



JENN

Training and Consultancy

The path to enlightened education

SUBJECT: MATHEMATICAL LITERACY

GRADE 12

2025 TERM 2 WINTER CLASSES

TEACHER AND LEARNER MANUAL: ANSWERS

MEASUREMENT

**Conversion, Time, Perimeter, Area,
Surface Area, and Volume**


MAPS AND SCALE

**Types of scales, Distance Calculation,
Positions, Relative positions, Assembly
Diagrams and Models**

SCALE

ACTIVITY 1: Bar and Number Scale



1.1.1	One cm on the map is equal to twenty centimetres in reality (A)
1.2.1	Bar scale
1.2.2	Bar scales are small graphics that indicate the proportions of a map to the original geographic area and help users measure distances on maps. While scale can be indicated as a ratio or in words (i.e. 1:10, or “One inch to ten miles”), scale bars allow users to measure distances in maps directly. The measured unit on the bar scale represents the length/distance indicated on the bar scale, in reality.
1.2.3	36 mm (NB: Measure the final printed paper.
1.3.1	Number Scale
1.3.2	One unit on the map is equal to 100 000 units in reality
1.3.3	Picture 1 - C Picture 2 - B Picture 3 - A
1.4.1	72
1.4.2	10 cm
(a)	
1.4.2	10 cm = 12 m
(b)	10 : 1200 (convert 12 m to cm) 1 : 120
1.5.1	One unit on the drawing represents five units in real life
1.5.2	 0 10 cm 35 cm
1.5.3	Measurement: 63 mm Length + 15% $= 63 + (63 \times \frac{15}{100})$ $= 63 + 9,45$ $= 72,45 \text{ mm}$ True circumference $72,45 \times 5$ $= 362,25 \text{ mm}$
1.5.4	With enlargement or reduction of the picture the number scale will not be applicable anymore, the bar scale will increase or decrease as well

ACTIVITY 2: MAPS and SCALE



1.1.1	Strip chart
1.1.2	National and provincial/regional road
1.1.3	547 km
1.1.4	100%
1.1.5	From the national to Tulbagh = 76 km From Tulbagh to Ceres = 110 km 76 km + 110 km = 186 km The Town is 186 km
1.2.1	North East (NE)
1.2.2	$\frac{2}{3}$
1.2.3	The type of route of the the marathon. The weather during the day of the marathon
1.2.4	Asakusa Station
1.2.5	42 km – 40 km = 2 km
1.2.6	3
1.2.7 (a)	Because it is people with different disabilities OR Beacause of different impairments OR They may run into each other
1.2.7 (a)	T46 = 3 960 – 1 700 – 1 580 = 680 1 700 : 680 : 1 580 85 : 34 : 79
1.3.1	5 (five)
1.3.2	Mpumalanga
1.3.3	Bar Scale = 22 mm Map Distance from Edenburg to Bloemfontein = 21 mm Actual distance = $\frac{21}{22} \times 60\text{km}$ = 57,3 km

	There was a direct measurement on the map not taking into account that the road is not straight when you travel
1.4.1	Kuruman
1.4.2	66 mm Measure the printed copy
1.4.3	Bar scale 80 km = 26 mm Actual distance = $\frac{66 \text{ mm}}{26 \text{ mm}} \times 80 \text{ km}$ = 203,08 km
1.4.4	Rural areas = 100% - 3,6% = 96,4% $\frac{96,4}{100} \times 4\,100\,000$ = 3 952 400
1.4.5	$(1 \text{ km})^2 = (0,62137119 \text{ miles})^2$ $1 \text{ km}^2 = 0,38610216 \text{ miles}^2$ Area of North-West in km^2 = $\frac{40\,495 \text{ miles}^2}{0,38610216 \text{ miles}^2}$ = 104 881,5681 = 104 882 km^2
1.4.6	Population of North-West = 4 100 000 Population density $\frac{4\,100\,000 \text{ people}}{104\,882 \text{ km}^2}$ = 39,091 people/ km^2 $\approx 39 \text{ people}/\text{km}^2$
1.5.1	N3 and N5
1.5.2	$\frac{5}{7}$ = 0,714
1.5.3	Volksrust and Standerton
1.5.4	Free State
1.5.5	R 23 to Volksrust, R11 to Newcastle to Ladysmith, then N3 to Pietermaritzburg then to Durban.
1.5.6	Avoid tollgates Want to visit other family members along the road Any suitable reason
1.6.1	N3
1.6.2	R617
1.6.3	6 km
1.6.4	Left

1.6.5	Dist. = 16km – dist. Hotel to Mkomazana – dist. Himeville to turn = 16 km – 4,4 km – 2 km = 9,6 km
1.7.1	Total distance = 89km
1.7.2	Elevation Map
1.7.3	Drummond
(a)	11:30 or half past 11
1.7.3	
(b)	Approximately 45km
1.7.4	Average speed = $\frac{89 \text{ km}}{6,5 \text{ h}}$ = 13,6923km/h = 13,69 km/h
1.7.5	The part shows a continuous downward slope, it is downhill
1.8.1	Cowdenbeath
1.8.2	Probability = $\frac{1}{3}$ Probability = 0,3
1.8.3	05:30; 06:00; 06:30; 07:00
1.8.4	07:47(last) 06:04 (first) 1h 43min
1.9.1	Franschhoek
1.9.2	08:30 + 1 hour 57 minutes
(a)	= 10:27
1.9.2	Distance from Paarl to Waterfront mall
(b)	= 36km + 25km + 2 km = 63km Time = 58 min + 7 min = 65 min Distance = speed × time 63 km = speed × (65 ÷ 60) Speed = $\frac{63 \text{ km}}{(65 \div 60)}$ = 58,15 km/h

1.9.3	Grabouw
1.10.1	$3 \times 4 = 12$ $4 \times 2 = 08$ $12 + 08 = 20$ players
1.10.2	Total distance travelled from the place of depature and back.
1.10.3	$R2\ 800 \times 3 = R8\ 400$ $R2\ 950 \times 4 = R11\ 800$ $R3\ 200 \times 1 = R\ 3\ 200$ Total amount = R23 400 For two nights = $R23\ 400 \times 2$ = R46 800 Petrol cost No of litres = $\frac{10,5 \times 2\ 769,2}{100}$ = 290,766 Cost = $290,766 \times 22,46$ = R6 530,60 Total Amount = $R46\ 800 + R6\ 530,60$ = R53 330,60 50% = R26 665,30 Each member will pay = $\frac{R26\ 665,30}{21}$ = R1 269,78
1.11.1	N8
1.11.2	21mm : 60km 21 mm : 60 000 000 mm $\frac{21}{21} : \frac{60\ 000\ 000}{21}$ 1: 2 857 142 ,8571429 Distance = 101mm Actual distance = $101 \times 2\ 857142,8571429$ = 288 571 428,57143mm = 288, 57km ≈ 289 km
1.11.3	Southwest OR SW
1.11.4	Kimberly Bloemfontein
1.11.5	Starting from Springfontein go straight North using N1 In Bloemfontein take N1 heading North East direction until you reach Winburg,

	Turn East to join N5 until you reach Harrismith Turn North to join N3 until you arrive in Warden.
1.12.1	A map is drawn to scale while a strip chart is not. OR A map shows the routes in a winding manner while a strip chart shows them as straight lines.
1.12.2	Probability = $\frac{2}{6}$
1.12.3	Distance (Springbok to Gobabis) = 892 km + 203 km = 1 095 km
1.12.4	$T = \frac{D}{S}$ $T = \frac{465 \text{ km}}{110 \text{ km/h}}$ = 4,227272727 hours = 4 hours + (0,227272727 × 60) = 2hrs 14min ∴ Invalid

Measurement

ACTIVITY: Conversion



1.1.1	21
1.1.2	10:30 1 : 3
1.1.3	$^{\circ}\text{C} = (212^{\circ} - 32^{\circ}) \div 1,8$ = $180 \div 1,8$ = 100
1.1.4	Weight = $40\text{g} \times 10$ = 400g $\frac{400 \text{ g}}{1000} = 0,4 \text{ kg}$
1.2.1	25 apples
1.2.2	$\frac{1}{3} \text{ hours} \times 60$ = 20minutes
1.2.3	$\frac{3}{2} \times 5\text{m}\ell$ 7,5 mℓ
1.2.4	$\frac{1000 \text{ m}\ell}{250 \text{ m}\ell}$ = 4 cup
1.2.5	$^{\circ}\text{F} = (150^{\circ} \times \frac{9}{5}) + 32 = 302^{\circ}\text{F}$

ACTIVITY: Time



1.1.1	Twenty to eleven in the morning
1.1.2	13:50
1.1.3	14:10 – 10:40 = 3 hours and 30 minutes = 3,5 hours
1.2.1	Figure 1: Analogue Figure 2: Digital
1.2.2	Ten minutes past ten
1.2.3	Time in the morning
1.3.1	240 g
	$55 \div 60$ = 0,92 hours
1.3.2	Analogue
1.3.3	16:30/04:30
1.4.1	Analogue and digital clocks
1.4.2	AM and PM time notation/format
1.4.3	Time = 22:11
1.4.4	Speed = 75mi/h
1.4.5	Temperature = 80 °
1.5.1	Digital
1.5.2	C/It is a time in the morning
1.5.3	04:20 p.m + 52 min = 04:72 p.m =05:12 p.m.
1.6.1	Daily distance = $2 \times 90\text{km}$ = 180 km
1.6.2	08:30
1.6.3	60 km

ACTIVITY: Perimeter, Area, Surface Area and Volume



1.1.1	Perimeter is the total distance around the vegetable garden
1.1.2	$8,5 \text{ m} + 2 \text{ m} + 5,5 \text{ m} + 6 \text{ m} + (5,5 + 2) \text{ m} + 2,5 \text{ m}$ $= 8,5\text{m} + 2\text{m} + 5,5\text{m} + 7,5\text{m} + 2,5 \text{ m}$ $= 32 \text{ m}$
1.1.3	$32 \text{ m} - 1 \text{ m} = 31 \text{ m}$ $31 \text{ m} \div 1,5 \text{ m} = 21 \text{ panels}$
1.2.1	Perimeter is the total distance around the fishpond
1.2.2	<p>Width of pond = 5,5m which is the same as the diameter of the curved side. Thus the radius is $= 5,5 / 2 = 2,75\text{m}$ Now the length of the fence $= 1,5 \text{ m} + 9\text{m} + 2,75\text{m} + 1,5\text{m} = 14,75\text{m}$ Breadth of fence $= 1,5 + 5,5 + 1,5 \text{ m} = 8,65\text{m}$ Total fence $= 14,75 \times 2 + 8,65 \times 2 = 46,5\text{m}$</p>
1.2.3	$\frac{46,5}{5} = 9$ thus 10 rolls. But 10 strolls $\times \text{R}162,50 = \text{R}1625$
1.2.4	<p>For each length you need a starting pole and then at most 1,8m in between. Thus, for breadth: starting pole $+ \frac{8,5}{1,8} = 6$ poles $\times 2$ sides $= 12$ poles For the length we don't need starting poles as there already are: Thus: $\frac{14,75}{1,8} = 9$ poles $\times 2 = 18$ poles Total: $18 + 12 = 30$ poles OR $\frac{46,5}{1,8} = 26 + 4 = 30$ <i>POLES</i></p>
1.2.5	$30 \text{ POLES} / 6 = 5 \text{ SETS}$ @R500 each $= 5 \times \text{R}500 = \text{R}2500$
1.3.1	$450 \div 1000$ $= 0,45 \text{ m}$
1.3.2	Perimeter is the distance around a 2D shape
1.3.3	C

	OR/OF Perimeter = $(2 \times \text{length}) + (2 \times \text{width})$
1.4.1	Perimeter = $2,08 \text{ m} + 3,5 \text{ m} + 2,08 \text{ m} + 3,5 \text{ m}$ = 11,16 m OR Perimeter = $2 (3,5 \text{ m} + 2,08 \text{ m})$ = 11,16 m
1.4.2	Area = length \times height = $3,5 \text{ m} \times 2,08 \text{ m}$ = 7,28 m ²
1.5.1	The line that divides the swimming pool into two equal parts. A straight line passing from side to side through the centre of the swimming pool.
1.5.2	Radius = $\frac{1830}{2}$ = 915 cm = $\frac{915}{100}$ = 9,15 m
1.5.3	B Circumference of the circle = $3,142 \times \text{diameter}$
1.6.1	Radius = $2 \text{ m} \div 2$ = $1 \text{ m} \times 1000$ = 1000 mm
1.6.2 (a)	$C = 2 \times \pi \times r$ = $2 \times 3,142 \times 1 \text{ m}$ = 6,284m
1.6.2 (b)	$2 \text{ m} \times 100 = 200 \text{ cm}$ Area of the square = 200×200 = 40 000cm ²
1.6.2 (c)	Perimeter of the square = $4 \times 2 \text{ m}$ = 8m Total length = $8 \text{ m} + 6,284 \text{ m}$ = 14,284m
1.6.3	YES Mr Mbhele will save Any valid reason
1.7.1	$55 \times 4,546092 \text{ ℓ}$ = 250,03506 ℓ $\approx 250 \text{ ℓ}$

1.7.2	Cheece Yogurt
1.7.3	<p>Length = 48 inch = 121,92 cm Width = 40 inch = 101,60 cm Height = 46 inch = 116,84 cm</p> <p>Volume = 121,92 cm × 101,60 cm × 116,84 cm = 1 447 305,492 cm³ ✓CA = 1 447 305,492 mℓ ÷ 1 000 = 1 447,305492 ℓ ÷ 4,546092 = 318,3625612 gallons = 318 gallons It can hold more than 310 gallons</p>
1.7.4	<p>Radius = 11,25 inch = 28,575 cm = 0,28575 m Height = 33 inch = 83,82 cm = 0,8382 m Surface area of a cylinder (in m²) = (2 × 3,142 × r²) + (2 × 3.142 × r × h) = (2 × 3,142 × 0,28575²) + (2 × 3,142 × 0,28575 × 0,8382) = 0,5131078448 + 1,505116345 = 2,018224189 m² ÷ 2,5 = 0,81 litres of paint = 1 tin of paint</p>
1.8.1	Measuring tape
1.8.2	<p>Animal weight in pounds = $\frac{(\text{girth})^2 \times \text{body length}}{300}$ = $\frac{70 \times 70 \times 78}{300}$ = 1274 pounds Conversion to kg = $\frac{1274 \text{ pounds}}{2,2046}$ = 577,88 kg</p>
1.9.1	<p>Perimeter of the pool cover = 2 (26 + 14) + 4 + 4 = 88m</p>
1.9.2	<p>Area of the pool = (24 × 12) + (4 × 8) = 320 m² Area of the pool cover = (26 × 14) + (10 × 4) = 404 m² Times bigger = 404 ÷ 320 = 1,26</p>
1.10.1	Volume of water = (24 × 12 × 2) + (8 × 4 × 1)

	$= 608 \text{ m}^3$
1.10.2	<p>Number of litres of water $= 608 \times 1000$ $= 608\,000$</p> <p>Number of teaspoons $= (608\,000 \div 1000) \times 1,5$ $= 912$</p> <p>Number of litres $= (912 \times 5) \div 1000$ $= 4,56$</p>
1.11.1	<p>Number of litres of water $= 9 \times 3,78541$ $= 34,07$</p>
1.11.2	<p>Number of minutes $= 608\,000 \div 34,07$ $= 17\,845,61$</p> <p>Number of hours $= 17\,845,61 \div 60$ $= 297,43$</p> <p>Number of days $= 297,43 \div 24$ $= 12,39 \text{ days}$ $= 13$</p>
1.12.1	<p>Area of metal border $= (3,142 \times 57^2) - (3,142 \times 50^2)$ $= 2\,353,36 \text{ cm}^2$</p>
1.12.2	<p>SA $= (3,142 \times 50^2) + (2 \times 3,142 \times 50 \times 25)$ $= 15\,710 \text{ cm}^2$</p> <p>Total area $= 2\,353,36 + 15\,710$ $= 18\,063,36 \text{ cm}^2$</p> <p>Convert to $\text{m}^2 = 18\,063,36 \div 100^2$ $= 1,806336$</p> <p>Including 10% $= 1,806336 \times 1.10$ $= 1,986 \text{ m}^2$ $= 1,99 \text{ m}^2$</p> <p>Siya's claim is CORRECT</p>
1.12.3	<p>Number of litres $= (1,99 \times 2) \div 5$ $= 0,796 \text{ litres}$ $= 1 \text{ litre}$</p>

Summative Assessment 1

1.1.1	$r = \frac{d}{2}$ $76 \div 2$ $= 38 \text{ mm}$
1.1.2	Volume of cylinder $= \pi \times r^2 \times h$ $= 3,142 \times 38^2 \times 70$ $= 317\,593,36 \text{ mm}^3 \div 10^3$ $= 317,593 \text{ cm}^3$
1.1.3	6 sides
1.1.4 (a)	Sum of the areas of all the faces of a cube
1.1.4 (b)	Area of a square $= 55 \text{ mm} \times 55 \text{ mm}$ $= 3\,025 \text{ mm}^2$ Total Surface area $= 6 \times 3\,025 \text{ mm}^2$ $= 18\,150 \text{ mm}^2$
1.2.1	Perimeter $= 2 \times (270 \text{ cm} + 90 \text{ cm})$ $= 720 \text{ cm}$
1.2.2	Lengthwise $= \frac{270 \text{ cm}}{60,96 \text{ cm}}$ $= 4,42913...$ $= 4$ Widthwise $= \frac{90 \text{ cm}}{60,96 \text{ cm}} = 1,4763...$ $= 1$ Total $= 4 + 4 + 1 + 1$ $= 10 \text{ people}$

Summative Assessment 2

1.1.1	The desk
1.1.2	Depth = $30 \text{ cm} \div 100$ = 0,3 m
1.1.3	Area = $1,5 \text{ m} \times 0,85 \text{ m}$ = 1,27 = $1,28 \text{ m}^2$
1.1.4	Exterior height of bookshelf = $(110 \text{ cm} + 75 \text{ cm}) - 140 \text{ cm}$ = $185 - 140$ = 45 cm Maximum height of a book = $45 \text{ cm} - 1,5 \text{ cm} - 3 \text{ cm}$ = 40,5 cm
1.2.1	Radius = $8 \text{ cm} \div 2$ = 4 cm
1.2.2	$6 \text{ cm} = 2,36 \text{ inches}$ $1 \text{ cm} = 2,36 \div 6$ = 0,393
1.2.3	Ribbon around the holder = $6 \text{ cm} \times 4$ = 24 cm Extra ribbon = $24 + 8$ = 32 cm
1.2.4	Volume of A = $3,142 \times 4^2 \times 10$ = $502,72 \text{ cm}^3$ Volume of B = $6 \times 6 \times 9$ = 324 cm^3 ∴ Sharon must buy
2.1.1	$4,5 \text{ m} \div 0,3048$ = 14,76377953 ft = 14,76 ft
2.1.2	Perimeter = $2 (\text{length} + \text{width})$ Perimeter = $2(45\text{m} + 25\text{m})$ = 140 m
2.1.3	$6\,000\,000 \text{ cm}^3 = 6 \text{ m}^3$ $V = h \times w \times d$ $6 \text{ m}^3 = \text{height} \times 3\text{m} \times 1\text{m}$ $\frac{6\text{m}^3}{3\text{m}^2} = \text{height}$ 2 m = height
2.1.4	$113,112 \text{ m}^2 \div 1,5 \text{ m}^2$ = 75,408 ℓ = $75,408 \text{ ℓ} \div 20 \text{ ℓ}$ = 3,7 tins ≈ 4 tins $4 \times \text{R2 } 608$ = R10 432 ∴ Not valid

Assembly Diagrams

1.1.1	$32 - (8 + 6 + 8 + 8)$ = 2 bolts
1.1.2	2 nuts
1.1.3	Short brace
1.2.1	Total no of washers = $9 + 8$ = 17
1.2.2	To study
1.2.3	G
1.2.4	10
1.2.5	$4 \times 15 = 60$ desks
1.3.1	Total = $(3 \times 4) + 18 + 18 \checkmark$ MA = 48
1.3.2	Part D
1.3.3	Step 5
1.3.4	Step 1 Attach part B to A Step 2 Attach part D to A Step 3 Place part C onto B and D OR Step 1 Attach part B to C Step 2 Attach part D to C Step 3 Place part A onto B and D
1.4.1	5
1.4.2	Tripod
1.4.3	Clockwise
1.4.4 (a)	H
1.4.4 (b)	G

Models

1.1.1	<p>Bottle diameter = $52 \times 2 \div 1000$</p> <p>Length = width = 0,104 m</p> <p>Bottle height = $327 \div 1000$</p> <p>= 0,327 m</p> <p>Pallet length = $8 \times 0,104$</p> <p>= 0,832</p> <p>Pallet width = $8 \times 0,104$</p> <p>= 0,832</p> <p>Pallet height = 0,327</p> <p>Lengthwise = $8,1 \div 0,832$</p> <p>= 9</p> <p>Width wise = $2,45 \div 0,832$</p> <p>= 2</p> <p>Height wise = $2,6 \div 0,327$</p> <p>= 7</p> <p>Total number of pallets = $9 \times 2 \times 7$</p> <p>= 126</p>
1.1.2	<p>$1,5 \text{ ton} \times 1000 = 1\,500 \text{ kg}$</p> <p>$64 \times 2 = 128 \text{ litre} = 128 \text{ kg}$</p> <p>Number of pallets = $1\,500 \text{ kg} \div 126 \text{ kg}$</p> <p>= 11 pallets</p> <p>His statement is INCORRECT.</p>
1.2.1	<p>Length in cm = $98,43 \times 2,54$</p> <p>= 250,01cm</p> <p>Length in m = $250,01 \div 100$</p> <p>= 2,50m</p>
1.2.2	<p>Along the length = $15 \div 2,50$</p> <p>= 6</p> <p>Along the width = $7,5 \div 2,50$</p> <p>= 3</p> <p>Number of tables = 6×3</p> <p>= 18 tables</p>
1.3.1	<p>Height of the box = 31,8 cm = 0,318m</p> <p>Number of layers = $\frac{2,4m}{0,318m}$</p> <p>= 7,547...</p> <p>= 7 layers</p> <p>His Statement is VALID</p>

1.3.2 **Length of the box and width of the room**

$$\begin{aligned}\text{Length of the box} &= 28 \text{ cm} \div 100 \\ &= 0,28 \text{ m}\end{aligned}$$

$$\begin{aligned}\text{Width of the room} &= 2,6 \text{ m} - 20\% \\ &= 2,08 \text{ m}\end{aligned}$$

$$\begin{aligned}\frac{2,08m}{0,28m} &= 7,43 \\ &= 7 \text{ boxes}\end{aligned}$$

Width of the box and length of the room

$$\text{Width of the box} = 0,23 \text{ m}$$

$$\text{Length of the room} = 2,4 \text{ m}$$

$$\begin{aligned}\frac{2,4m}{0,23m} &= 10,434... \\ &= 10 \text{ boxes}\end{aligned}$$

$$\begin{aligned}\text{Total no of boxes to be packed} &= 7 \times 10 \times 7 \\ &= 490 \text{ boxes}\end{aligned}$$