

**SUBJECT: Mathematical Literacy**  
**GRADE 12 WEEKENDS REVISION STUDY GUIDE**  
**TERM 1**  
**2019**

**Topic 1**

Basic Calculations and Conversions

**Topic 2**

Financial Documents

**Topic 3**

Tariffs, Income and Expenditure

**Topic 4**

Interest, Loans and Investments

**Topic 5**

Data Handling

### Teaching Programme

**NB: Use a pencil to complete the programme as you teach**

Date	Topic	Duration	Date	Topic	Duration
	<b>Pre-Test</b>				
				<b>Post-Test</b>	

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S. Mandizira

Writers

T.M Majola

<b>LEARNER / TEACHER MANUAL</b>	
<b>ACTIVITY</b>	<b>DURATION:1hr</b>
<b>TOPIC : BASIC CALCULATIONS AND CONVERSIONS</b>	

<b>Activity 1</b>
<b>Rounding off</b>
1.1. <b>Round off the following as prescribed:</b> a) 1870 (to the nearest 50) b) 1481 (to the nearest 100) c) R3 267 988 (to the nearest million)
1.2 12,6 people can fit in a lift without going over the maximum weight restriction. What would your final answer be taking the context into consideration. Rounding up or down
<b>Ratios and proportions:</b>
1.3 Write the following ratios in simplest form: (a) 20 : 32 (b) 72 : 56 (c) 27 : 81
1.4 Write the following ratios in unit form: a) 25 : 75 b) 728 : 91 c) 107 : 11

<b>Activity 2</b>
<b>Conversions</b>

Marieka owns a coffee shop. She serves a mixed berry and almond polenta cake that is baked in espresso cups at her coffee shop. She uses the recipe below to make the cake.



### Mixed Berry and Almond Polenta Cake

Makes 15 espresso cups

#### Ingredients

6 eggs separated (keep the yolks for mayonnaise or scrambled egg)

140 g butter

140 g castor sugar

140 g ground almonds

250 g fat-free cottage cheese

75 g mixed frozen berries

25 g polenta

Bake at 356 °F until light brown, 30 to 40 minutes.


2.1.1	Express the baking temperature of 356 °F in °C. Use the formula: $^{\circ}\text{C} = (^{\circ}\text{F} - 32^{\circ}) \div 1,8$	(2)
2.1.2	Fat-free cottage cheese is sold in quantities of 125 g at R8,99. Calculate the cost of the fat-free cottage cheese required in the recipe.	(2)
2.1.3	Give, in simplest form, the ratio of polenta : mixed frozen berries.	(2)
2.1.4	An empty espresso cup weighs 116 g. Marieka uses an espresso cup to weigh the correct amount of castor sugar required in the recipe. Write down the reading on the kitchen scale when the correct amount of castor sugar is placed in the espresso cup.	(2)
2.1.5	Marieka places the cakes in the oven at 14:40. She takes the cakes out of the oven after 35 minutes. Determine the time at which she took the cakes out of the oven.	(2)

2.1.6	Given that 1 kg = 2,2 lb. (pounds), express the amount of ground almonds required in the recipe in pounds.	(2)
2.1.7	How many grams of mixed frozen berries are required to make 20 espresso cups of mixed berry and almond polenta cake.	(2)

<b>LEARNER TEACHER/MANUAL</b>	
<b>ACTIVITY</b>	<b>Duration: 2hrs</b>
<b>TOPIC: Financial Documents</b>	

A financial document (also known as financial statement) is a formal record of financial activities of a business, person or other entity.  
 Everyday financial documents includes the following

1. Till Slips
2. Account Statements
3. Invoices and Receipts
4. Payslips
5. Quotations
6. Budgets
7. Loan agreements, etc.




**Worked Example 1: Pay Slip (15 minutes)**

The supervisor at Zoom Car wash has to report for duty 30 minutes earlier than the normal starting time, from Monday to Saturday but leaves work at the same time as other workers. He receives a monthly salary, works every Sunday and is paid overtime. Table 1 below shows a monthly salary slip (some data omitted) for the supervisor.

**TABLE 1: MONTHLY SALARY SLIP FOR THE SUPERVISOR**

<b>SALARY SLIP</b>	
Name of the Employer	Zoom Car Wash
Address	12 Stateway Welkom

		9460	
Name of the Employee		M Ncubuka	
ID No: 890106 5387 000		Employee No: 124567	
Position		Supervisor	
Payment period: 1 November 2017 to 30 November 2017			
	<b>RATE</b>	<b>TOTAL HOURS (hrs x days x weeks)</b>	<b>AMOUNT IN RAND</b>
Normal hours worked	21,93	....	<b>B</b>
Sunday hours (1,5 normal rate)	....	9 x 1 x 4	1 184,40
Overtime hours worked/ (1½ of normal rate)	....	0,5 x 6 x 4	350,88
<b>TOTAL Gross Salary</b>			6 272,16
UIF (1% of gross salary)			.....
<b>NET Salary</b>			<b>6 209,44</b>

[Source:

[www.zoomhandcarwash.com/](http://www.zoomhandcarwash.com/)

NOTE: Employer and employee each contribute a monthly amount of 1% of the employee's gross salary for UIF

Use TABLE 1 above to answer the questions that follow:

1.	Explain the term employer	
	<b>Solution: is the company/individual who offers work opportunities to pay ✓✓</b>	(2)
2.	State one benefit of contributing towards the UIF	
	<b>Solution: to give the employee a short term financial relief should he/she become unemployed. ✓✓</b>	(2)
3.	Calculate the hourly rate for Sunday hours	
	<b>Solution: <math>1\ 184,40 \div (9 \times 4 \times 1) \checkmark</math> OR <math>R\ 21,93 \times 1,5 \checkmark</math> <math>= R\ 32,90 \checkmark</math> <math>= R\ 32,90 \checkmark</math></b>	(2)
4.	Calculate :	
	a. The value of B	
	<b>Solution: <math>B = R\ 6\ 272,16 \checkmark - (R\ 1\ 184,40 + R\ 350,88) \checkmark</math> OR <math>B = 9 \times 6 \times 4 \checkmark \times 21,93 \checkmark</math> <math>= R\ 4\ 736,88 \checkmark</math> <math>= R\ 4\ 736,88 \checkmark</math></b>	(3)
	b. The total UIF amount that must be paid on behalf of M Ncubuka to the Department of Labour	
	<b>Solution: 1% gross salary = <math>R\ 6\ 272,16 - R\ 6\ 209,44 \checkmark</math> <math>= R\ 62,72 \checkmark</math> Total UIF amount = <math>2 \times R62,72</math> <math>= R\ 125,44 \checkmark</math></b>	(3)
		<b>[12]</b>



### Activity 1: Pay Slip (15 minutes)

Eunice is an employee at Emoya High School. Her daily working hours are from 07:30 to 15:00 from Monday to Friday. Her total daily hours worked includes a 20-minute tea break and 45-minute lunch break.

The following deductions are made from her gross monthly salary:

- 7,5% of her gross monthly salary for pension fund contributions
- UIF (Unemployment Insurance Fund) of 1% of her gross monthly salary
- PAYE (pay-as-you-earn) tax per tax bracket

Below is a copy of her salary advice that she received at the end of October 2013. Use the above information as well as the information provided on her salary advice to answer the following questions:

#### SALARY ADVICE

Company Name		Period	Date
Emoya High School P O Box 0111 Willows 9320		08	31/10/2013
Name of Employee: Mrs Eunice Mentoor	Identity Number 641028 0124 111	Employee number: 51111110	
INCOME			
Description	Hours	Hourly rate	Amount
Basic Salary	172,5	A	R7 452,00
Overtime worked (Mon – Fri)	0	75,80	R0 00
Overtime worked (Saturdays)	0	120,45	R0,00
Housing allowance			R 500,00
<b>GROSS SALARY</b>			<b>R7 952,00</b>
DEDUCTIONS			
Description			Amount
PAYE tax			R 393,00
UIF contributions			R79,52
Pension fund contributions			R596,40
<b>TOTAL DEDUCTIONS</b>			<b>R1 068,92</b>
<b>TAXABLE SALARY</b>			<b>R7 276,08</b>
<b>LEAVE DAYS DUE</b>	<b>18</b>	<b>NETT SALARY</b>	<b>R6 883,08</b>
Total Gross Remuneration	Total PAYE Tax	Total Medical and contributions	Total pension fund contributions
R63 616,00	R4 982,00	R0,00	R5 981,67

1. The new tax year, to which this salary advice is applicable, started on 1 March 2013  
Explain why the period on the salary advice is indicated as 08. (2)
2. Define the term gross salary (2)

3. Calculate her housing allowance as a percentage of her gross salary. (2)
  4. Show how the pension fund contribution of R596,40 was calculated. (2)
  5. Write down the total pension fund contribution she has made thus far for the current tax year. (2)
  6. Calculate the missing value of **A**. (2)
  7. Determine the difference between the overtime hourly rate paid for working during the week (Monday – Friday) and for working on Saturdays. (2)
- [14]**



**Worked Example 2: Budget and Quotations (25 minutes)**

1. In recent years households in South Africa have experienced a large increase in electricity costs. Mr Chan would like to replace his electric stove with a gas stove. He received quotations from The Alternative Heat Company (Option 1) and TG Gas Specialist (Option 2), as show below. Some information has been omitted.

**OPTION 1**

QUOTATION			
The Alternative Heat Company 375 Nelson Drive Upington 1826		DATE	23/04/2015
		INVOICE NUMBER	# 1431 B
		CUSTOMER ID	Won 283
Issued to: Mr RS Chan 23 Third Avenue Upington			
DESCRIPTION	QUANTITY	PRICE EXCLUDING 14% VAT	AMOUNT IN RAND
Defly DHG 121 gas stove	1	R2 893,86	R2 893,86
Empty 9 kg gas bottle	1	R394,74	R394,74
Refill 9 kg gas bottle	9 kg	R20,00 (per kg)	...
Internal installation (parts and gas certificate included)	1	R2 719,30	R2 719,30
Gas piping	2 m	R15,35 per metre	...
		SUBTOTAL	...
		14% VAT	...
		<b>TOTAL AMOUNT</b>	...

THIS QUOTATION IS VALID FOR 14 DAYS FROM THE ISSUE DATE.

**OPTION 2**

TG Gas Stove Specialist 37 Rooiness Street, Upington, 1826		
Quote : # 1416		Date: 25/04/2015
Issued to: RS Chan Mr 23 Third Avenue Upington		
ITEM DESCRIPTION	MEASUREMENTS	PRICE INCL. 14% VAT
Five-plate stove, each	900 mm	R3 499,00
Gas bottle cylinder, each	9 kg	R499,00
Refill 9 kg gas bottle cylinder, each	per 9 kg	R189,00
Hose and regulator set		R235,00
4 metal clips @ R3,50 each		...
Copper pipe @ R23,50/m	2 m	...
Installation by certified gas technician @ R350,00 per hour		...
Gas certificate		<b>R349,00</b>
<b>Total Cost (including VAT)</b>		...

**NOTE:** Installation of gas stove takes three hours.

[source:www.vertex42.com]

Use the quotations provided above to answer the questions that follow

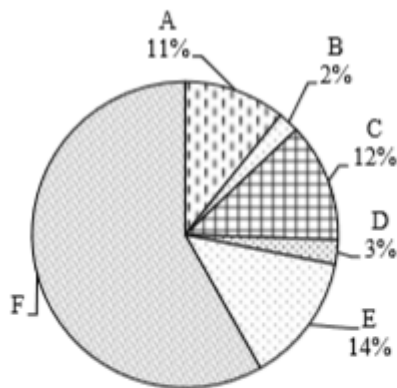
1.1	On which date will the quotation from The Alternative Heat Company expire?	
	<b>Solution: 07/05/2015 ✓✓</b>	(2)
1.2.	Calculate the total quotation amount for option 1	
	<b>Solution: R 893,86 + R 394,74 + R180 + R2 719,30 + R30,70 ✓</b>	



	$= R6\ 218,60 \checkmark$ <b>VAT</b> $R6\ 218,60 \times 14\% \checkmark$ $= R\ 870,60 \checkmark$  <b>Total amount = <math>R6\ 218,60 + R\ 870,60</math></b> $= R7\ 089,20 \checkmark$	(5)
1.3.	<p>Mr Chan estimates that the difference in total cost between the two options is less than R 1 000,00. Verify, showing ALL calculations, whether Mr Chan's estimation is valid.</p> <p><b>Solution:</b>  <b>Total cost = <math>R3\ 499,00 + R499,00 + R\ 189,00 + R\ 235,00 + (4 \times R3,50) + (2 \times R23,50) + (3 \times R\ 350,00 + R\ 349,00 = R\ 5\ 882,00 \checkmark \checkmark</math></b></p> <p><b>Difference in price = <math>R7\ 089,20 - R\ 5\ 882,00 \checkmark</math></b>  <math>= R\ 1\ 207,20 \checkmark</math></p> <p><b>Mr Chan's estimation is NOT valid. <math>\checkmark</math></b></p>	(5)
1.4.	<p>Give ONE reason why Mr Chan may choose the more expensive option.</p> <p><b>Solution: The brand of the gas stove/No time to shop around/The company will install the stove/Reputable dealer/After sales service <math>\checkmark \checkmark</math></b></p>	(2)

2. The Mangaung Metropolitan Municipality receives funding for its capital projects from various sources. The pie charts below show the various sources of funding and the capital expenditure for projects during 2011/2012.

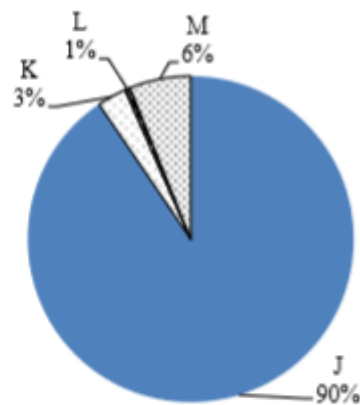
**PIE CHART X:  
FUNDING SOURCES  
FOR 2011/2012**



**Key: FUNDING SOURCES**

A	Municipal infrastructure grant
B	Department of Minerals and Energy grant
C	Capital replacement reserves
D	Public contributions and donations
E	External loans
F	Other grants and subsidies

**PIE CHART Y:  
CAPITAL EXPENDITURE  
FOR PROJECTS FOR  
2011/2012**



**Key: PROJECTS**

J	Infrastructure
K	Sports fields
L	Recreation facilities
M	Other

[Adapted from [www.mangaung.co.za](http://www.mangaung.co.za)]

2.1.	Identify the second biggest funding source that contributes to the municipality's budget for capital projects. <b>Solution: External Loans</b> ✓✓	(2)
2.2.	Calculate the percentage contribution of other grants and subsidies to the municipality's budget for capital projects. <b>Solution: <math>100\% - (11\% + 2\% + 12\% + 3\% + 14\%) = 58\%</math></b> ✓✓	(2)
2.3.	Calculate the value of the external loans if the total amount obtained from the funding sources was R587 646 376,00. <b>Solution:</b> <b>Value of External Loans = <math>14/100 \times R587\ 646\ 376</math></b> ✓ <b>= R82 270 492,64</b> ✓	(3)
2.4.	On which project did the municipality spend the least? <b>Solution: Recreation Facilities</b> ✓✓	(2)
2.5	The municipality has a contract to spend R28 401 736,00 of their funds on infrastructure. Write down this contract amount in words. <b>Solution</b> <b>Twenty-eight million, four hundred and one thousand, seven hundred and thirty-six rand.</b> ✓✓	(2)
		<b>[25]</b>

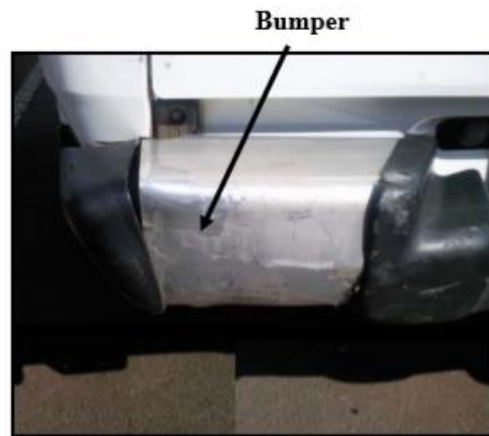
### Activity 2: Budget and Quotations (35 minutes)



1.1. Ms Vermaas had an accident with her bakkie. The left rear end on her vehicle was hit resulting in damage to the bumper and tail gate. Below are pictures of the damages to Ms Vermaas' bakkie.



**THE LEFT REAR END OF THE BAKKIE**



**ENLARGED PICTURE OF THE DAMAGED BUMPER**

She obtained quotations from three panel beaters (Gail's Panel Beaters, TBOS' Panel Shop and Dong's Panel Beaters) for the repair of the damages to the bakkie.

Each of the quotations (summarized below) lists the parts to be replaced, repair work and paint work. The quotations excluded 14% VAT.

GAIL'S PANELBEATERS			LABOUR COSTS			
Method	Parts/Description	Price in rand	Paint/Spray		Strip and Assemble	
			Hours	Total in rand	Hours	Total in rand
Strip	Strip and assemble				3,75	750,00
Paint	Rear bumper		1	850,00		
Replace	1 tailgate	5 348,26				
	1 L/Rear bumper	298,35				
	1 L/Rear bumper end	368,17				
	1 centre bumper rubber	584,75				
<b>Total Parts Costs</b>		<b>R6 599,53</b>	<b>Total Labour Costs = R1 600,00</b>			

TBOS' PANELSHOP			LABOUR COSTS			
Method	Parts/Description	Price in rand	Paint/Spray		Strip and Assemble/Repair work	
			Hours	Total in rand	Hours	Total in rand
Strip	Strip and assemble				2,5	400,00
Paint	Repaired areas		1	1 000,00		
Replace	Towbar cover	514,08				
	Towbar centre step	505,22				
	Towbar ends	638,36				
Repair	Tailgate				5,0	800,00
	Towbar				3,75	600,00
<b>Total Parts Costs</b>		<b>R1 657,66</b>	<b>Total Labour Costs = R2 800,00</b>			

DONG'S PANELBEATERS			LABOUR COSTS			
Method	Parts/Description	Price in rand	Paint/Spray		Strip and Assemble	
			Hours	Total in rand	Hours	Total in rand
Strip	Strip & assemble				3,5	700,00
Paint	Repaired areas		2	1 800,00		
Replace	1 tailgate	5 348,26				
	1 tailgate badges	749,13				
	1 rear bumper and tow hitch	2 592,50				
<b>Total Parts Costs</b>		<b>R8 689,89</b>	<b>Total Labour Costs = R2 500,00</b>			

An additional amount has to be added to each quotation for sundries and consumables.

Sundries: administrative cost like telephone calls made to client and suppliers.

Consumables: cleaning materials.

1.1. What does VAT stand for? (2)

1.2. Without doing any calculations, Ms Vermaas stated that Dong's panel Beaters charged the lowest hourly rate to strip and assemble the bakkie. Verify, showing calculations, whether her statement is CORRECT (6)

- 1.3. Gail's Panel Beaters quoted a final total amount of R9 497,93 (including VAT) which included the amount charged for sundries and consumables. Calculate the amount, excluding VAT, charged for sundries and consumables. (6)

2. Ulwazi and Ami are engaged and plan to get married. They are planning their wedding reception. They plan to invite 67 couples and 15 single persons as the only guests to the reception. The table below is an extract from the budget for the wedding reception.

**TABLE 1: Extract from the budget for the wedding reception**

<b>Reception costs</b>	
Venue	R22 100
Catering	R34 200
Drinks	R7 650
Wedding Cake	R2 500
<b>Subtotal</b>	<b>R66 450</b>
<b>Other expenses</b>	
Flowers and decorations	....
.....	....
<b>Subtotal</b>	<b>....</b>
<b>TOTAL BUDGETED AMOUNT</b>	<b>R125 000</b>


[www.coinmill.com]

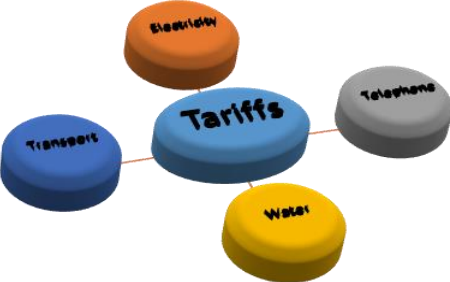
Currency: 1 rand = 0,32253 Ghanaian cedi (GHIC)

Use the table above to answer the following questions

- 2.1. Determine the total number of guests they plan to invite to their wedding reception. (2)
- 2.2. Show how the catering cost was determined if the cost per person is R 225,00 (2)
- 2.3. Express the total reception cost as a percentage of the total budgeted amount. (2)
- 2.4. Calculate the cost of the flowers and decorations if it is 1,8% of the total budgeted amount. (2)
- 2.5. Ami's father, who lives in Ghana, offers to contribute 30 000 Ghanaian cedi towards the wedding reception costs. Determine the amount in rand that Ulwazi and Ami will have to contribute to the reception costs to meet the overall budgeted amount. (4)
- 2.6. Ulwazi's father offered to pay for Ami's wedding ring, which costs R1 349,00 excluding 14% VAT. Calculate the selling price (rounded off to the nearest cedi) of Ami's wedding ring, including VAT. (5)
- 2.7. Identify ONE expense, other than flowers and décor that could be included in the budget and briefly explain this expense. (2)

<b>LEARNER TEACHER/MANUAL</b>	
<b>ACTIVITY</b>	<b>Duration: 3hrs</b>
<b>TOPIC: Tariffs</b>	
<p>A tariff is a charge in Rands per measuring unit for a specific service, such as electricity, water and telephone calls.</p> <ul style="list-style-type: none"> <li>- Water consumption is measured by kilo litres (<i>Kl</i>), electricity consumption in kilowatt-hours (<i>kWh</i>) and cellphone airtime in minutes or seconds</li> </ul> <p>Tariffs are NOT always constant                  The formulae for calculating the total cost is:  <b>Total cost = number of units x tariff (cost per unit)</b></p>	







**Worked Example 1: Water and Electricity (40 minutes)**

1. The table below indicates the example of sliding scales for water tariffs

<b>Residential (all tariffs are VAT exclusive)</b>		
Up - 6 kl	First 6 kl	Free
> 6 kl - 10 kl	Next 4 kl	R5,21 per kilolitre
> 10 kl - 15 kl	Next 5 kl	R7,87 per kilolitre
>15 kl - 20 kl	Next 5 kl	R10,52 per kilolitre
>20 kl - 30 kl	Next 10 kl	R13,38 per kilolitre
>30 kl – 40 kl	Next 10 kl	R13,97 per kilolitre
>40kl	Over 40 kl	R16,96 per kilolitre

1.1. If Sarah used 21kl of water during a certain month. Calculate the total cost using the table above

**Solution:**

$$6 + 4 + 5 + 5 + 1 = 21$$

- the first 6 kl @ R0,00 = R0,00 ✓
  - the next 4 kl @ R5,21/kl = R20,84 ✓
  - the next 5 kl @ R7,87/kl = R39,35 ✓
  - the next 5 kl @ R10,52/kl = R52,60 ✓
  - the next 1 kl @ R13,38/kl = R13,38 ✓
- Total 21 kl = R126,17 ✓**

(6)

2. Use the tariff structure for water to complete the table below:

Quantity/block × rate	Total Cost per block	Total Volume of water used
6 kl @ R0,00		
___ @ R8,35	R75,15	
15 kl @ ___		30 kl
___ @ R12,53	R187,97	

2.1. Copy and complete the table above.

**Solution:**

Quantity/block × rate	Total Cost per block	Total Volume of water used
6 kl @ R0,00	<b>R0,00</b> ✓	<b>6 kl</b> ✓
✓ <b>9 kl</b> @ R8,35	R75,15	<b>15 kl</b> ✓
15 kl @ <b>10,16</b> ✓	<b>R152,40</b> ✓	30 kl
✓ <b>15 kl</b> @ R12,53	R187,95	<b>45 kl</b> ✓

(8)

2.2. Calculate what a homeowner would pay for 42 kl of water using the table below:

<b>Residential (all tariffs are VAT exclusive)</b>	
≤ 6 kl	Free
6 kl < x ≤ 10 kl	R8,35 per kl
15 kl < x ≤ 30 kl	R10,16 per kl
30 kl < x ≤ 45 kl	R12,53 per kl
45 kl < x ≤ 60 kl	R12,98 per kl
>60 kl	R14,34 per kl

**Solution:**

$$6 \times R0,00 = R0,00 \quad \checkmark$$

$$9 \times R8,35 = R75,15 \quad \checkmark$$

$$15 \times R10,16 = R152,40 \quad \checkmark$$

$$12 \times R12,53 = R150,36 \quad \checkmark$$

$$\text{Total cost} = R0,00 + R75,15 + R152,40 + R150,36 \checkmark \\ = R377,91 \quad \checkmark$$

(6)

2.3. On average, Joe pays R200 for water each month. Calculate his average water consumption.

**Solution:**

Joe gets 6 for free, the next 9 kl cost him R75,15, which leaves him with ✓

$$R200,00 - R75,15 = R124,85 \quad \checkmark$$

$$\text{Then } R124,85 \div 10,16 \checkmark = 12,288 \text{ kl } \checkmark$$

Therefore, his average water consumption is 6 kl + 9 kl + 12,288 kl = 27,29 kl ✓

(5)

3. The table below indicates the tariffs for Emfuleni Local Municipality for 2015/16  
**Emfuleni Local Municipality**

	<b>Household (all tariffs are VAT exclusive)</b>	
<b>Block 1</b>	0 - 50 KWh	R0,8375 per KWh
<b>Block 2</b>	51 - 350 KWh	R0,9440 per KWh
<b>Block 3</b>	351 - 600 KWh	R1,2629 per KWh
<b>Block 4</b>	Over 600KWh	R1,5156 per KWh

3.1.	<p>How much will Thabo pay for 350 kWh of electricity?</p> <p><b>Solution:</b>  <b>1<sup>st</sup> 50kWh</b> : <math>50 \times R0,8375</math>  <math>= R41,875 \checkmark</math></p> <p><b>Next 300kWh</b> : <math>300 \times R0,9440</math>  <math>= R283,20 \checkmark</math></p> <p><b>Total cost</b> = <math>R41,875 + R283,20 \checkmark</math>  <math>= R325,075</math>  <math>\approx R325,08 \checkmark</math></p>	(5)
3.2.	<p>If VAT is charged at 15%, how much will Thabo pay in total?</p> <p><b>Solution:</b>  <math>R 325,08 \times 1,15 \checkmark</math>  <math>= R373,84 \checkmark</math></p>	(2)

4. Mr Benny Bunckle, a resident in the Dikwena Municipality, has a flat rate electricity system in his house. He receives the following electricity bill for January.

<b>ELECTRICITY BILL</b>					
Type of system: 3 Part flat rate – 60 AMP				Dikwena Municipality	
Account No.	Account Date	Enquiries		Fax	
00112371	31/01/2017	427-1914		427 - 1920	
Name	Street Address	Location		Type of Dwelling	
Mr Benny Bunckle	Hillside Road	Mpipi		Residential	
Date	Details	Charge/Tariff	Cost	VAT (15%)	Amount Due
31/01	<b>Electricity Consumption:</b> Reading in December: 376 912 kWh				
28/01	Current reading: 377 449 kWh				
	Consumption for January 537 kWh	31,5 c/Kwh	R169,16	R25,37	R194,53
	<b>Additional charges:</b>				
28/01	Fixed Service Fee	R58,80 per month		R8,82	R67,62
28/01	Fixed Network Charge	R20,20 per month		R3,03	R23,23
<b>Total Amount Due</b>					<b>R285,38</b>

At the end of February, the reading on Mr Bunckle's electricity meter is 377 957 kWh. Calculate the Total Amount Due by Mr Bunckle for his electricity consumption in February.

**Solution:**

**Consumption for February**

$$= 377\ 957 - 377\ 449 \checkmark$$

$$= 508\ \text{kWh} \checkmark$$

$$\text{Cost of electricity} = 508\ \text{kWh} \times 31,5\ \text{c/kWh} \checkmark$$

$$= 16\ 002\ \text{c} \checkmark$$

$$= R160,02 \checkmark$$

$$\text{Cost including VAT} = R160,02 \times 1,15$$

$$= R184,02 \checkmark$$

$$\text{Total due} = R184,02 + R67,62 + R23,23 \checkmark$$

$$= R274,87 \checkmark$$

(7)

[39]





### Activity 1: Water and Electricity Tariffs (45 minutes)

1. A certain municipality has the two different tariff structures for water. One structure is for normal times when there are no water restrictions. The other structure is for dry times with water restrictions, when people have to pay more for water.

		<b>Normal</b>	<b>With restrictions</b>
	<b>Usage (kl)</b>	<b>Charge per kl</b>	<b>Charge per kl</b>
1	0 - 6	R0,00	R8,35
2	+6 - 15	R8,35	R10,16
3	+15 - 30	R10,16	R12,53
4	+30 - 45	R12,53	R12,98
5	+45 - 60	R12,98	R14,34
6	60+	R14,34	R20

1.1	How much more would a household using 18 kl water have to pay during times when water restrictions are imposed?	(7)
1.2	If a household pay R200 for water during normal times, calculate the number of kl used. Round your answer off to the nearest whole number	(4)

2. Mr Tana received an account bill from the municipality. Study the table extracted from the municipality account statement showing the water amount to be paid and answer the questions that follow.

<b>Date</b>	<b>Service</b>	<b>Details</b>	<b>Charge</b> (excl. VAT)	<b>VAT</b>	<b>Charge</b> (incl. 15% VAT)
20/03/15	Water	Meter no.B- ZGD543 Tariff: Water Domestic Reading dates: Current (09/2/15) = 2 384 Previous (07/01/15)= 2 368 Water 16 kl	R184,66	-----	R212,36

#### WATER

WA 0100: 6 kl @ 9,941230  
 WA 0100: 4 kl @10,136180  
 WA 0100: 10 kl @14,077830  
 WA 0100: 10 kl @18,249050  
 WA 0100: 30+ @ 22,901530

#### DEBT COLLECTION ACTION

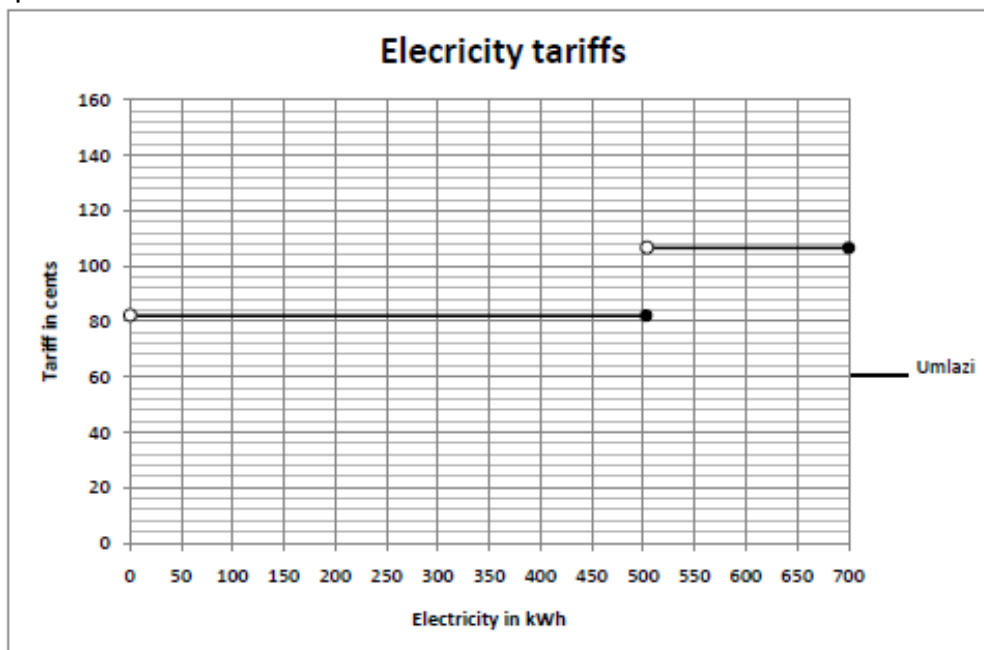
The supply of services may be discontinued if any amount is unpaid after the due date and the deposit may be reviewed simultaneously. Please note that the due date does not apply to overdue accounts.

2.1.	Calculate the amount of VAT (VALUE ADDED TAX) charged for the water tariff given in the table.	(2)
2.2.	Show how the total amount of R184,66 was calculated.	(4)

3. Study the tables below and answer the questions that follows:

Umlazi City Power – Tariffs and Charges (all rates are VAT exclusive)		Meloding City Power – Tariffs and Charges(all rates are VAT exclusive)	
0-300 kWh	R0, 8245 per kWh	0 - 150 kWh	64,93c per kWh
301 - 500 kWh	R0, 8245 per kWh	150,1 - 350 kWh	89,95c per kWh
501 - 1000 kWh	R1, 0715 per kWh	350,1 - 600 kWh	118,11c per kWh
1001 - 2000 kWh	R1, 0933 per kWh	More than 600 kWh	140,18c per kWh
2001 - 3000 kWh	R1, 1197 per kWh		
>3000 kWh	R1, 1337 per kWh		

- 3.1. If VAT is 15%, how much will 250 kWh cost in Umlazi (VAT inclusive)? (3)
- 3.2 Calculate the difference in costs (VAT exclusive) of 350 kWh of electricity in Umlazi and the same amount of electricity in Meloding. (8)
- 3.3. Fred buys electricity for R550 (excluding VAT) from Umlazi City Power. How many kWh of electricity does he receive? (4)
- 3.4. If Motlatsi (from Meloding) spends R550 (excluding VAT) on electricity, does he get more, the same or less kWh of electricity as Fred? Justify your answer, showing ALL calculations. (5)
- 3.5. The graph below indicates the tariffs (VAT excluded) for electricity up to 700 kWh from Umlazi. Use the same grid to draw the graph of the tariffs up to 700 kWh for Meloding. Work with prices excluding VAT in all the questions that follow.



- a. Write down the maximum quantity in kWh of electricity that users in (4)

both cities must use in order to pay the lowest tariff. (2)

b. In which interval does electricity in Meloding cost less than in Umlazi? (2)

[45]



**Worked Example: Transport and Cellphone Tariffs (50 minutes)**

1. Kim parks the car in a parking garage attached to the office block. The table below shows the costs for parking there for a given time period.

PARKING TARIFFS	
Number of hours	Cost
0 to 1 hour	FREE
1 to 3 hours	R4,00
3 to 5 hours	R6,00
5 to 7 hours	R8,00
7 to 9 hours	R10,00
More than 9 hours	R12,00
Saturday before 13:00	R5,00
Sundays and Public Holidays	FREE

1.1. On Tuesday, Kim arrives at 08:01 and leaves at 08:45 for a meeting. She returns to work at 12:15 and leaves again at 17:30. How much does she pay in total for the parking?

**Solution: 8:45 – 08:01 = 44 min**  
**This is less than an hour so the parking will be free ✓**  
**17:30 – 12:15 = 5 hours 15min ✓**  
**Then she will pay R8,00 for parking ✓**

(3)

1.2. Kim is charged R8,00 for parking from 08:45 to 13:35. Use the table above to determine if this charge is correct. Show ALL your calculations.

**Solution:**  
**13:35 – 08:45 = 4 hours 40 min ✓**  
**She should be charged the ‘3 to 5 hour’ rate, which is R6,00. ✓**  
**The charge of R8 is incorrect. She was overcharged by R2**

(2)

2. Marina wants to buy a new cellular phone and consider the following call packages:

Call Package 1	Call Package 2	Call Package 3
Monthly rental = R200,00	Monthly rental = R300,00	Monthly rental = R350,00
First 50 minutes free	First 200 minutes free	First 200 minutes free
Calls cost R1,00 per minute	Calls cost R1,00 per minute	Calls cost R2,50 per minute

The total cost for Call Package 1 is given by the following formula:

Total cost (in rand) = R200 + R1,00 x (number of minutes more than 50)

2.1.	Write down a formula which can be used to calculate the total cost for Call Package 2 <b>Solution:</b> <b>Total cost (in rand) = R300 + R1,00 x (number of minutes more than 200) ✓ ✓</b>	(2)																																																																
2.2.	Write down a formula which can be used to calculate the total cost for Call Package 3. <b>Solution:</b> <b>Total cost (in rand) = R350 + R2,50 x (number of minutes more than 200) ✓ ✓</b>	(2)																																																																
2.3.	Use the formula for Call Package 1, Call Package 2 and Call Package 3 to complete the table below  Comparing Call Package 1, 2 and 3 <table border="1" data-bbox="284 792 1142 1106"> <thead> <tr> <th>Duration of calls</th> <th>0</th> <th>50</th> <th>100</th> <th>150</th> <th>200</th> <th>250</th> <th>300</th> </tr> </thead> <tbody> <tr> <td>Cost of Package 1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Cost of Package 2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Cost of Package 3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <b>Solution:</b> <table border="1" data-bbox="304 1200 1197 1514"> <thead> <tr> <th>Duration of calls</th> <th>0</th> <th>50</th> <th>100</th> <th>150</th> <th>200</th> <th>250</th> <th>300</th> </tr> </thead> <tbody> <tr> <td>Cost of Package 1</td> <td>200</td> <td>200</td> <td>250</td> <td>300</td> <td>350</td> <td>400</td> <td>450</td> </tr> <tr> <td>Cost of Package 2</td> <td>300</td> <td>300</td> <td>300</td> <td>300</td> <td>300</td> <td>350</td> <td>400</td> </tr> <tr> <td>Cost of Package 3</td> <td>350</td> <td>350</td> <td>350</td> <td>350</td> <td>350</td> <td>475</td> <td>600</td> </tr> </tbody> </table>	Duration of calls	0	50	100	150	200	250	300	Cost of Package 1								Cost of Package 2								Cost of Package 3								Duration of calls	0	50	100	150	200	250	300	Cost of Package 1	200	200	250	300	350	400	450	Cost of Package 2	300	300	300	300	300	350	400	Cost of Package 3	350	350	350	350	350	475	600	(21)
Duration of calls	0	50	100	150	200	250	300																																																											
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Cost of Package 1	200	200	250	300	350	400	450																																																											
Cost of Package 2	300	300	300	300	300	350	400																																																											
Cost of Package 3	350	350	350	350	350	475	600																																																											
2.4.	Explain in words what happens at column (300; 150) on the table for Call Package 1 and Call Package 2. Also give a name for this point. <b>Solution:</b> <b>The total cost for Call Package 1 and Call Package 2 is the same. ✓ ✓</b>	(2)																																																																
2.5.	If Marina intends to use 250 minutes per month and wants to take the cheapest Call Package, which one must she choose? <b>Solution:</b> <b>Call Package 2 ✓ ✓</b>	(2)																																																																

3. Mrs Ndlovu has a landline telephone. A service provider has offered her a choice of two different call packages.

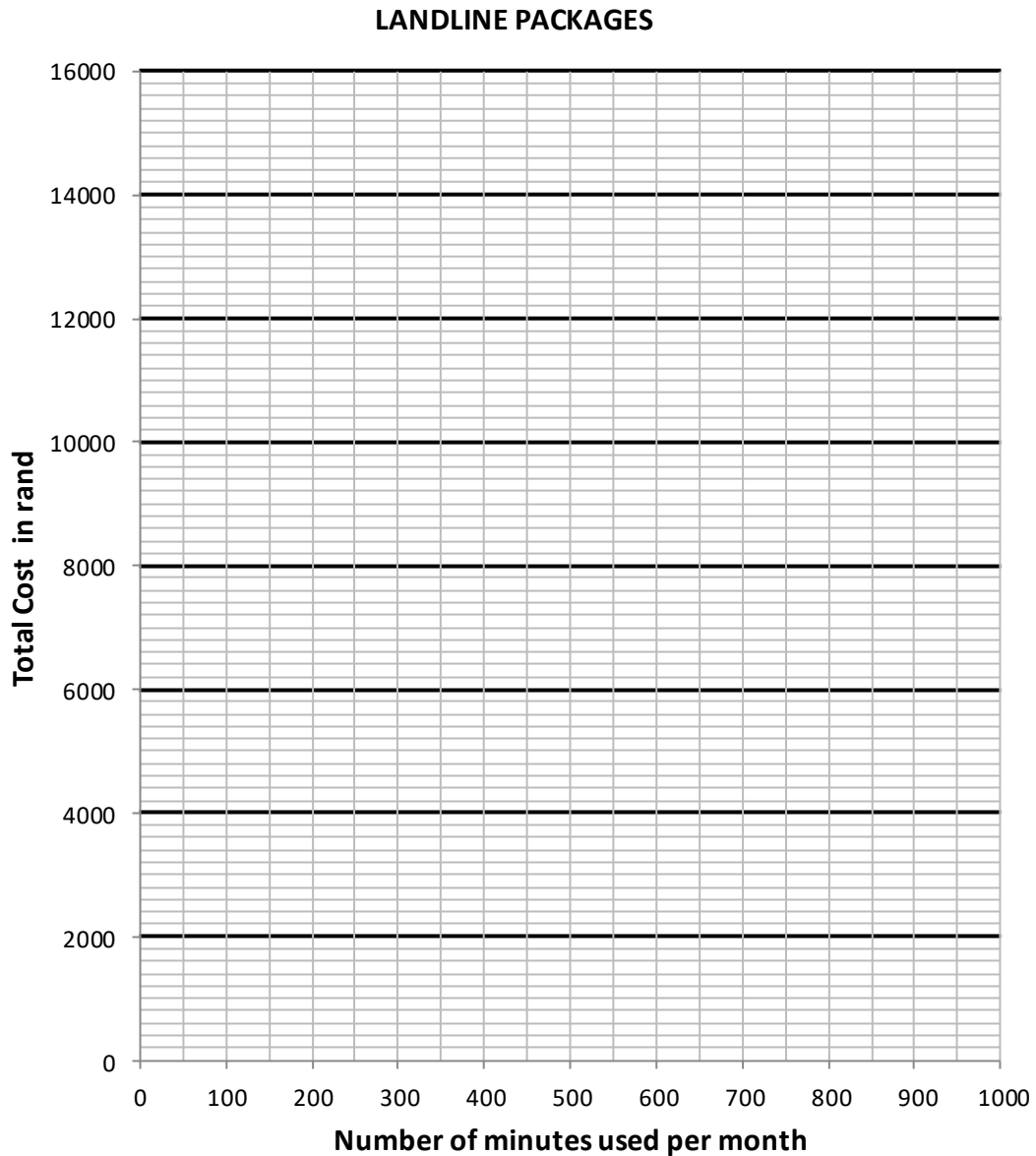
Call Package 1	Call Package 2
Monthly rental of R150	Monthly rental of R300
First 100 minutes are free	First 500 minutes
Calls cost R0,50 per minute	Calls cost R0,50 per minute

The total cost for Call Package 1 is given by the following formula:

$$\text{Total cost (in rand)} = R150 + R0,50 \times (\text{number of minutes more than 100})$$

3.1.	Write down a formula which can be used to calculate the total cost (in rand) for Call Package 2.  <b>Solution:</b> <b>Total cost (in rand) = R300 + R0,50 × (number of minutes more than 500)</b> ✓✓	(2)
3.2	If Call package 2 is used, determine the total cost, in rand, if Mrs Ndlovu and her family have made calls with a total duration of 510 minutes.  <b>Solution:</b> <b>Total cost (in rand) = R300 + R0,50 × (number of minutes more than 500)</b> <b>= R300 + R0,50 × (510 – 500) ✓</b> <b>= R300 + 5 ✓</b> <b>= R305 ✓</b>	(3)

3.3. Use the graph below to draw a line graph to illustrate the total cost for Call Package 1 and 2.



(6)

3.4. At what point will the cost of call package 1 be the same as call package 2?

**Solution: 400 min ✓✓**

(2)

3.5. Which call package is cheaper if Mrs Ndlovu makes 700 minutes' worth calls per month?

**Solution: Call package 2 ✓✓**

(2)

3.6. Which package would you recommend Mrs Ndlovu to purchase if she makes only 300 minutes calls per month?

**Solution: Call package 1 ✓✓**

(2)

**[51]**



### Activity 2: Transport and Cellphone Tariffs (35 minutes)

1. Pantsula has a landline contract known as Scamtho 250, which consists of the following monthly tariff system:

- A fixed monthly fee of R299,00
- 150 minutes free per month for landline-to-landline calls
- 100 minutes free per month for landline-to-cell phone calls
- 80 cents per minute (billed per second) for all calls outside the free minutes.



- 1.1. Calculate the cost of a 90-second call made after the free minutes have been exhausted. Give your answer in Rands. (3)
- 1.2. The table below shows Pantsula's variable costs for calls made.

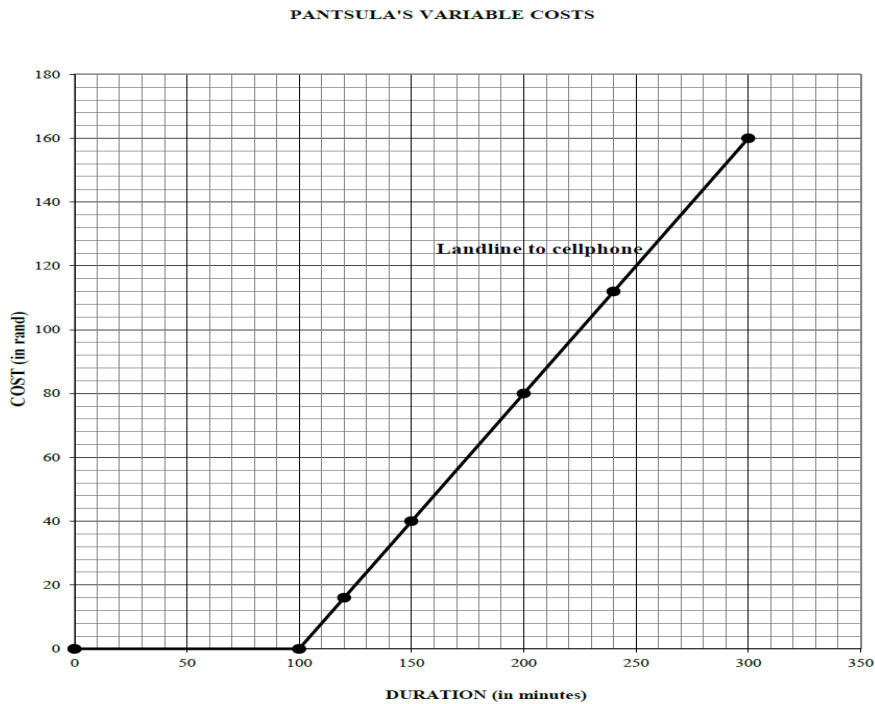
#### Pantsula's variable costs for calls made

Duration of calls (in minutes)	0	100	120	150	200	240	<b>R</b>
Costs for landline to landline (in Rands)	0	0	0	0	40	<b>Q</b>	120
Costs for landline to cell phone (in rands)	0	0	16	<b>P</b>	80	112	160

Calculate the missing values **P**, **Q** and **R**

(6)

- 1.3. The graph showing the variable costs for landline-to-cell phone calls has been drawn on the **ANNEXURE** below. Draw, on the same **ANNEXURE**, the graph showing the variable costs for landline-to-landline calls.



(4)

- 1.4. Determine Pantsula's total monthly cost if the owner used 200 minutes on landline-to-landline and 140 minutes on landline-to-cellphone calls. Use the formula:

$$\text{Total monthly cost} = \text{Fixed monthly cost} + \text{Variable cost} \quad (3)$$

2. Rafique is the driver of a metered taxi. The company he works for charges the following fare for a single trip.

- A minimum call-out fee of R50 per trip with the first three kilometres free.
- Thereafter, R12,00 for each additional kilometre or thereof

- 2.1. Write down an equation that Rafique can use to calculate the total cost (in rand) per single trip, in the form:

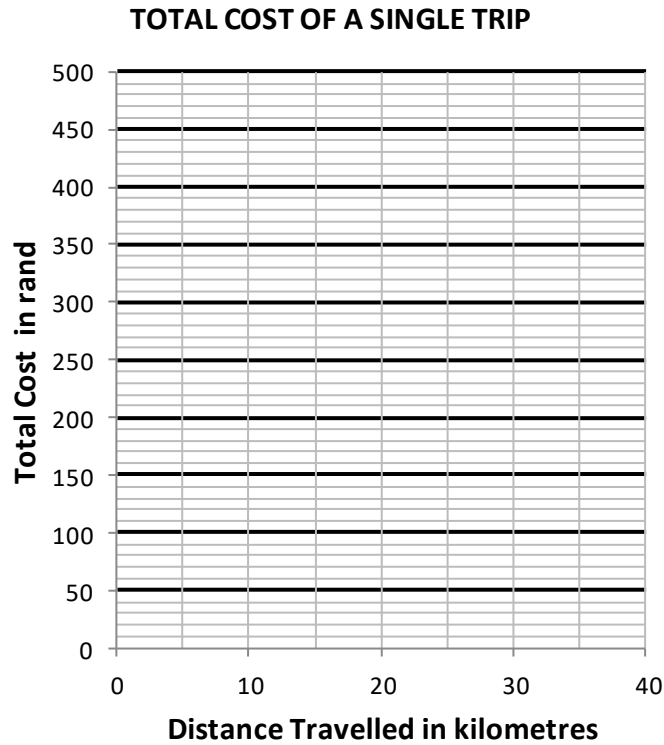
$$\text{Total cost (in rand) per single trip} = \dots\dots \quad (3)$$



- 2.2. The table below shows the total cost per single trip for different distances travelled.

Distance(km)	0	1	3	5	10	20	30
Total cost per single trip (in rand)	0	50	50	74	134	254	374

Use the table above to draw a line graph that shows the total cost per single trip. (5)



- 2.3. A client pays Rafique R1 214 for a single trip. Determine the distance travelled during this trip. (4)

- 2.4. Mrs Mkhize hires a taxi from this company to take her to a meeting venue 5 km from her home. The meeting is scheduled to take exactly ONE hour and she requests that the taxi wait for her to take her back home. The company charges an extra R100,00 per hour if the taxi has to wait for a client and a trip will be charged as a single trip.

Calculate the total taxi fare Mrs Mkhize will pay for this trip. (5) [33]

LEARNER TEACHER MANUAL	
ACTIVITY	DURATION: 2hrs
TOPIC: INCOME AND EXPENDITURE	
<p><b>Income</b></p> <ul style="list-style-type: none"> <li>Income is money coming into a household/business/government.</li> <li>There are 3 types of income:           <ul style="list-style-type: none"> <li>➤ <i>Fixed income (salary, wage, service charges, rentals, taxes etc)</i></li> <li>➤ <i>Variable income (commission, sales tariffs etc)</i></li> <li>➤ <i>Occasional income (bonus, gifts, loans, donations etc)</i></li> </ul> </li> </ul> <p><b>Expenditure</b></p> <ul style="list-style-type: none"> <li>Expenditure/expenses is money being spent or money going out of household/business/government.</li> <li>There are 3 types of expenditure:           <ul style="list-style-type: none"> <li>➤ <i>Fixed expenses (expenses that do not change eg rent, fees, loan repayment, contract payments etc)</i></li> <li>➤ <i>Variable expenses (expense that changes with quantity or time eg electricity, water, food)</i></li> <li>➤ <i>Occasional expenses (expenses that are infrequent eg broken car)</i></li> </ul> </li> </ul> <p><b>Budgets</b></p> <ul style="list-style-type: none"> <li>A budget is a list of <b>expected</b> income and expenditure.</li> <li>A budget surplus occurs when income is greater than expenditure (<b>profit</b>)</li> <li>A budget deficit occurs when income is less than expenditure (<b>loss</b>)</li> <li>A balanced budget is when income equals expenditure (<b>break-even</b>)</li> </ul> <p><b>Cost and Selling Price</b></p> <ul style="list-style-type: none"> <li>Cost price of a product is the cost of <b>manufacturing</b> or <b>buying</b> a product.           <ul style="list-style-type: none"> <li>➤ <i>Formula: <b>Cost Price = Selling Price – Profit</b></i></li> </ul> </li> <li>Selling price is the price at which product is sold.           <ul style="list-style-type: none"> <li>➤ <i>Formula: <b>Selling Price = Cost Price + Profit</b></i></li> </ul> </li> </ul> <p><b>Profit</b></p> <p>It is the difference between income and expenses or the difference between selling and cost price.</p> <p>Formula: Profit = Selling Price – Cost Price</p>	

$$\text{Profit} = \text{Income} - \text{Expenditure}$$

Note:  $\text{Income} = \text{selling price} \times \text{number of items}$

$\text{Expenditure} = \text{Fixed cost} + \text{cost price} \times \text{number of items}$

### Activity 1

1.1 The 2017 budget for ABC High School, is shown below.

#### Projected budget for ABC High School

Inco e	(R)	Expenditure	(R)
School fees	1 663 200	Salaries (SGB posts)	1 512
Donations	1 800	Curriculum material	121
Department grant	220 500	Computer maintenance	21
Bad debts recovery	11 250	Prize giving function	8
Cafeteria	10 800	Maintenance (grounds)	94
Interest received	1 089	School vehicle maintenance	39
Fundraising	9 250	Stationary	116
		Municipality (water etc.)	140
		Sport, Transport etc.	13
		Development	16
		Other expenses	15
<b>Total income</b>	<b>A</b>	<b>Total expenses</b>	<b>2 098</b>

<b>Surplus/ Deficit = Income - Expenditure</b>	<b>-180 475</b>
--	-----------------

Use the budget to answer the following questions:

- 1.1.1 For which year is the budget projected?
- 1.1.2 Give an example of a fixed expenditure in the budget.
- 1.1.3 Calculate the value of **A**.
- 2.4.4 Write down the ratio of Donations to Fundraising, in simplified form.
- 2.4.5 Define the term **deficit** as used in the budget.

**Activity 2**

Mrs Nchabeleng is having a business of manufacturing and selling the foam beds. The cost of the material used differs according to the size of bed. She pays her three employees who are manufacturing the beds R5500 per month and pays her administrator R5000.00 per month. She also pays R2500 for the rental of factory per month. The prices of the beds and cost for every size are shown below. The prices exclude transport costs.



Size	Double	Queen	King
Cost of material	R2500.00	R3698.00	R6885.20
Selling Price	R6000.00	R8 500.00	R10 000.00
<b>Prices are VAT inclusive.</b>			

- 2.1. Calculate the VAT exclusive selling price for the Queen size bed if VAT is at 15% (2)
- 2.2. Determine the VAT for the cost of material for manufacturing the king size bed if VAT is at 15% (4)
- 2.3. Determine her fixed costs per month. (2)

2.4 The business for the king and queen size beds has not been good. She decided to discontinue the manufacturing of the double and king size beds. The table below represents the income and cost for the Queen size beds.

<b>Queen</b>	0	1	2	4	5	<b>A</b>	7
<b>Cost (R)</b>	24000	26500	29000	34000	36500	39000	41500
<b>Income (R)</b>	0	8 500	17000	34000	42 500	51000	<b>B</b>

- 2.4.1. Determine the values of A and B. (3)
- 2.4.2. Write the formula for determining the income for selling (N) number of beds. (2)
- 2.4.3. Hence calculate the profit for selling 10 beds. (6)
- 2.4.4. How many beds must she sell to start making profit? (2)
- 2.4.5. The graph for the cost of manufacturing queen size beds has been drawn on Annexure A. Plot the graph representing the income for selling queen size beds on the same system of axis. (5)

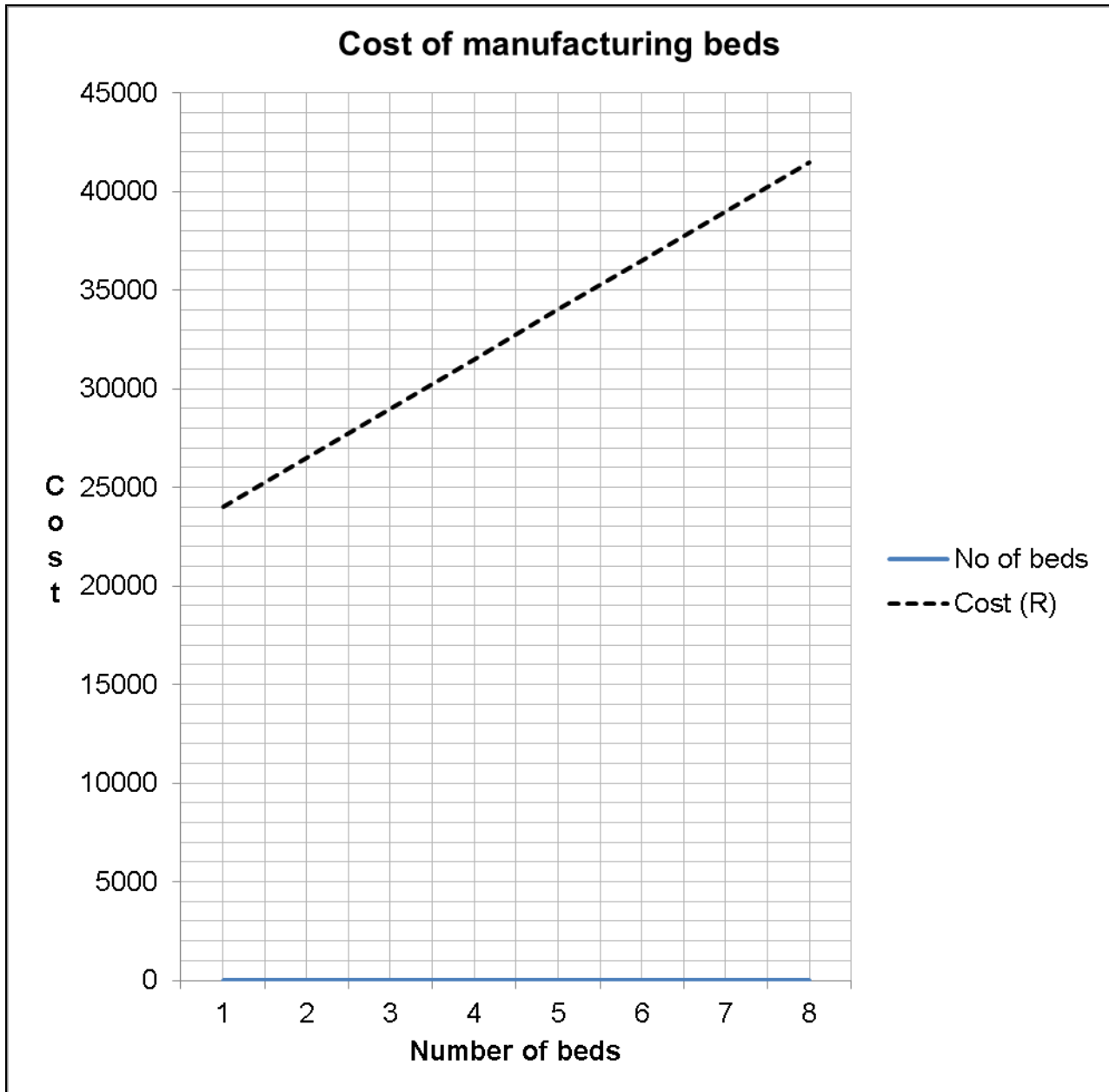
2.4.6. How many beds must she sell to break even?

(2)

**ANNEXURE**

**LEARNER:**

**GRADE:**



3.1

Tebogo decided to remove garden waste on Saturdays. She hired a bakkie and a trailer at R400 a day. She asked her friend James to help her. She pays James R300 per day.

**PHOTO 1: Hired trailer and bakkie**



3.1.1 Calculate Tebogo's daily fixed expenses. (2)

3.1.2 Tebogo has removed 80 drums and her variable expenses are R240. Calculate the variable expenses per drum. (2)

3.1.3 TABLE 2 below shows the ratio between the number of drums (with waste) and the total expenses.

**TABLE 2: Expenses of removal of waste drums**

Number of drums ( $n$ )	0	10	20	30	40	50	80
Expenses (C) in Rand	700	730	760	A	820	850	940

Use the above information and answer the questions that follow:

(a) Write down a formula in the form **Expenses (C) = .....** to determine the expenses (C) if a number of drums ( $n$ ) are removed. (2)

(b) Hence determine the value of A. (2)

(c) Determine the number of drums that were removed for R1 000. (2)

3.1.4 Tebogo receives R20 to remove 1 drum. On a certain day, she received R1 600. Calculate the number of drums she removed on that specific day. (2)

3.1.5 The graph of Tebogo's expenses (3.1.3) is drawn on the ANSWER SHEET provided. Now draw the graph of Tebogo's income for 3.1.4 above on the same set of axes and name the axes and the graph appropriately. (6)

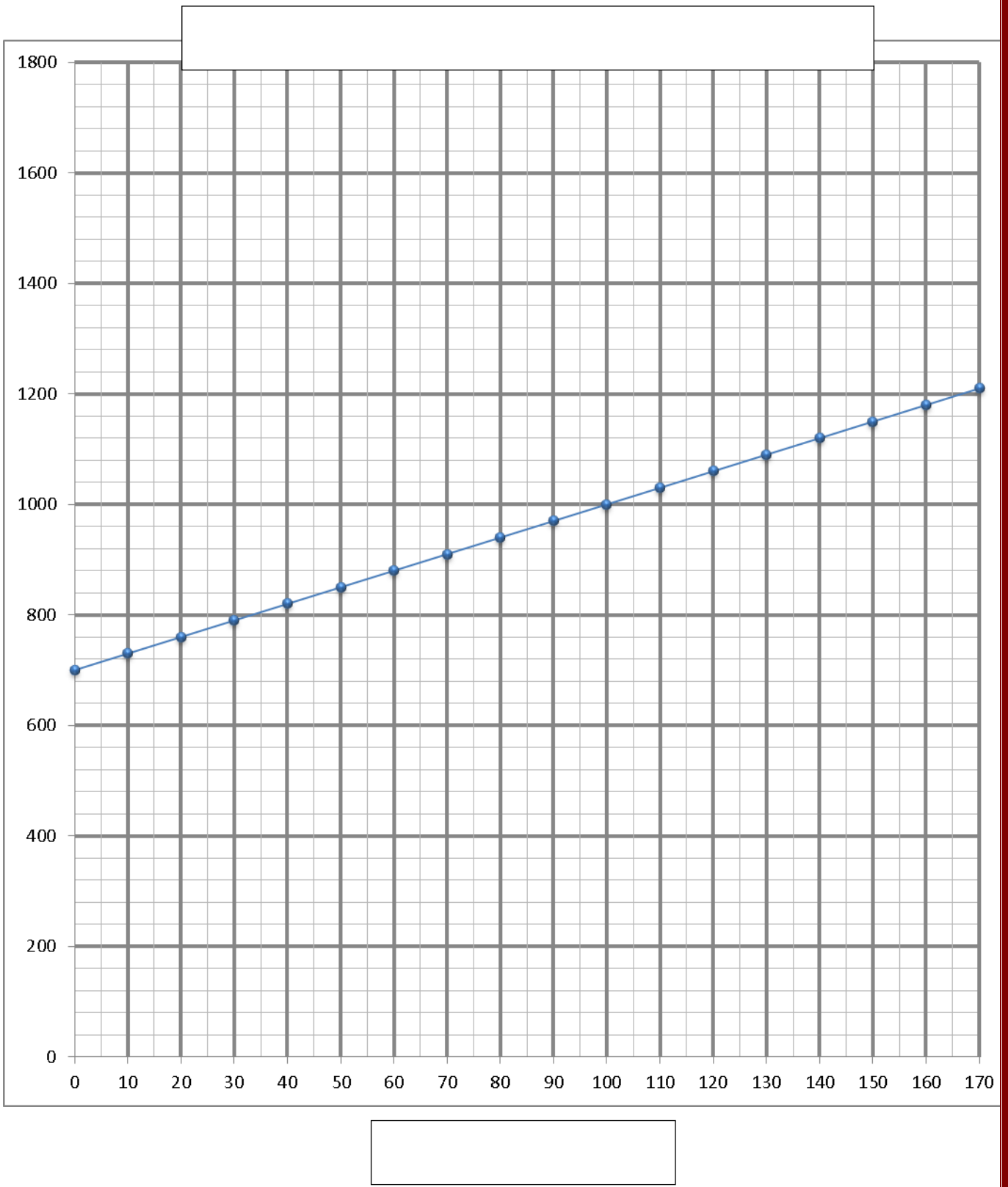
3.1.6 Use the following formula and determine the number of drums that should be removed to break even.

$$\text{Number of drums} = \frac{\text{Fixed expenses}}{\text{Income per unit} - \text{variable cost per unit}} \quad (3)$$

**ANSWER SHEET: QUESTION 3.1.5**

**NAME:** \_\_\_\_\_  
\_\_\_\_\_

**GRADE 12:**



<b>LEARNER TEACHER/MANUAL</b>	
<b>ACTIVITY</b>	<b>Duration: 40 min</b>
<b>TOPIC: HIRE PURCHASE</b>	
<b>Key Concepts/Terminology</b>	
<b>Interest:</b>	
<p><b>Hire purchase agreements</b> are used when customers don't have the full amount to purchase a product, usually appliances (e.g. TV's, washing machines, fridges etc) and cars.</p>	
<p>Customers are able to put down a deposit and then pay the remaining outstanding balance off by means of <b>monthly instalment repayment</b></p>	
<p>Often insurance is added onto a monthly repayment.</p>	
<p>Repayment period is usually 12; 24; 36; 48; or 60 months,</p>	

**Worked Example 1:**

1. Lerato buys a second-hand car worth R142 000. She pays a 15% deposit and the balance over 4 years using a hire purchase agreement. Calculate Lerato's monthly installment if interest is charged at 12,5% per annum. (7)

**Answer:**

$$\text{Deposit} = 15/100 \times R142\ 000 = R21\ 300 \checkmark \checkmark$$

$$\begin{aligned} \text{Outstanding balance} &= R142\ 000 - R21\ 300 \checkmark \\ &= R120\ 700 \checkmark \end{aligned}$$

$$\begin{aligned} \text{Interest charged} &= (12,5/100 \times R120\ 700) \times 4 \text{ years} \\ &= R15\ 087,50 \times 4 \checkmark \\ &= R60\ 350 \checkmark \end{aligned}$$

$$\begin{aligned} \text{Total repayment amount} & \\ &= R120\ 700 + R60\ 350 \\ &= R181\ 050 \checkmark \end{aligned} \quad (7)$$



2. The advertisement below gives the hire purchase conditions for a fridge.



- |     |   |     |
|-----|---|-----|
| 2.1 | Describe how a hire-purchase agreement works.   |     |
| 2.2 | Calculate the deposit payable for this fridge.  |     |
| 2.3 | Calculate the total amount that will be paid in repayments for this fridge on the hire-purchase option.                   |     |
| 2.4 | Now calculate how much more it will cost in total to buy this fridge on hire-purchase rather than through a cash payment. | (2) |
|     |   | (3) |
| 2.5 | Why do you think some people choose a hire-purchase option even though it costs so much more in the end?                  | (4) |
|     |   | (4) |
|     |   | (2) |



**Activity 1**

Clint buys a laptop for R3 999. He signs a hire purchase agreement that stipulates charges of 18% p.a. interest, a 15% deposit and an insurance fee of R30 be paid monthly



**Calculate:**

- |     |  |     |
|-----|--|-----|
| 1.1 | His monthly installment over the 3 year period.              | (2) |
| 1.2 | The total amount he will have paid at the end of the 3 years | (2) |

- 1.3 How much more does the laptop cost if Clint buys it on HP as opposed to cash? (2)

### Activity 2

Ms Tsie decided to buy the following lawn-mower which was advertised as follows:

**BRILLIANT LAWN-MOWER ON SPECIAL  
HAVE FUN WHILE CUTTING YOUR LAWN!!  
THE BEST IN THE MARKET AVAILABLE IN A RANGE OF COLOURS**



**Now only R23 099**

**SAVE R900**

**Deposit: R2 300**

**Instalments: R975 x 36 months**

- 2.1 What is the special cash price of the lawn-mower? (2)
- 2.2 How much did the lawn-mower cost before the special? (2)
- 2.3 What percentage of the original cash price is the SAVE amount? (2)
- 2.4 Ms Tsie decided to take the lawn-mower on hire purchase. Calculate the total amount that she will pay for the lawn-mower. (3)
- 2.5 Calculate how much Ms Tsie would have saved, had she bought the lawn-mower cash. (2)

### Activity 3

The picture shows a sales advert for a house.

	<p><b>Loan information:</b>                  Deposit: 8%                  Interest rate: Prime + 2%                  Loan period: 20 years</p>
--	--

Source: Property24

- 3.1 Describe the various features of the house. (3)
- 3.2 Through calculation determine values for
- a. Deposit (2)
  - b. Loan amount (2)
  - c. Monthly repayment (2)
  - d. Real cost (3)
  - e. Interest
- 3.3 If the buyer had to pay a 15% deposit instead of 8%, what effect would this have on the real cost of the loan? (6)
- 3.4 Now consider that the interest rate on this loan is given at prime (9%) instead of prime + 2%, with the original deposit amount. What effect would this have on the real cost of the loan? Show all workings (6)
- 3.5 If the length of this loan was 25 years, with the original deposit and interest rate, what effect would this have on the real cost of the loan? Show all workings. (4)

#### Activity 4



ACER



**New selling price R8 999  
Save R400**

**Hire-purchase:  
Option Deposit R500  
Instalment is R403, 70 × 30 months  
Total cost R..... @ 17% interest  
per annum**

TOSHIBA

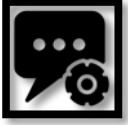


**Selling price R8 499  
Get 7% Discount on Cash!!**

**Hire-purchase:  
Option @ 15% Deposit  
Instalment is R..... × 12 months  
Total Cost = R9 102, 30 (excluding  
deposit) at 7% interest per annum**

- 4.1 What will be the total cost if the Acer is purchased on the hire-purchase option. (3)
- 4.2 The original selling price of the Acer laptop was VAT inclusive. Calculate the original selling price excluding VAT. (4)
- 4.3 Calculate the deposit on the Toshiba laptop if the Hire-purchase option is used. (2)
- 4.4 How much will be saved if the cash option is used rather than the hire purchase option to buy the Toshiba laptop? (6)

**[15]**

<b>LEARNER TEACHER/MANUAL</b>	
<b>ACTIVITY</b>	<b>Duration: 2hrs</b>
<b>TOPIC: BANKING, LOANS AND INVESTMENT</b>	
<b>Key Concepts/Terminology</b>	
<p><b><u>Some Common Banking Terminology</u></b></p>  <ul style="list-style-type: none"> <li>• <b>Opening balance-</b> the amount of money in the account at the beginning of the statement period.</li> <li>• <b>Closing balance-</b> the total amount of money in the account at the end of the statement period.</li> <li>• <b>Deposit-</b> money paid into a client's account.</li> <li>• <b>Withdrawal-</b> money that is withdrawn/taken out of a client's bank account.</li> <li>• <b>Electronic funds transfer-</b> the electronic transfer of money from a client's account into another account by means of computer-based systems.</li> <li>• <b>Bank statement-</b> a record indicating the opening and closing balances as well as all the transactions, for a particular period (usually a month).</li> <li>• <b>Debit transaction-</b> when money is taken out of a client's account.</li> <li>• <b>Credit transaction-</b> when money is paid into a client account.</li> </ul> <p><b><u>Types of Bank Accounts</u></b></p> <p><b>Savings account-</b> a savings account allows the account holder to keep the money that is saved in a safe place, while it earns some interest.</p> <p><b>Cheque/Current account-</b> this account is used for daily deposit and withdrawal transactions and account holder's salary is usually paid into this account.</p> <p><b>Credit card-</b> allows the account holder to buy goods and services now; but only repay the full value (plus interest) over a period of time back to the bank</p>	

## Activity 1:



A farmer decides to buy the tractor. He decides to take a loan of R50 000 as a down payment. Direct Axis, a loan company, advertises a loan of R50 000 as shown below:

**Personal Loan Calculator**  
For illustration purposes

R5 000,00
R150 000,00

<b>R68,40</b> Monthly Service Fee ⓘ	<b>28%</b> Interest Rates ⓘ	<b>R1 774,00</b> Monthly Repayment ⓘ (excluding service fee)		2 Years	3 Years	4 Years	5 Years	6 Years
--	--------------------------------	--	--	------------	------------	------------	------------	------------

[Source: <[www.directaxis.co.za](http://www.directaxis.co.za)>]

1.1.1 State the period of the advertised loan. (2)

1.1.2 The monthly repayment indicated in the advertisement is not the full monthly amount that needs to be repaid every month. Determine the actual monthly amount to be repaid. (3)

1.1.3 Determine the **total** repayment amount of the loan over the full period of the loan. (3)

1.1 The website provides the following information as an illustrative example:

An illustrative example of a loan at an interest rate of 28% per annum would be: Loan amount R50 000.00 plus a once-off initiation fee of R1 197.00 and a monthly admin fee of R68.40, over 72 months.

1.2.1 Determine the total value of the loan including the once-off initiation fee. (3)

1.2.2 A client applied for a loan at 15:38. If the client got a response at 10:55 the next day, calculate how long it took for the client to get a response from the time he applied.



## Activity 2

Mavuvuka is the name of the stokvel for Siyjabula primary school staff members. There are 35 members contributing in the stokvel. Members pay monthly contributions in hundred rand increments which increase every month. They contribute for 11 months. They buy groceries at the end of November with 40% of their savings and the rest is used for children's back- to- school cost. The money is deposited at the bank on the 1<sup>st</sup> of every month.

**NOTE:** Dineo's contributions increase by R100 per month.

Amanda's contributions increase by R200 per month.

**Table 1:** below shows the monthly contributions of two staff members, Dineo and Amanda.

Mavuvuka monthly contribution for Dineo and Amanda. Other months have been omitted.

Month	Jan 2016	Feb 2016	.....	May 2016	.....	Nov 2016
Dineo's contribution (R)	100	200	.....	<b>A</b>	.....	<b>1 100</b>
Amanda's contribution (R)	200	400	.....	1 200	.....	<b>B</b>

- 2.1 Determine the missing values **A** and **B**. (4)
- 2.2 Calculate Amanda's total contribution for 11 months. (3)
- 2.3 Calculate the amount that Amanda will use to buy groceries if she uses 40% of her total contributions for 11 months (excluding interest). (2)
- 2.4 In January 2017, Amanda decided to increase her initial contribution from R200 to R250. Calculate the percentage increase. You may use the following formula:

$$\text{Percentage increase} = \frac{\text{New amount} - \text{Old amount}}{\text{Old amount}} \times 100\% \quad (2)$$

- 2.5 Explain the terms *interest* and *interest rate*. (4)
- 2.6 Determine the total amount for January 2016 if 18 members contributed R100.00 each and 17 members contributed R200,00 each as initial amount (3)
- 2.7 The bank offers Mavuvuka stokvel 3,5% interest rate per annum compounded monthly.
  - 2.7.1 Determine the monthly interest rate. (2)
  - 2.7.2 Hence determine the total amount (with interest) at the end of the second month. (8)

**Activity 3**

Theo is planning to take a personal loan for him to buy a motor-bike which can be used to deliver the plants that he is selling. The motor-bike costs R28 000. He saw the advertisement about loans on a local newspaper. There are two options offered and he needs to decide on the cheapest option.

## EARTHNIICAL PERSONAL LOANS

**LOAN TERMS AND CONDITIONS PERIOD**

PERIOD	INTEREST RATE	FACTOR
5 years	9,5%	21
15 years	9,5%	10.44
<b>Factor includes:</b> interest, insurance fees, initiation fees and monthly service fees		

The following formula may be used:

$$\text{Monthly repayments} = \text{loan amount} \div 1\,000 \times \text{factor}$$

Use the given information to answer the following questions:

- 3.1 Calculate Theo's monthly repayments if he decides to take the loan over a 5-year period. (2)
- 3.2 Show by calculations that Theo will pay R52 617,60 over the period of 15 years. (4)
- 3.3 The advertisement claims that: ***the longer the term (loan period), the more money you save.*** Do you agree with this claim? Justify the answer by means of calculations. (5)

[11]

**Activity 4**

Mr Jacob does his banking with First National bank. The statement provided on ANNEXURE A was sent to Mr Jacob at the end of November.



## ANNEXURE A

Mr Andy Jacob  
56 Stable Road  
Uppertown  
1856

SMART ACCOUNT: 397465859939  
Copy Tax Invoice/Statement Number:13

29 August 2015 to 28 November 2015

Statement Date: 28 November 2015

Bank Charges		Statement Balances		Interest Rates
Bank charges	R91,60	Opening Balance	R5 254,69 Cr	Credit Interest 0,00%
Subscription Fees	R0,00	Closing Balance	R2 141,98 Cr	

## Account Transactions

Date	Description		Amount	Balance	Bank Charges
Opening Balance				R5 254,69 Cr	
02 Sep	ATM Cash	Eldorado	100,00	5154,69 Cr	5,25
04 Sep	Debit Card POS Purchase	Johnson	120,00	5034,69 Cr	
12 Sep	Debit Card POS Purchase	Vodacom	1004,00	4030,69 Cr	
17 Sep	Debit Card POS Purchase	Trading	2840,00	1190,69 Cr	
29 Sep	#Monthly account fee		12,50	1178,19 Cr	
29 Sep	#Service fees		5,25	1172,94 Cr	
05 Oct	Debit Card POS Purchase	Gift shop	477,25	695,69 Cr	
07 Oct	ADT Cash deposit	TD Mall	800,00 Cr	1495,69 Cr	5,60
12 Oct	Debit Card POS Purchase	Spar	105,00	1390,69 Cr	
16 Oct	Debit Card POS Purchase	PnP	305,00	1085,69 Cr	
17 Oct	ATM Cash	Bokville	200,00	885,69 Cr	6,55
20 Oct	ATM Cash	Eldorado	200,00	685,69 Cr	6,55
28 Oct	ADT Cash deposit	Southgate	2000,00 Cr	2685,69 Cr	14,00
29 Oct	Debit Card POS Purchase	CNA	37,50	2648,19 Cr	
29 Oct	Debit Card POS Purchase	Spar	140,00	2508,19 Cr	
29 Oct	#Monthly account fee		12,50	2495,69 Cr	
29 Oct	#Service fees		13,10	2482,59 Cr	
29 Oct	#cash deposit fees		19,60	2462,99 Cr	
30 Oct	Debit Card POS Purchase	Woolies	169,32	2293,67 Cr	
31 Oct	Debit Card POS Purchase	Edgars	126,22	2167,45 Cr	
31 Oct	Debit Card POS Purchase	Miladys	155,94	2011,51 Cr	
11 Nov	Debit Card POS Purchase	Checkers	130,00	1881,51 Cr	
13 Nov	Debit Card POS Purchase	Hyper CD	40,90	1840,61 Cr	
13 Nov	Debit Card POS Purchase	C gardens	60,00	1780,61 Cr	
18 Nov	ATM Cash	Shell	400,00	1380,61 Cr	9,15
18 Nov	Debit Card POS Purchase	Mr Price	209,98	1170,63 Cr	
25 Nov	ADT Cash deposit	Southgate	1000,00 Cr	2170,63 Cr	7,00
28 Nov	#Monthly account fee		12,50	2158,13 Cr	
28 Nov	#Service fees		9,15	2148,98 Cr	
28 Nov	#cash deposit fees		7,00	2141,98 Cr	
Closing Balance				2 141,98Cr	

4.1 Use **ANNEXURE A** to answer the following questions:

4.1.1 How many days does this statement cover? (2)

- 4.1.2 How many statements did Mr Jacob receive for this account thus far? (2)
- 4.1.3 How much is the monthly account fee payable on this account? (2)
- 4.1.4 Calculate the bank charges for the month of October. (2)
- 4.1.5 Mr Jacob used his cash withdrawal amounts to pay for his weekly expenses which are airtime, petrol, meals and purchasing groceries. Suggest TWO cost effective ways that he could use to save on cash withdrawal fees. (2)

4.2 Mr Jacob wants to change his account from FNB Smart account to Bates PLUS account. The two tables given on ANNEXURE B, shows the banking fees for the two accounts.

**ANNEXURE B**

Table 1  
Extract of Banking Fees for SMART ACCOUNT

Pay-As-You-Use Pricing Option	
Monthly Account Fee	R12,50
Cash Withdrawals	
Cash@Till	FREE
FNB Slimline	R5,00
FNB ATM	R3,95 + R1,30 per R100
Other Banks' ATM	R6,50 + FNB ATM Fee
FNB Branch/Cheque	R50,00 + R1,65 per R100
Deposits	
Cash Deposit at FNB ATM	R0,70 per R100 (minimum R5,50)
Cash Deposit at FNB branch and ATM	R1,65 per R100 (minimum R5,50)
Cheque deposit at FNB branch and ATM	R22,50
Card purchases/payments	FREE

Table 2  
Extract of Banking Fees for Bates Plus account

Pay-As-You-Use Pricing Option	
Monthly Account Fee	R11,80
Cash Withdrawals	
Point of sale(Cash withdrawal)	FREE
Bates Bank ATM	0 – R1000 : R6,80 Above R1000 : R4,00 + R1,20%
Branch	R33,00 + R1,40%
Other Banks' ATM	0 – R1000 : R6,80 + R6,70 Above R1000 : R4,00 + R6,70 + R1,20%
Deposits	
Cash Deposit at ATM	R4,50
Cash Deposit at Branch	R31,50
Cheque deposit at branch	R31,50
Cheque deposit at ATM	R31,50
Card purchases/payments	FREE

- 4.2.1 In July 2015 Mr Jacob made the following transactions on his FNB account.

- cash withdrawal of R600 at a FNB ATM
  - 1 deposit of R900 at the FNB ATM
  - 1 deposit of R2 500 in the bank
- (7)

Calculate the total service fee for these transactions

- 4.2.2 Jacob states that if he had a Bates Bank PLUS savings account then his bank fees will be less than his present bank. Use the transactions Mr Jacob made in July 2015 and information provided on ANNEXURE B to verify whether his statement is correct or not.
- (5)  
[22]

**Activity 5**

It is January and Ms Hegter has just started a new job. She will earn a gross monthly salary of R18 000. She knows how important it is to save for her retirement and is surprised to learn that you should save at least 15% of your gross salary for approximately 40 years to provide for your retirement.

- 5.1 Refer to the table below when answering this question. If Ms Hegter's salary increases by 6% each year for the next 3 years, calculate what her salary will be at the beginning of year 3 by completing the table on your Answer Sheet.

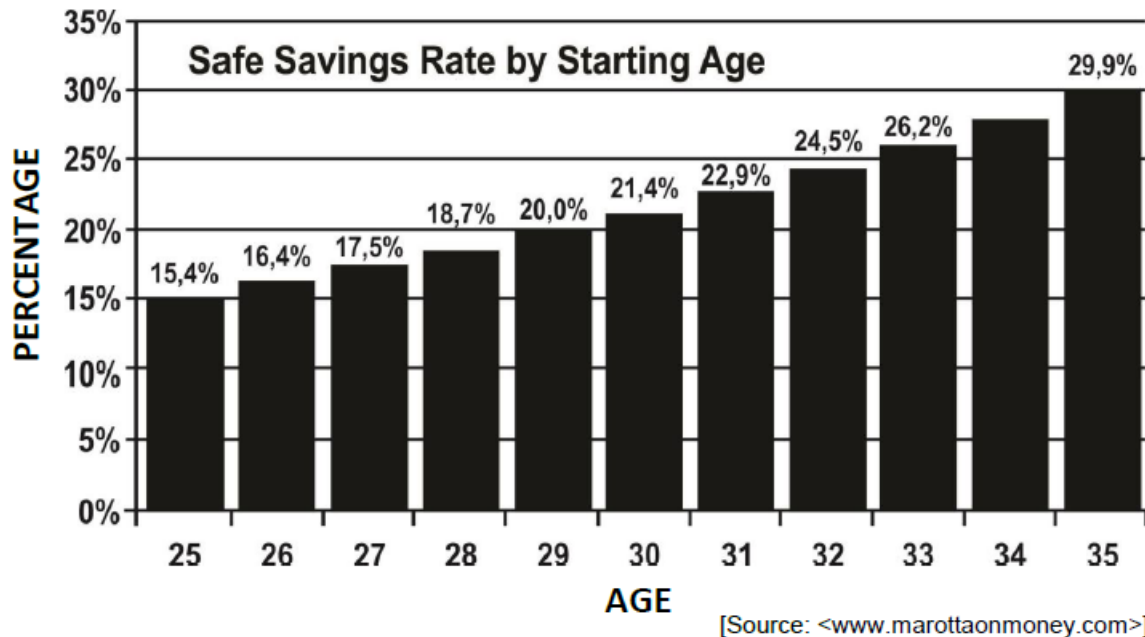
Salary for:	Working	Salary increase of 6% at end of:
Year 1: R216 000		Year 1: R_____
Year 2: R_____		Year 2: R_____
Year 3: R_____		

(5)


- 5.2 Determine how much Ms Hegter would save if she were to save 15% of her salary for years 1, 2 and 3.
- (4)

5.3 The graph below shows the percentage of your salary that you should be saving for your retirement based on the age at which you begin saving for it.

*E.g. If you start saving for your retirement when you are 25 years old then you would need to save 15,4% of your monthly salary.*



- 5.3.1 Ms Hegter has been working for a while and is now earning R20 800 per month. She is saving the recommended amount of R3 640 per month for her retirement. Determine how old Ms Hegter was when she started saving. (4)
- 5.3.2 If Ms Hegter were to only start saving for her retirement when she was 30, determine the amount of money she would be saving that year if her annual salary was R290 000. (3)
- 5.3.3 By using the **scale of the graph**, determine, to one decimal place, as accurately as possible, the safe rate for a 34-year-old person to start saving. Show all your working. (3)
- 5.3.4 Ms Hegter notices a pattern by which the safe saving rate increases annually.
- Describe or illustrate the pattern. (2)
  - Assuming the pattern remains the same, predict the safe saving rate for a 37-year-old person. (3)
- [24]

<b>LEARNER TEACHER/MANUAL</b>	
<b>ACTIVITY</b>	<b>Duration: 1hr</b>
<b>TOPIC: SIMPLE AND COMPOUND INTEREST</b>	
<b>Key Concepts/Terminology</b>	
<ul style="list-style-type: none"> <li>• <b>Interest</b> is the amount of money either earned or charged</li> <li>• <b>Interest rate</b> is the percentage used to calculate the amount of interest that is either earned or charged</li> <li>• <b>Principal amount</b> is the original amount of money initially invested or borrowed.</li> <li>• <b>Accumulated/Total Amount</b> of the investment or loan is the final amount which is made up of the principal amount plus interest.</li> <li>• <b>Time period</b> of the investment or loan is the length of the time that the money is invested or borrowed.</li> <li>• <b>Simple interest</b> is calculated only on the principal amount of money that is invested/borrowed. Therefore Interest remains the same.</li> <li>• <b>Compound interest</b> is calculated on the accumulated/total amount of money, i.e. on the principal amount plus any on any interest accrued. Therefore interest constantly increases.</li> </ul>	

**Worked Example 1:****1.2 Context/Scenario:**

Neo and Jan are friends and they want to buy themselves a bicycle. Jan approaches his uncle for a loan of R800 and promises to pay his uncle interest of 5% simple interest per month. His uncle agrees, but says his loan must be paid back within 3 months. Neo is a cashier at Bonolo Supermarket. He qualifies for a loan of R800 at the interest rate of 5% compound interest per month.

1.2.1 Determine Jan's total monthly interest repayments for the 3 months.

1.2.2 Calculate the total value that Jan needs to repay at the end of the 3 months.

1.2.3 Neo claims that his total repayment amount after 3 months will be lesser compare to Jan total repayment amount. Show by means of calculations whether Neo statement is correct or not. (3)  
(2)

**Answers**

$$1.1.1 \text{ interest} = \frac{5}{100} \times R800$$

$$= R40 \checkmark$$

$$\text{Total interest} = R40 \times 3 \text{ months} \checkmark$$

$$= R120 \checkmark$$

$$1.1.2 \text{ Total amount} = R800 + R120 \checkmark$$

(8)

$$= R920 \checkmark$$

1.1.2 Neo total amount:

$$\begin{aligned} \text{Month 1 interest} &= 5/100 \times R800 \checkmark \\ &= R40 \checkmark \end{aligned}$$

$$\begin{aligned} \text{Month 2 interest} &= 5/100 \times (R800 + R40) \checkmark \\ &= 0,05 \times R840 \\ &= R42 \checkmark \end{aligned}$$

$$\begin{aligned} \text{Month 3 interest} &= 5/100 \times (R840 + R42) \\ &= 0,05 \times R882 \end{aligned}$$

$$= R44,10 \checkmark$$

$$\begin{aligned} \text{Total interest} &= R40 + R42 + R44,10 \checkmark \\ &= R126,10 \checkmark \end{aligned}$$

$$\begin{aligned} \text{Neo total amount} &= R800 + R126,10 \\ &= R926,10 \checkmark \end{aligned}$$

Neo statement is not correct. He is paying R6,10 more as compared to Jan.  $\checkmark$



### Activity 1

1. Benita borrowed R18 000. She had to pay it back with interest at the end of three years at 4% simple interest per annum.

- 1.1 How much was the interest after three years? (3)
- 1.2 What did she owe in total after three years? (3)
- 1.3 After three years Benita could only pay back the total interest owing. She asked for two years' extension on the loan. The interest rate changed to 4,5% simple interest per annum for the remaining two years. How much was the interest amount after two years at the new interest rate? (4)
- 1.4 How much did she pay back at the end of the fifth year? (2)
- 1.5 How much in total did she pay over the five years (3)

### Activity 2

2. Meta bought furniture for R22 000 and paid a 10% deposit. She had to pay 26% simple interest on the remainder and pay the capital plus interest back in monthly payments over 24 months.



- 2.1 Calculate the deposit amount. (2)
- 2.2 What was the interest on the remainder? (3)
- 2.3 How much was her monthly payment? (3)

### Activity 3

1. Abigail is saving for an overseas trip. She invests her inheritance of R20 500 for two years at 9% per annum compound interest, compounded half yearly (every six months).



- 3.1 Calculate the interest at the end of the first six months. (3)
- 3.2 Write down the principal for the second time period. (2)
- 3.3 Calculate the interest at the end of the first year (3)
- 3.4 Calculate the amount she will have at the end of two years. (3)
- 3.5 How much interest does her investment earn over the two years? (3)

#### Activity 4

1. Mano invested an amount of money to give to each of his children when they turn 18. Find the amount and the interest earned at the end of the first two years:

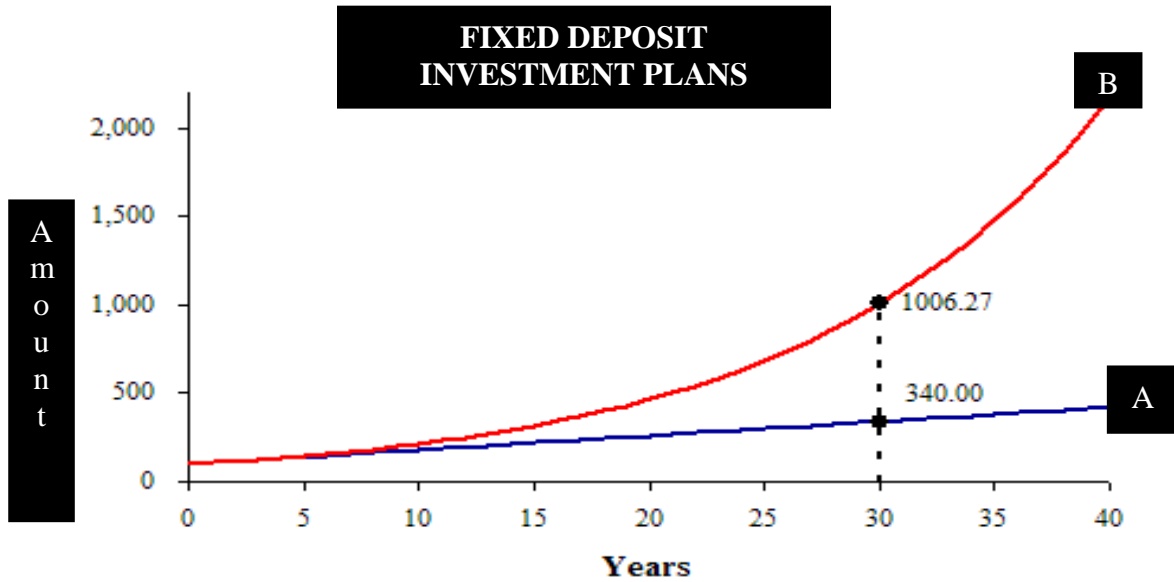


- 4.1 If R8 950 is invested for Jane for 6 years at 9% compound interest per annum.
- 4.2 If R10 500 is invested for Linda for 4 years at 9% compound interest per annum compounded quarterly.
- 4.3 Find the amount and the interest earned at the end of the first year if R10 600 is invested for Lloyd for five years at 9% compound interest per annum compounded monthly.



**Activity 5**

5. Lerato is currently doing grade 10 and she took Mathematical Literacy as one of her subjects. After learning more about the interest and interest rates she has decided to have a fixed deposit investment plan. From that plan she has a choice of two plans. Plan A is illustrated by graph A and plan B is illustrated by Graph B, shown below:



- 5.1 What type of graph is illustrated by graph A and B? (2)
- 5.2 What type of interest is illustrated by graph A and B? (2)
- 5.3 How much money will Lerato be investing in the fixed deposit? (2)
- 5.4 In which year will Plan A equal Plan B? (2)
- 5.5 Which plan would you recommend Lerato to choose? Give a reason for your answer. (2)
- 5.6 Calculate the interest rate quoted on the investment. (2)

LEARNER TEACHER MANUAL															
ACTIVITY		DURATION : 3hrs													
TOPIC : DATA HANDLING															
<p><b>Data</b> Data is the plural of the word datum, which means a piece of information.</p> <p><b>Types of Data</b></p> <ul style="list-style-type: none"> <li>• Numerical Data           <ul style="list-style-type: none"> <li>➤ <i>Discrete</i>: data which consist of only whole numbers. It is found through counting eg learners in a class.</li> <li>➤ <i>Continuous</i>: data which consist of decimals. It is found by measuring. Example is mass (kg) of learners.</li> </ul> </li> <li>• Categorical Data           <ul style="list-style-type: none"> <li>➤ Any data described by description/qualities eg race, gender, flavor etc.</li> </ul> </li> </ul> <p><b>Data Organization</b></p> <ul style="list-style-type: none"> <li>• Alphabetical or numerical order</li> <li>• Tally and frequency tables</li> <li>• Stem and leaf diagrams</li> </ul> <p><b>Measures of Central Tendency</b></p> <ul style="list-style-type: none"> <li>• Mean           <ul style="list-style-type: none"> <li>➤ It is the sum of all data divided by total number of data in any given set.</li> </ul> </li> <li>• Median           <ul style="list-style-type: none"> <li>➤ Is the central data item when data is arranged in ascending or descending order.</li> </ul> </li> </ul> <p><i>Note: for any odd total number of data, the median is the data value in the middle. For any even total number of data, the median is the sum of two central data items divided by 2.</i></p> <ul style="list-style-type: none"> <li>• Mode/modal data           <ul style="list-style-type: none"> <li>➤ That's the data appearing most frequently</li> </ul> </li> </ul> <p><b>Quartiles</b> These are 3 values <b>Q1</b> (lower quartile), <b>Q2</b> (median) and <b>Q3</b> (upper quartile) that are divided into 4 equal parts, each part approximately 25% of an arranged data set.</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">25% of data</td> <td style="width: 25%;">25% of data</td> <td style="width: 25%;">25% of data</td> <td style="width: 25%;">25% of data</td> </tr> <tr> <td><b>min</b></td> <td><b>Q1</b></td> <td><b>Q2</b></td> <td><b>Q3</b></td> </tr> <tr> <td></td> <td></td> <td></td> <td><b>max</b></td> </tr> </table> <p>25% of the data values is less than Q1 ( 75% of data values is greater than Q1)            50% of the data values is less than Q2 (50% of data values is greater than Q2)            75% of the data values is less than Q3 (25% of data values is greater than Q3)</p> <p><b>How to find quartiles</b></p>				25% of data	25% of data	25% of data	25% of data	<b>min</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>				<b>max</b>
25% of data	25% of data	25% of data	25% of data												
<b>min</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>												
			<b>max</b>												

- ✓ Arrange data in order
- ✓ Find Q2 (median)
- ✓ Find the midpoint/central value of the data on the left side of Q2. This is Q1.
- ✓ Find the midpoint/central data value of the data on the right side of Q2. This is Q3.

### Five Number Summary

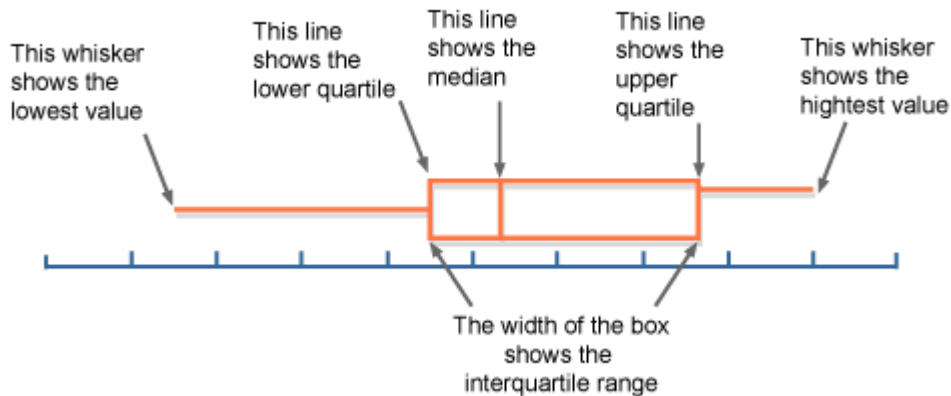
Minimum

Q1(lower quartile)

Q2(median)

Q3(upper quartile)

Maximum



### Percentiles

That's a data value that tells you the percentage of data values less than it.

Special percentiles are:

Q1 25<sup>th</sup> percentile

Q2 50<sup>th</sup> percentile

Q3 75<sup>th</sup> percentile

### Measures of Spread/Dispersion

- Range = maximum – minimum  
It is affected by extreme values hence not a good measure
- Interquartile Range (IQR) = Q3 – Q1  
It is not affected by outliers

### Outlier

It is an extremely lower or higher value in a given set of data.

Any set of data that contains an outlier you must not use the mean as better measure of central tendency to summarise the data and also the range

### Example

The 17th FINA World Championship was held in Budapest from 14-30 July 2017. South Africa's and Spain's women's water polo teams competed against each other on

20 July 2017. The ages and heights of the South African and Spanish team members are listed in TABLE below

SOUTH AFRICA			SPAIN		
Number	Age	Height	Number	Age	Height
1	25	1,77	12	17	1,87
2	19	1,77	13	17	1,77
3	26	1,63	10	19	1,73
4	26	1,63	9	21	1,73
5	28	1,82	11	21	1,73
6	24	1,64	4	22	1,80
7	22	1,64	7	24	1,77
8	24	1,64	2	24	1,76
9	18	1,64	3	24	1,80
10	32	1,69	6	25	1,74
11	24	1,69	5	26	1,74
12	26	1,76	1	27	1,77
13	20	1,77	8	31	1,74

Use the information above and answer the questions below

1.1	How many days was the FINA World Championship? Ans = 17days	(2)
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1.2	If the 14th of July had been on a Friday, on which day of the week did these two teams compete? Ans = Thursday	(2)
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1.3	What is the height of the oldest member of the South African team? Ans = 1,69m	(2)
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1.4	Calculate the mean of the heights of the Spanish team. Round your answer off to two decimals. Ans = $\frac{(1,8+1,77+1,73+1,8+1,77+1,76+1,8+1,74+1,74+1,74+1,77+1,74)}{13}$ =1,77m	(3)
-----	--	-----

1.5	Determine the lower quartile (Quartile 1 / Q1) of the ages of the Spanish team. 17;17;19;21;21;22;24;24;24;25;26;27;31 (median) Bottom half = 17;17;19;21;21;22 Q1 = $(19+21) \div 2$ =20yrs	(3)
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1.6	Determine the mode of the ages of the South African team. Ans = 24yrs and 26yrs	
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**Activity**

The number of learners, teachers and schools in the school sector of South Africa is indicated per province for 2016 in TABLE 4.

**TABLE 1: LEARNERS, TEACHERS AND SCHOOLS PER PROVINCE IN 2016 IN THE SOUTH AFRICAN SCHOOL SECTOR**

PROVINCES	PUBLIC SCHOOLS			PRIVATE SCHOOLS		
	LEARNERS	TEACHERS	SCHOOLS	LEARNERS	TEACHERS	SCHOOLS
Eastern Cape	1 898 723	58 372	5 469	62 824	3 257	207
Free State	671 712	22 465	1 214	16 637	1 058	68
Gauteng	2 048 558	63 092	2 083	278 026	18 986	730
Kwazulu-Natal	2 808 137	84 810	5 895	69 407	4 989	247
Limpopo	1 706 725	51 650	3 867	58 830	2 768	151
Mpumalanga	1 046 234	34 034	1 725	28 118	370	122
Northern Cape	287 435	8 841	545	4 080	295	30
North West	811 340	24 876	1 471	19 207	1 232	63
Western Cape	1 063 349	33 254	1 450	53 223	4 264	237
<b>South Africa</b>	<b>12 342 213</b>	<b>...</b>	<b>23 719</b>	<b>590 352</b>	<b>37 219</b>	<b>1 855</b>

[Adapted from: [www.dbe.gov.za](http://www.dbe.gov.za)]

Use TABLE 1 and the information above to answer the questions that follow.

- 1.1.1 Which province had the most learners in private schools in 2016? (2)
- 1.1.2 Which provinces have less than the mean number of teachers per province for public schools? (4)
- 1.1.3 Determine the median value of teachers per province for private schools. (2)
- 1.1.4 Calculate the range for the number of learners in public schools (2)
- 2.1 TABLE 4 below shows statistics of two neighboring suburbs Fisantekraal and Durbanville.

**Table 4: Statistics of Fisantekraal and Durbanville**

Description	Fisantekraal	Durbanville
<b>Population group</b>	46% coloured (51% african)	82,2% white (10,1% coloured)
<b>Number of inhabitants per km<sup>2</sup></b>	18 928	1 980
<b>Area of suburb in km<sup>2</sup></b>	0,65 km <sup>2</sup>	27,41 km <sup>2</sup>
<b>Level of education</b>	1,1% has tertiary education	52,4% has tertiary education
<b>Average income per household</b>	R19 601 – R38 200 (26% of population)	R307 601 – R614 400 (25% of population)
<b>% houses with Connected running water supply</b>	52%	98,8%
<b>% houses with toilet facilities connected to sewerage system</b>	71%	98,9%
<b>% houses with electricity</b>	68,5%	99,4%

**TABLE 4: Statistics of neighboring suburbs**Adapted from source: [www.grafika24.com](http://www.grafika24.com)

Use the table above to answer the following questions.

- 2.1.1 Calculate the range of the average income per people living in Fisantekraal. (2)
- 2.1.2 Determine the number of people staying in Fisantekraal (3)
- 2.1.3 How many more people are staying in Durbanville compared to Fisantekraal. (4)
- 2.1.4 What is the probability of randomly finding a house without water supply in Fisantekraal? (2)

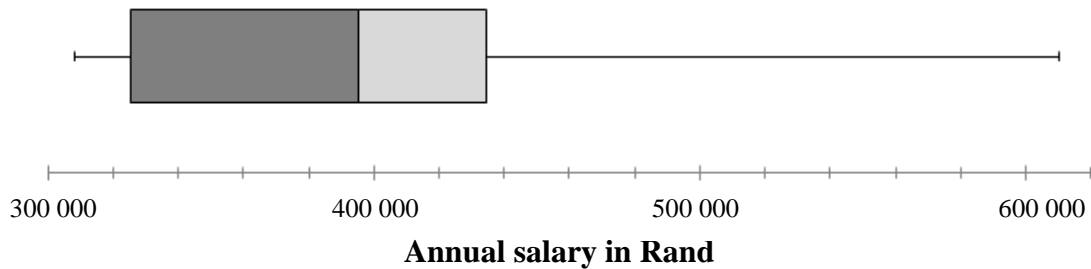
2.2 TABLE 3 below shows the annual salaries of 20 people living in Durbanville. A

corresponding box-and-whisker plot for this data is given

**TABLE 3: ANNUAL SALARIES**

308 400	325 600	374 012	408 416	482 650
308 400	365 420	391 216	410 650	502 150
325 600	365 716	399 816	417 016	550 210
325 600	374 012	399 816	434 375	610 350

**Salaries of a sample of people living in Durbanville**



Use the table and box-and-whisker above to answer the following questions.

2.2.1 Determine the modal annual salary of this sample. (2)

2.2.2 Calculate the Inter-Quartile Range. (5)

2.2.3 An analyst reckons that 25% of all the people are earning more than R36 000 per month. Verify by means of calculations if this statement is correct. (4)

3.2.4 The average annual salary of this neighborhood in Durbanville is R403 971,25 compared to the average annual income of a similar neighborhood in San Francisco (USA) of \$31 520,00.

Verify if the statement that San Francisco has a higher average annual salary is if the exchange rate is as follows.

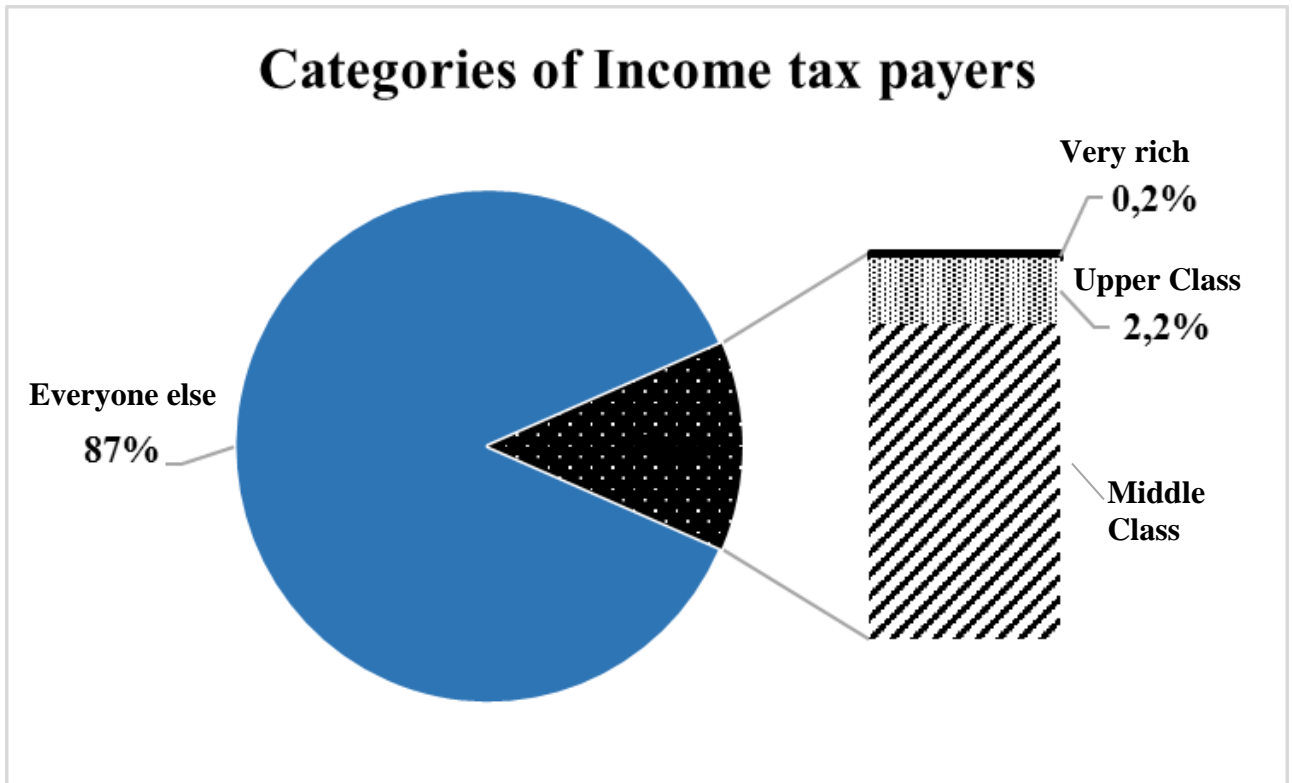
$$R1,00 = \$0,075301$$

(4)

2.3 TABLE 4 and the charts below show information about the personal income taxpayers of South Africa with a population of 56 million people.

**TABLE 4: Categories of tax payers in South Africa**

CATEGORIES	DESCRIPTION
<b>Very Rich</b>	Earning more than R1,5 million per year
<b>Upper Class</b>	Earning between R0,5 million and R1,5 million per year
<b>Middle Class</b>	Earning between R70 000 and R0,5 million per year
<b>Everyone Else</b>	Earning less than R70 000 per year (Do not pay income tax)



Use TABLE 4 and the chart to answer the questions that follow.

- 2.3.1 What percentage of people earns more than half a million rand per year? (2)
- 2.3.2 What percentage of the individuals fall in the category of the middle class? (2)
- 2.3.3 Calculate the number of persons in South Africa who contributes personal income taxes to the South African Revenue Services (SARS). (3)
- 2.3.4 Sandra makes the following statement: "87% of South Africans do not contribute to any form of taxes." Is Sandra's statement valid? Justify your answer. (3)



**Sources of information (SOI):**



1. Answer Series 3 in 1 Grade 12
2. Via Afrika Mathematical Literacy Grade 12
3. Gauteng SSIP 2017
4. Grade 12 March test 2017
5. Grade 12 Answer Series
6. Grade 12 Platinum Mathematical Literacy
7. March 2015 & 2018 Paper 1
8. November 2014 & 2015 Paper 1 and 2
9. KZN September 2017
10. Grade 11 Paper2 2017 final
11. IEB Mathematical Literacy November Paper 1 and 2 2017
12. Oxford Successful Mathematical Literacy Grade 12
13. North West September 2018



