



República Democrática de Timor-Leste
Ministério das Finanças



“Seja um bom cidadão, seja um novo herói para a nossa Nação”

COMPETENCY STANDARDS

in

Workplace Numeracy

for

PFM PROFESSIONALS IN TIMOR LESTE

November 2016: Version 0.7

FINAL DRAFT



**Public Finance Management
Capacity Building Centre**

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PART I

OVERVIEW OF WORKPLACE NUMERACY COMPETENCIES

1. COMPETENCY LEVELS

Competencies in workplace numeracy are applicable to all Public Finance Management roles and are categorized into the following two (2) levels: Fundamental and Extended. The Extended Level builds on the Fundamental Level. A PFM Professional who needs to show competence at the Extended Level will also need to show competence at the Fundamental Level.

The relevant technical areas for each level are shown in the table below.

Level	Technical areas
Extended (in addition to Fundamental)	<ol style="list-style-type: none"> 1. Planning 2. Budgeting 3. Accounting & Financial Reporting 4. Internal Audit 5. Financial Management Information Systems Development 6. Statistics 7. Investment 8. Economic Policy 9. Aid Effectiveness 10. Public Private Partnerships & Loans
Fundamental	<ol style="list-style-type: none"> 1. Payments 2. Procurement & Contract Management 3. Asset & Fleet Management 4. Logistics & Maintenance 5. Customs 6. Revenue 7. PFM Legal specialisation

Public Finance Management Competency Standards for Numeracy

Further, the Extended Level applies to any PFM Professional who has a Management role, in any of the technical areas. The table below shows how this applies to positions.

Level	Position
Extended (in addition to Fundamental)	Chief of Department; National Director; Director General in any of the technical areas listed above
Extended (in addition to Fundamental)	Staff with a PFM position in technical areas listed for the Extended Level above
Fundamental	Staff with a PFM position in technical areas listed for the Fundamental Level above

2. WORKPLACE NUMERACY COMPETENCY GROUPS

The Workplace Numeracy Competencies are grouped across different functions as follows:

Function	Competency Type	Competency Title	Competency Definition
1. Computation	1.1 Calculate and convert time and money using basic operations in the context of the workplace	1.1.1 Calculate and convert time	Accurately calculate and convert unit of time such as hour, minute, second, day, week, month and year by using basic operations
		1.1.2 Use basic operations to deal with counting money and convert money into different currencies	Effectively use the currencies' symbols and accurately convert the numerical values using basic operations
	1.2 Use fractions, decimals and percentages to do computation in the workplace context	1.2.1 Use and apply fractions, decimals and percentages in workplace situations	Understand the order of operations to calculate for fractions, decimals and percentages and accurately convert between fractions, decimals and percentages
		1.2.2 Accurately use numerical values, estimate and round numbers in workplace situations	Accurately use numerical values, estimate and round calculations in various computations, including decimals, fractions and percentages
	1.3 Use measurement in the context of the workplace	1.3.1 Use numbers to make a comparison and calculation in workplace situations	Effectively compare and calculate numbers in workplace situation
		1.3.2 Use shortcuts and informal methods to do any calculation in the workplace	Undertake a simple way of calculation to measure thing at workplace.

Function	Competency Type	Competency Title	Competency Definition
		1.3.3 Interpret and use the Metric measurement system	Understand the metric measurement to measure things correctly
	1.4 Use tools to do computation in the workplace context	1.4.1 Use shortcuts and the appropriate calculator to compute in a range of numerical situations	Efficiently and accurately use calculator to compute for real numbers
		1.4.2 Use a spread sheet on MS Excel to do computation	Efficiently and accurately use a spreadsheet to compute for real numbers
	1.5 Use and apply percentage in the context of the workplace	1.5.1 Compute the quantities of percentage and work on interest rate in a range of situations	Efficiently and accurately apply the percentage and calculate for simple interest rate
		1.5.2 Calculate the applicable discounts and mark up in a range of situations	Efficiently and accurately calculate for the percentage of discounts and mark up and determine the total values after discounting and marking up
	1.6 Use and apply numerical problem solving in the context of the workplace	1.6.1 Compute and use variables	Use variables such as x, y or z to represent anything that is unknown and solve for variables
		1.6.2 Reconcile numerical information from different sources	Reconcile data from one source (e.g. ledger or accounts book) and compare with other sources (e.g. bank statement, report) to confirm accuracy or to identify errors if any

Function	Competency Type	Competency Title	Competency Definition
2. Data interpretation and analysis	2.1 Collect and organise data	2.1.1 Collect, generate and verify data accuracy	Collect data in accordance with requirements and accurately verify the type of data, the validity, and category
	2.2 Analyse data	2.2.1 Organise, identify and classify the type of data	Organize, identify and accurately classify data based on the type such as qualitative, quantitative, temporal and spatial data
	2.3 Represent data using diagrams	2.3.1 Create and choose the most appropriate graph or chart	Effectively and accurately create graphs and charts such as line graph, bar chart and pie chart based on the data provided, and choose the graph that best suits the type of data and the purpose
	2.4 Use and interpret data	2.4.1 Write about data and its interpretation	Appropriately use the language of describing the graph such as increase/decrease, stable or peak to interpret data on the graph
		2.4.2 Analyse and interpret data before drawing a conclusion	Analyse data and interpret the result to develop the conclusion
	2.5 Use computer-based tools to complete data collection and data interpretation	2.5.1 Use spread sheet on MS Excel to input, update, and/or analyse a set of data	Appropriately use MS Excel program to gather data,, input, and update information to support data analysis

Function	Competency Type	Competency Title	Competency Definition
		2.5.2 Use the most appropriate diagram including tables and graphs to represent a dataset	Use data provided to produce diagrams that accurately and completely represent the dataset, through appropriate MS Excel tools.

PART II

DETAILED WORKPLACE NUMERACY COMPETENCIES

1. COMPUTATION

Competency Type	1.1 Calculate and convert time and money using basic operations in the context of the workplace	
Competency Title	1.1.1 Calculate and convert time	
Competency Definition	Accurately calculate and convert unit of time such as hour, minute, second, day, week, month and year by using basic operations.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	<p>Calculate the time being used or required;</p> <p>Use the appropriate language of time (e.g.: before, after, today, tomorrow);</p> <p>Calculate basic conversion of time unit (e.g.: 1 hour = 60 minutes = 3600 seconds);</p> <p>Read, record and interpret time from digital/analog clock and calendar;</p> <p>Read and write numbers related to time on relevant documents in workplace situations.</p>	
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> How to write and read the time table, digital/ analog clock and/or 	

	<p>calendar;</p> <ul style="list-style-type: none"> Identify the number of days in a week and the number of hours in a day (e.g.: 1 week = 7 days, 1 day = 24 hours); How to apply and use the basic operations such as addition, subtraction, multiplication and division; The basic language of time; Activities that require time calculation to complete certain tasks. 	
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> Write and read the time table, digital/analog clock and/or calendar; Apply basic computation in counting and converting unit of time; Distinguish the time difference; Calculate time in a range of situations; Express the time needed in words or digits. 	

Competency Type	1.1 Calculate time and money using basic operations in the context of workplace	
Competency Title	1.1.2 Use basic operations to deal with counting money and convert money into different currencies	
Competency Definition	Effectively use the currencies symbols and accurately convert the numerical values using basic operations.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:

	<p>Calculate or compute the cost for purchasing certain goods or items;</p> <p>Calculate the total cost of delivering items by applying basic operations such as addition, subtraction, multiplication and division;</p> <p>Use currency notation and/or symbols;</p> <p>Convert two different currencies (e.g.: USD to AUD or AUD to USD and USD to IDR or IDR to USD);</p> <p>Use and apply the language to express and compare something and/or price (more/less, cheaper/more expensive, double/halve, total);</p> <p>Compute the time being used and estimate or calculate the cost (e.g.: \$ per hour, \$ per day);</p> <p>Count and compute large amounts of money using basic operations such as addition, subtraction, multiplication and division.</p>	
<p>Knowledge</p>	<p>The following knowledge is required to perform the above at Fundamental Level:</p>	<p>The following knowledge is required to perform the above at Extended Level:</p>
	<ul style="list-style-type: none"> • How to update the rate of change from two different type of currencies such as AUD and IDR; • Activities that require time and money calculation; • How to read and write numbers related to money on relevant documents in a range of workplace situations; • How to write the correct expression of a certain amount 	

	<p>considering the comma and/or period;</p> <ul style="list-style-type: none"> • The rate of change from a range of different currencies and in various circumstances (e.g.: buy, sell, different expressions); • How to interpret and compare numbers related to money on relevant documents or in a range of workplace situations; • How to read price lists in order to make comparisons and to calculate the total difference of money; • How to do a complex computation. 	
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Add and subtract the total amount without using calculator; • Use and apply multiplication and division rules; • Compute and convert dollars into two different currencies; • Identify the difference amount of money. 	

Competency Type	1.2 Use fractions, decimals and percentages to do computation in the workplace context	
Competency Title	1.2.1 Use and apply fractions, decimals and percentages in workplace situations	
Competency Definition	Understand the order of operations to calculate for fractions, decimals and percentages and accurately convert between fractions, decimals and percentages.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:

	<p>Work with simple fractions and decimals in a range of workplace situations;</p> <p>Compute the value of money using both fractions and decimals form;</p> <p>Compute and calculate the percentage values of a range of items and/or money;</p> <p>Express the fraction or decimal in percentage or vice versa when dealing with money and goods;</p> <p>Make a comparison and/or differentiate the fractions, decimals and percentages (e.g.: $\frac{1}{2} > \frac{1}{4}$ and $\frac{1}{2} = 0.5 = 50\%$) in a work situation;</p> <p>Recognize relationships among simple fractions, decimals and percentages (e.g.: $\frac{1}{4} = 0.25 = 25\%$);</p> <p>Calculate amount using ratio;</p> <p>Interpret the word problems and write it in a simple fractions, decimals or percentages (e.g.: 8 out of 12 = $\frac{8}{12} = \frac{2}{3}$, 8 hours per day = $\frac{8}{24}$, five out of sixteen = $\frac{5}{16} = 0.3125 = 31.21\%$);</p> <p>Visualise items that are written in the form of fractions, decimals and percentages.</p>	
<p>Knowledge</p>	<p>The following knowledge is required to perform the above at Fundamental Level:</p>	<p>The following knowledge is required to perform the above at Extended Level:</p>

	<ul style="list-style-type: none"> • How to read and write things or money in the form of fractions, decimals or percentages in a range of workplace situations; • Understand the relationship among fractions, decimals and percentages; • Understand the order of operation such as Brackets, Indices, Division, Multiplication, Addition and Subtraction (BIDMAS) (e.g.: $2 + 3 \times 6 = 2 + (3 \times 6) = 2 + 18 = 20$); • How to calculate and simplify the fractions, decimals and percentages; • How to add and/or subtract fractions, decimals and percentages; • The computation applied for fractions, decimals and percentages; • How to calculate basic multiplication and division for both fractions and decimals; • How to express things or money in a form of fractions, decimals or percentages; • How to describe fractions in a diagram; • Understand the ratio 	
<p>Skills & Attributes</p>	<p>The following abilities are required to perform the above at Fundamental Level:</p>	<p>The following abilities are required to perform the above at Extended Level:</p>
	<ul style="list-style-type: none"> • Add, subtract, multiply and divide fractions, decimals and percentages; • Transform or write the word problem into a number; • Solve problems in workplace situations using fractions, decimals and percentages; • Read and write fractions and 	

	<p>decimals;</p> <ul style="list-style-type: none"> • Read and write percentages; • Interpret and calculate percentages; • Interpret and calculate fractions and decimals in a range of workplace situations; • Simplify fractions; • Solve for ratio 	
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Competency Type	1.2 Use fractions, decimals and percentages to do computation in the workplace context	
Competency Title	1.2.2 Accurately use numerical values, estimate and round numbers in workplace situations	
Competency Definition	Accurately use numerical values, estimate and round calculations in various computations, including decimals, fractions and percentages.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	<p>Identify the place values of numbers and express it in words;</p> <p>Round the decimals into the nearest second/ first place to estimate a numerical calculation;</p> <p>Use number facts and rounding to give rough estimates of numerical calculations in appropriate situations;</p> <p>Use place value concepts for whole numbers and decimals to interpret and compare written and spoken numbers involving money;</p>	

	<p>Use the accurate real numbers in writing and recognize the writing system (e.g. in Portuguese or Indonesian language, people use comma (,) for cents and dots (.) for thousands, however, in English it is vice versa e.g.: One Thousand Dollars, using English format (\$1,000) Vs Indonesian format (\$1.000); One Hundred Dollars and Five Cents, using English format (\$100.05) Vs Indonesian format (\$100,05).</p> <p>Estimate the total cost of buying, ordering or delivering things;</p> <p>Determine the reasonable answers to workplace situations;</p> <p>Estimate the cost before tax;</p> <p>Obtain accurate results for calculations involving money.</p>	
<p>Knowledge</p>	<p>The following knowledge is required to perform the above at Fundamental Level:</p>	<p>The following knowledge is required to perform the above at Extended Level:</p>
	<ul style="list-style-type: none"> • How to read and write the correct form of decimals; • The basic operations such as addition, subtraction, multiplication and division; • The basic computation in fractions and decimals (e.g.: $\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$, $\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$, \$2.05 + \$0.05 = \$2.10); • How to write and identify the place values for decimals; • How to round decimals into the nearest tenth place (e.g.: \$4.2683 = \$4.3); • To calculate and report about the 	

	<p>number of staff/items in form of percentage (e.g.: Total staff in office A is 30, 12 males and 18 females. How many percentages of female staff? $\frac{18}{30} \times 100\% = 60\%$. Therefore, 60% of the staff are females;</p> <ul style="list-style-type: none"> • The appropriate language being used or required in communicating the place values (e.g.; ones, tenths, hundredths, thousandths); • The process in rounding decimals to the nearest second/first place. 	
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Add, subtract, multiply and divide fractions; add, subtract, multiply and divide decimals; • Name the place value for decimals (ones, tenths, hundredths, thousandth); • Illustrate and visualise things and/or money in the form of fractions, decimals or percentages. 	

Competency Type	1.3 Use measurement in the context of the workplace	
Competency Title	1.3.1 Use numbers to make a comparison and calculation in workplace situations	
Competency Definition	Effectively compare and calculate numbers in workplace situation.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:

	<p>Use simple everyday numbers and figures to interpret information which is in workplace documents;</p> <p>Use simple everyday numbers to measure things ;</p> <p>Accurately use numbers to calculate the price of a certain items then make a comparison to support the decision making process;</p> <p>Write and document numerical information in a range of workplace documents.</p>	
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • The whole numbers, natural numbers, fractions in numeral and word form; • The order and use of whole numbers and simple fractions in workplace documents or simple tables; • How to use common words for ordering and comparing numbers, fractions such as smaller, bigger, larger, first, second, between, halve. 	
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Count the whole numbers; • Understand and apply the rules of basic operations; • Distinguish the difference of numbers; • Calculate a range of number; • Apply basic computation in a complex situation. 	

Competency Type	1.3 Use measurement in the context of the workplace	
Competency Title	1.3.2 Use shortcuts and informal methods to do any calculation in the workplace.	
Competency Definition	Undertake a simple way of calculation to measure thing at workplace.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	Use whole numbers and figures to mentally calculate the simple measurement	
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> The whole numbers, natural numbers, familiar fractions in numeral and word form; The order and use of whole numbers and familiar, simple fractions in everyday documents or simple tables. 	
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> Read and understand a price list; Count the whole numbers; Distinguish the difference of numbers; Calculate mentally a range of numbers. 	

Competency Type	1.3 Use measurement in the context of the workplace	
Competency Title	1.3.3 Interpret and use the Metric measurement system	
Competency Definition	Understand the metric measurement to measure things correctly.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	<p>Use and apply the basic metric measurement system to measure goods, materials and items in practical situations;</p> <p>Estimate the numerical values and convert the unit of measurement appropriately;</p> <p>Accurately use digital measuring equipment to 2 or 3 decimal places and interpret results;</p> <p>Convert metric measurement;</p> <p>Calculate the area and volume of simple relevant shapes and apply the appropriate unit of measurement;</p> <p>Interpret and draw simple scale diagrams;</p> <p>Use the names and symbols of the units of measurement (e.g.: centimetre (cm), millimetre (mm), kilometre (km), kilogram (kg) in dealing with goods, materials and items at the workplace.</p>	

Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • How to define the basic concept for length, mass, area, capacity and volume; • How to make an initial estimation of measurements; • How to choose appropriate measuring instruments and use them correctly to measure; • How to use arithmetic operation; • The formula and the process of calculating perimeter, area and volume; • Use appropriate unit of measurement; • Visualise and describe the different types of solids (e.g. square, rectangle, diagonal, cube); • The names and symbols of the units of measurement (e.g.: centimetre (cm), millimetre (mm), kilometre (km), kilogram (kg)). 	
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Estimate length of a certain things; • Apply the basic operations such as addition, subtraction, multiplication and division; • Interpret the metric measurement in practical situations; • Convert metric measurement appropriately; • Calculate the perimeter, area and volume using the right formulas. 	

Competency Type	1.4 Use tools to do computation in the workplace context	
Competency Title	1.4.1 Use shortcuts and the appropriate calculator to compute in a range of numerical situations	
Competency Definition	Efficiently and accurately use calculator to compute for real numbers.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	<p>Recall addition, subtraction, multiplication and division and use estimating numbers (e.g.: estimating $199 + 299$ as approximately $200+300 = 500$ and comparing estimate to actual solution.</p> <p>Calculate double numbers (x2) less than 1000 (e.g.: Mr. X has 25 computers, Mr. Y has double computers of Mr. X. Therefore, Mr. Y has 50 computers);</p> <p>Use a calculator efficiently to do accurate calculations.</p>	
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Use simple calculator and scientific calculator; • Understand the order of operations and the language such as double (x2), triple (x3), times (x), sum (+) and difference (-). 	

Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Use different types of calculator to compute; • Do mental computation for quick estimates to check the accuracy of the calculations. 	

Competency Type	1.4 Use tools to do computation in the workplace context	
Competency Title	1.4.2 Use a spread sheet on MS Excel to do computation	
Competency Definition	Efficiently and accurately use a spreadsheet to compute for real numbers.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level , the following performance is required:	At Extended Level , the following performance is required:
	<p>Create and use spread sheet to calculate for various numbers using basic operations;</p> <p>Use and apply for percentage, sum and average using the spread sheet;</p> <p>Verify and input the correct number with different variables.</p>	
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Read a spread sheet; • Use computer and MS Excel program; • Use formulas in MS Excel • Sort and filter data accordingly; 	

	<ul style="list-style-type: none"> Learn to keep certain columns together when sorting and filtering Create and label tables in MS Excel. 	
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> Use MS Excel tools to compute; Check and verify using mental computations. 	

Competency Type	1.5 Use and apply percentage in the context of the workplace	
Competency Title	1.5.1 Compute the quantities of percentage and work on interest rate in a range of situations	
Competency Definition	Effectively and accurately apply the percentage and calculate for simple interest rate.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	<p>Calculate or compute the cost for purchasing certain goods or items in a form of percentage;</p> <p>Calculate the total cost of delivering goods by applying basic operations and convert it into percentage;</p> <p>Calculate simple interest rates in workplace situations;</p> <p>Compute tax being applied (e.g.: 10 % of the total amount goes for tax);</p> <p>Identify and determine the difference by percentage;</p>	

	<p>Use, allocate and calculate a budget in the form of percentage (e.g.: 25% of the total annual budget is allocated to health sector);</p> <p>Calculate for interest rates</p>	
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • How to read and write in a percentage form; • Understand the difference between a percentage and percentage point and when each should be used • How to write correct number of a certain amount considering the comma and/or period; • How to express things or money in a form of percentage; • How to interpret and compare numbers related to money in relevant documents or in workplace situations in the form of percentage; • How to read basic price list in order to make comparison and to identify the total difference of money; • The basic operations that apply to workplace situations. 	
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Add and subtract the total amount in a form of percentage with and without using a calculator; • Multiply and divide the percentage; • Represent any quantities in a form of percentage; • Identify the difference. 	

Competency Type	1.5 Use and apply percentage in the context of the workplace	
Competency Title	1.5.2 Calculate the applicable discounts and mark up in a range of situations	
Competency Definition	Efficiently and accurately calculate for the percentage of discounts and mark up and determine the total values after discounting and marking up.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	<p>Calculate or compute the simple discount in particular situations (e.g.: 5% discount from the total amount \$100 is $5\% \times \\$100 = \frac{5}{100} \times \\$100 = \\$5$);</p> <p>Calculate the mark up and compute for the total amount;</p> <p>Express and interpret the discount of a certain item with a certain amount of money;</p> <p>Express and interpret the mark up of a certain item with a certain amount of money;</p> <p>Calculate the total payment after discounting or marking up.</p>	
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • How to read and write in a percentage (%) form; • How to write correct number of a certain amount considering the comma and/or period; • How to interpret and compare numbers related to money on 	

	<p>relevant documents;</p> <ul style="list-style-type: none"> • How to read a basic price list in order to make comparison and to identify the total difference of money; • The basic operations that apply to workplace situations. 	
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level :
	<ul style="list-style-type: none"> • Add and subtract the total amount in a form of percentage with and without using a calculator; • Use and apply multiplication and division rules; • Represent any quantities in a form of percentage; • Identify the difference in an amount of money; • Calculate a large amount of money using basic operations. 	

Competency Type	1.6 Use and apply numerical problem solving in the context of the workplace	
Competency Title	1.6.1 Compute and use variables	
Competency Definition	Use variables such as x, y or z to represent anything that is unknown and solve for variables	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	<p>Use variable expression to calculate or compute the cost for purchasing a certain goods or items;</p> <p>Identify variable to calculate the total cost of delivering or ordering things;</p>	

	Translate word phrases into variable expressions (e.g.: 4 less than a number x is expressed as $4 - x$; and 5 more than a number y is expressed as $5+y$)	
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> Express word problem in a variable form; Use the correct language to express basic operation (e.g.: less than (-), more than (+), times (x) and divide (:). 	
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> Solve for a variable using addition, subtraction, multiplication and division; Use variable expressions (e.g.: $x = \text{money}$). 	

Competency Type	1.6 Use and apply numerical problem solving in the context of the workplace	
Competency Title	1.6.2 Reconcile numerical information from different sources	
Competency Definition	Reconcile data from one source (e.g. ledger or accounts book) and compare with other sources (e.g. bank statement, report) to confirm accuracy or to identify errors if any.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	Check the numbers from different sources to avoid repetition or	

	<p>miscompute in daily transactions;</p> <p>Verify data from various sources such as comparing the bank statement with the record statement.</p>	
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Use arithmetic to do computation, analyse data and verify balances; • Use computer to do calculation; • Read and understand a financial record; • Keep a record of regular transactions. 	
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Add and subtract the total amount; • Use computers to do calculation on a spread sheet; • Identify the difference in number and/or amount; • Identify any missing numbers; • Differentiate the numbers (e.g.:1,000,000,000 \neq 100,000,000); • Apply critical thinking. 	

2. DATA INTERPRETATION AND ANALYSIS

Competency Type	2.1 Collect and organise data	
Competency Title	2.1.1 Collect, generate and verify data accuracy	
Competency Definition	Collect data in accordance with requirements and accurately verify the type of data, the validity, and category.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	Collect or gather data from required source; Verify whether the data is valid or invalid; Organise information into tables.	Identify and verify data accurately from various sources; Use and interpret data in particular situations at the workplace; Remove incomplete or inaccurate data Confirm completeness and accuracy of data.
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> How to collect, sort and record data; How to cluster data based on the type, locations, gender, age and other variables. 	<ul style="list-style-type: none"> How to verify data accurately; Interpret information and present it in tables; Differentiate the type of data whether it is qualitative or quantitative.
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> Record data from two different sources; Recognise the type of data and group it accordingly. 	<ul style="list-style-type: none"> Verify data from various sources; Identify the groups for classification of different types of data.

Competency Type	2.2 Analyse data	
Competency Title	2.2.1 Organise, identify and classify the type of data	
Competency Definition	Organize, identify and accurately classify data based on the type such as qualitative, quantitative, temporal and spatial data.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	<p>Prepare simple tables and graphs;</p> <p>Identify the type of data;</p> <p>Classify basic data based on the type such as qualitative data or quantitative data from different sources that provide in a range of particular situations;</p> <p>Identify and name the x-axis, y- axis and the title.</p>	<p>Verify and confirm data classifications including qualitative, quantitative, temporal, spatial, etc.</p>
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<p>How to organize, identify and use simple data on a table;</p> <p>Classify and distinguish the qualitative data and quantitative data.</p>	<p>Differentiate the type of data based on classifications.</p>
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<p>Record and gather data from various sources;</p> <p>Recognize the type of data and group it accordingly.</p>	<p>Identify and classify data.</p>

Competency Type	2.3 Represent data using diagrams	
Competency Title	2.3.1 Create and choose the most appropriate graph or chart	
Competency Definition	Effectively and accurately create graphs and charts such as line graph, bar chart and pie chart based on the data provided, and choose the graph that best suits the type of data and the purpose.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	Create an appropriate graph based on the data provided from different sources; Calculate/Determine and interpret mean, median mode, and range; Calculate for weighted average.	Represent, illustrate and interpret data on the graph; Determine and interpret, variance and standard deviation;
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • How to describe and interpret the data using the appropriate language (e.g.: increase/decrease, stable, peak); • Read and sketch the graph; Define and understand the mean, media and mode; • Different types of charts/graphs and their use; • Relationship between table of data and a chart/graph; • Concepts of mean, median and mode; • Understand the weighted average. 	<ul style="list-style-type: none"> • Use and solve for frequency table in workplace situations; • Understand and apply the language of change such as rapidly/slowly, gradually/dramatically; • How to use formulas to find variance and standard deviations; • Choose the most appropriate chart for a given dataset (pie chart OR line graph OR bar graph).

Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Calculate and determine the mean, median and mode; • Analyse the simple graph. 	<ul style="list-style-type: none"> • Calculate and determine the range, variance and standard deviations; • Interpret the data on a graph and make a summary.

Competency Type	2.4 Use and interpret data	
Competency Title	2.4.1 Write about data and its interpretation	
Competency Definition	Appropriately use the language of describing the graph such as increase/decrease, stable or peak to interpret data on the graph.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	<p>Read and understand the graph to represent a data set from a certain period of time;</p> <p>Use the correct language to explain the graph (e.g.: increase/ decrease, stable, peak).</p> <p>Summarise using percents and ratios</p>	<p>Make comparisons across categories (e.g.: Bar chart, line graph or pie chart);</p> <p>Calculate and analyse the percentage changes from a certain period of time;</p> <p>Use the frequency table to display data on a graph; Analyse the data on a graph or pie chart and make a comparison;</p> <p>Use the correct language to express and explain the changes in values on a graph (increase/decrease rapidly/slowly, gradually/dramatically, accounted for);</p>

		Summarise data by means of percents, percentiles, rates and ratios;– Percentiles and rates in Level 2) Identify limitations with the given datasets.
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> How to describe and interpret the data using the appropriate language (e.g.: increase/decrease, stable, peak). 	<ul style="list-style-type: none"> Use and solve for frequency table in workplace situations; Understand and apply the language of change such as rapidly/slowly, gradually/dramatically.
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> Analyse the simple graph; Use appropriate language to interpret data on a graph. 	<ul style="list-style-type: none"> Interpret the data on a graph and make a summary.

Competency Type	2.4 Use and interpret data collection	
Competency Title	2.4.2 Analyse and interpret data on the graph before drawing a conclusion	
Competency Definition	Analyse data and interpret the result to develop the conclusion.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	Read and understand the graph to represent a data set from a certain period of time;	Make comparisons across categories (e.g.: Bar chart, line graph or pie chart);

	Use the correct language to explain the graph (e.g.: increase/ decrease, stable, peak) and draw a conclusion;	Calculate and analyse the percentage changes from a certain period of time; Analyse the data on a graph or pie chart and make a conclusion Use the correct language to express and explain the changes in values on a graph (increase/decrease rapidly/slowly, gradually/dramatically, accounted for).
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • How to describe and interpret the data using the appropriate language (e.g.: increase/decrease, stable, peak); • Comparisons of different scales and units of data; • Comparisons across different types of charts/graphs; • Trends on graphs; • Compositions of totals using charts/graphs. • How to draw a conclusion from the data provided. 	<ul style="list-style-type: none"> • Use a frequency table in workplace situations; • Understand and apply the language of change such as rapidly/slowly, gradually/dramatically; • How to calculate percentage changes over time in relation to trends; • How to calculate distribution of percentages for the composition of different variables and total.
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Analyse the simple graph. • Draw a conclusion 	<ul style="list-style-type: none"> • Interpret detailed data on a graph and make a summary. • Write a report

Competency Type	2.5 Use computer-based tools to complete data collection and data interpretation	
Competency Title	2.5.1 Use spread sheet on MS Excel to input, update, and/or analyse a set of data	
Competency Definition	Appropriately use MS Excel program to gather data, input, and update information to support the data analysis.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	Use MS Excel spread sheet to input data with the different types of variables; Identify the different type of data in each sheet.	Link charts to datasets for automatic updates in Ms Excel using computer base tools such as sorting, ordering
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> Understand the tools on MS Excel and the language. 	<ul style="list-style-type: none"> How to link data to charts/graphs in MS Excel.
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> Use and apply basic formulas on the spread sheet such as Addition, subtraction, multiplication, division, SUM and AVERAGE; Label the name of the title, x-axis and y-axis in a spread sheet; Use and apply percentages on the spread sheet; Apply sort and filter the data on a table. 	<ul style="list-style-type: none"> Checking and verifying data updates.

Competency Type	2.5 Use computer-based tools to complete data collection and data interpretation	
Competency Title	2.5.2 Use the most appropriate diagram including tables and graphs to represent a dataset	
Competency Definition	Use data provided to produce diagrams that accurately and completely represent the dataset, through appropriate MS Excel tools.	
	Level 1 Fundamental	Level 2 Extended
Performance	At Fundamental Level, the following performance is required:	At Extended Level, the following performance is required:
	Use MS Excel spread sheet to input data, make a table and create a chart accordingly.	Update data automatically by linking charts in MS Excel to dataset; Use the most appropriate chart to represent dataset on spread sheet.
Knowledge	The following knowledge is required to perform the above at Fundamental Level:	The following knowledge is required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • How to use computer and MS Office; • Understand the tools on MS Excel. 	<ul style="list-style-type: none"> • How to choose and use the most appropriate diagrams.
Skills & Attributes	The following abilities are required to perform the above at Fundamental Level:	The following abilities are required to perform the above at Extended Level:
	<ul style="list-style-type: none"> • Use and edit graphs accordingly. 	<ul style="list-style-type: none"> • Present data accurately and appropriately in a graph.

PART III

GLOSSARY

Term	Definition
a.m.	Before noon. Latin for Ante Meridiem
Actual	The correct answer
Addition	To find the total of more than one amount, e.g. $14 + 10 = 24$
Analysis of data	To make statements about a set of data based on interpretation of the results
Analog Clock	Uses the position of clock hands and numbers to display the time
Annual	Occurs once every year
Area	The amount of surface space an object covers, measured using non-standard and standard units
Average	The numerical result of dividing the sum of two or more quantities by the number of quantities
Bank statement	An online or printed summary of a bank accounts balance at a point in time. It gives details of all transactions including money paid in out as well as any interest earned, depending on the type of account
Bar Chart/Bar Graph	A bar graph (also bar chart) is a graphical display of data using bars of different heights. They can also be displayed horizontally
Basic operation	Basic operation such as addition, subtraction, multiplication and division
BIDMAS	A way of remembering the order in which operations are carried out. It stands for Brackets - Indices - Division - Multiplication - Addition - Subtraction
Budgeting	Budgeting is an important process for individuals, families, organisations and government when making financial decisions
Calculate	To work out the value of something. This does not have to mean you need a calculator
Calendar	A visual display showing months, weeks and days. A calendar can be used to support time management
Capacity	The maximum amount of space an object/container can hold e.g. its maximum capacity its 2 litres. Capacity is measured in ml
Currency	The system of money generally used in a particular country
Data	A collection of facts, such as numbers, words, measurements, observations
Decimal number	Fraction with a denominator of 10, 100, 1,000, etc., written using a decimal point
Difference	That which results from subtraction

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Digit	The symbols used to make numerals (numbers). 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are the ten digits used in our number system
Digital Clock	Uses numbers and symbols to display the time e.g.03:30, 17:45
Division	To find the number of group an amount can be split equally in to
Draw conclusions	To make statements about a set of data based on results
Estimation	A "reasonable" guess. Predicting solutions and checking the accuracy of calculations
Exchange rate	The amounts you multiply your own currency by change it in to a different currency
Formula	A rule or equation describing the relationship of two or more variables or quantities, e.g. $A = \pi r^2$
Fraction	A way of writing rational numbers (numbers that are not whole numbers), also used to represent ratios or division, in the form of a numerator over a denominator, e.g. $\frac{3}{5}$ (a unit fraction is a fraction whose numerator is 1)
Frequency	How many times something happens. Another word for 'total'
Frequency table	A table used to note tally marks and show frequencies of each item
Interest	Money charged for borrowing money, or money earned for saving money, usually stated as a percentage, e.g. 4.95%
Labelling	The labels on graphical representation which give further information about the data
Length	How long something is from end to end. The distance from one point to another
Line Graph	A graph that shows information that is connected in some way-such as change over a period of time
Loan	Something that is borrowed (Usually money) and need to be paid back, usually with interest on top
Mass	A large body of matter with no definite shape. The amount of matter in an object
Mean	The average of a number of items in a group (total the items and divide by the number of items)
Median	The middle item in an ordered group. If the group has an even number of items, the median is the average of the two middle terms
Mode	The value that occurs most often
Multiplication	To find the product of more than one amount, e.g. 4×3
Natural number	A counting number
p.m.	After noon. Latin for Post Meridiem
Percentage	A common fraction with 100 as its denominator
Perimeter	The distance around a shape

Public Finance Management Competency Standards for Numeracy

Pie Chart	A chart which uses "pie slices" to show relative sizes of data
Proportion	Written as two equal ratios. For example, 5 is to 4 as 10 is to 8, or $5/4 = 10/8$
Qualitative	Descriptive information
Quantitative	Numerical information
Range	The largest number take away the smallest value in a set of data
Ratio	A comparison between two numbers or symbols. May be written $x:y$, x/y , or x is to y
Real numbers	All numbers (including natural numbers, integers, decimals, rational numbers and irrational numbers) which do not involve imaginary numbers (multiples of the imaginary unit i , or the square root of -1), may be thought of as all points on an infinitely long number line
Round	To reduce the amount of significant figures or decimal places a number has. For example £178 rounded to the nearest £10 is £180
Scale	The intervals that are used on a graphical representation of data e.g. a scale which rises in ones or in tents, etc.
Solid	A 3D shape
Solve	To find the missing value in an equation
Subtraction	To find the difference between two amounts, or the remainder, e.g. The difference between 12 and 7 is 5 a $12 - 7 = 5$
Sum	The answer when two or more values are added together
Time	Measured in seconds, minutes, hours, etc., to help measure durations, passing of time and order events
Trends	The overall picture of a set of data over time, e.g. the temperature is rising over time
Units	A quantity used to describe a measurement. Examples are kilograms, meters and centilitres
Value	A numerical amount or quantity
Variable	A symbol that stands for a number
Volume	The amount which can be held, as measured in cubic units
Whole number	Any number from zero e.g. 0, 1, 2, 3 (no negative numbers or fractions)
x-axis	The horizontal axis on a coordinate graph
y-axis	The vertical axis on a coordinate graph