages 8.3 Solved problems involving direct and inverse proportions

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements.(***Bold and italicized terms are elaborated in the Range)***
9. Apply matrices	9.1 Operated on matrices 9.2 Calculated the determinant of a 2*2 matrix 9.3 Calculated the inverse of a 2*2 matrix 9.4 Applied matrices in solving simultaneous equations
10. Apply probability	10.1 Deduced whether two events are dependent or independent 10.2 Applied the laws of probability in finding the changes of an event occurring
11. Perform commercial calculations	11.1 Converted one currency to another 11.2 Calculated exchange rates 11.3 Calculated income 11.4 Calculated of taxes 11.5 Calculated average sales
12. Apply Trigonometry	12.1 Calculations are performed using trigonometric rules 12.2 Calculated circular measure 12.3 Applied trigonometric ratios 12.4 Calculated simple trigonometric identities 12.5 Applied trigonometry of angles greater than a right angle 12.6 Applied sine and cosine rules 12.7 Performed phasor representation
13. Apply vectors	13.1 Performed manipulation of vectors 13.2 Performed resolution of vectors

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	Range
1. Units of measurement may include but not limited to:	• Millimetres • Centimetres • Metres • Kilometres
2. Figures may include but not limited to:	• square • rectangle • triangle • polygons • circles
3. Linear graphs may include but not limited to:	• Distance against time • Temperature against time • Velocity against distance

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Applying fundamental operations (addition, subtraction, division, multiplication)
- Using and applying mathematical formulas
- Logical thinking
- Problem solving
- Applying statistics
- Drawing graphs
- Using different measuring tools

Required knowledge

The individual needs to demonstrate knowledge of:

- Fundamental operations (addition, subtraction, division, multiplication)
- Calculating area and volume
- Types and purpose of measuring instruments
- Units of measurement and abbreviations
- Rounding techniques
- Types of fractions
- Types of tables and graphs
- Presentation of data in tables and graphs

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Applied Algebra 1.2 Performed geometrical calculations 1.3 Carried out Mensuration based on the concept 1.4 Demonstrated knowledge of applied Statistics 1.5 Applied graphs and charts 1.6 Applied number series 1.7 Applied Indices and Logarithms 1.8 Applied Ratios 1.9 Applied matrices 1.10 Applied probability accurately 1.11 Performed commercial calculations accurately 1.12 Applied Trigonometry appropriately 1.13 Applied vectors according to the concept
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Measuring equipment 2.3 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written test 3.4 Portfolio of Evidence

	3.5 Interview 3.6 Third party report
4. Context of Assessment	Competency may be assessed 4.1 On job 4.2 Off job 4.3 During industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.