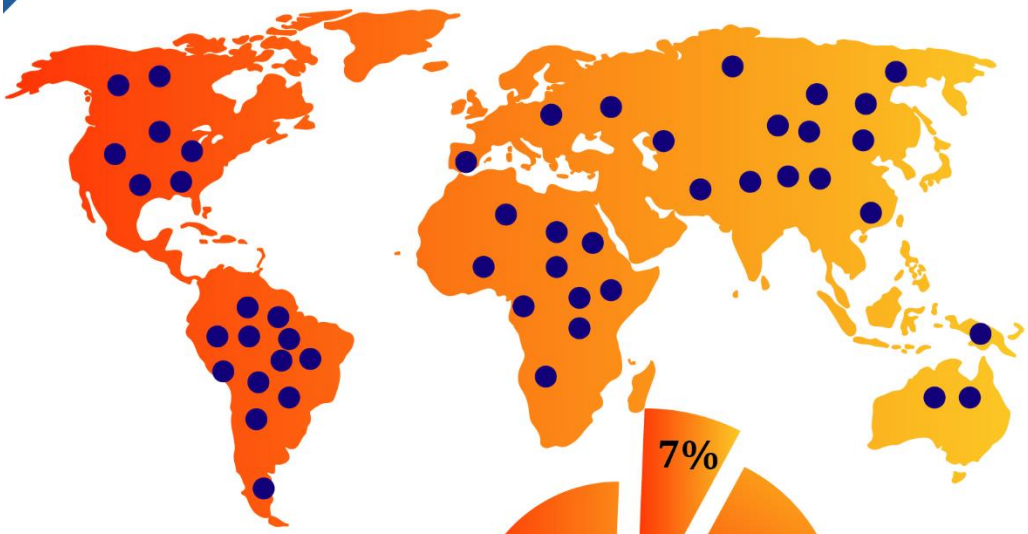
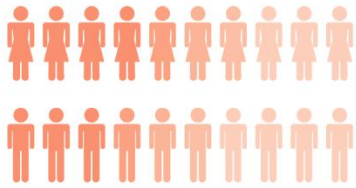
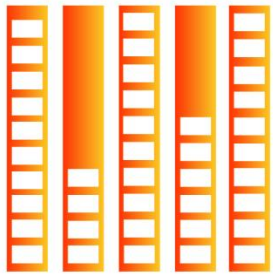
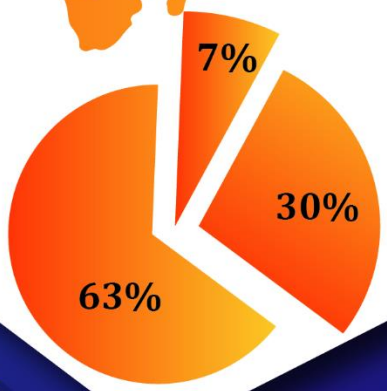
A MAIN STREAM APPROACH TO STATISTICS IN GEOGRAPHY

WORLD PROBLEMS AND DEVELOPMENT









NEW EDITION

REVISION MANUAL

2024

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COMPOUND/ CUMULATIVE LINE GRAPHS (AGGREGATE LINE GRAPH)

It is a form of a line graph designed to show the accumulated total values at various dates or possibly places. Lines are Super- imposed above each other.

Merits/ advantage of the cumulative line graph

- Gives good visual impression
- They are easy to interpret
- Consumes less space
- They are easy to draw
- Can show a wide range of items

Demerits/ disadvantages of the cumulative line graph

- It needs high skill to interpret the graph.
- It needs high skill to construct the graph.
- A problem may arise in the selection of the varied line texture.
- Determining of a suitable scale may be a problem.
- It involves tedious calculation in construction of cumulative table.
- Difficult to find out the value of any one commodity for a particular year since cumulative figures are plotted.

Construction of the compound line graph.

Consider the data given below for Cocoa purchase by province's in Ghana **(1947/48 – 1950/51).**

Year/ province	Togoland	E. province	W. province	Ashanti
1947/48	20	54	28	106
1948/49	26	80	46	126
1949/50	24	67	40	116
1950/51	22	72	45	123

a) Variable determination

Dependent variable – province (y- axis)

Independent variable – years (x- axis)

b) Cumulative value determination for the CUMULATIVE TABLE

YEAR/PROVINCE	TOGOLAND	E.P	W.P	ASHANTI
1947/48	20	74	102	208
1948/49	26	106	152	278
1949/50	24	91	131	247

1950/51	22	94	139	263

c) Vertical and horizontal scale determination.

Vertical scale = $\frac{Highest\ cumulative\ value}{Graph\ space}$

= $\frac{278}{20cm}$ = 13.9 approximately 15

1 cm reps 15 province cocoa purchase

d) **Horizontal Scale** is upon decision thus **1** take **2**cm to represent one year.

e) Start drawing the graph beginning from the biggest values.

f) Use **colors** to shade the components.

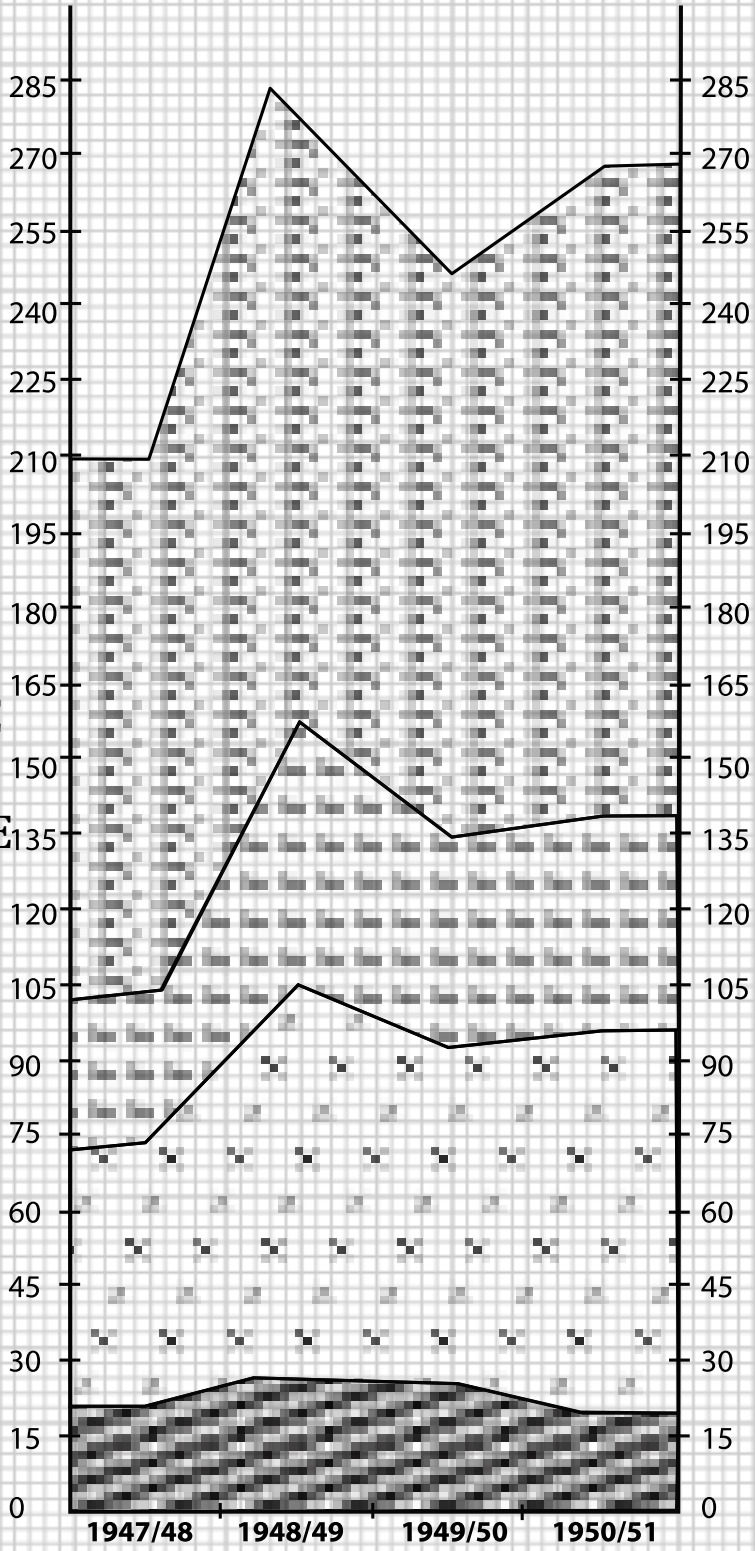
g) Lines are attached to the vertical axis.

h) Interpret the colors by using a key.

i) Lines must not cross each other since plotting depends on cumulative totals.

A COMPOUND LINE GRAPH SHOWING COCOA PURCHASE BY PROVINCE IN GHANA 1947-/48 - 1959/51

SCALE:
vertical scale: 1cm reps 15 province
Horizontal Scale: 2cm reps one year



PROVINCE COCOA PURCHASE

PROVINCE COCOA PURCHASE

KEY

TogoLand

E.P

W.P

Ashant

CIRCULAR GRAPH (POLAR GRAPH OR CLOCK GRAPH)

It is a graph in circular form designed to have bars and circular line to show two attributes whose values appear in varied unit. They are normally used to represent geographical variables/ information such as temperature, rainfall and human activities.

The circle is divided **into twelve equiangular radii.**

Circular graphs are divided into two

- Simple circular graphs
- Compound circular graphs/complex circular

a) SIMPLE CIRCULAR GRAPH

Is drawn to represent information on month and activities only.

Construction procedure

The following tables data show the climate condition for certain weather station in Jerusalem.

Month	J	F	M	A	M	J	J	A	S	O	N	D
TEMP	8	91	12.2	17	21	22	23	24	23	21	17	12
RAINFALL	150	160	70	18	-	-	-	-	-	22	80	90

a) Estimation of the scale to be used

$$\text{Rain value scale} = \frac{Highest\ value}{Graph\ space} = \frac{160mm}{6cm} = 26$$

Approximately **30mm**

Thus the value scale for rainfall is 1cm represents 30mm

$$\text{Temp scale} = \frac{highest\ value}{Graph\ space} = \frac{24}{6cm} = 4$$ approximately 5^0C

Hence the temperature vertical scale **1cm represents 5^0C.**

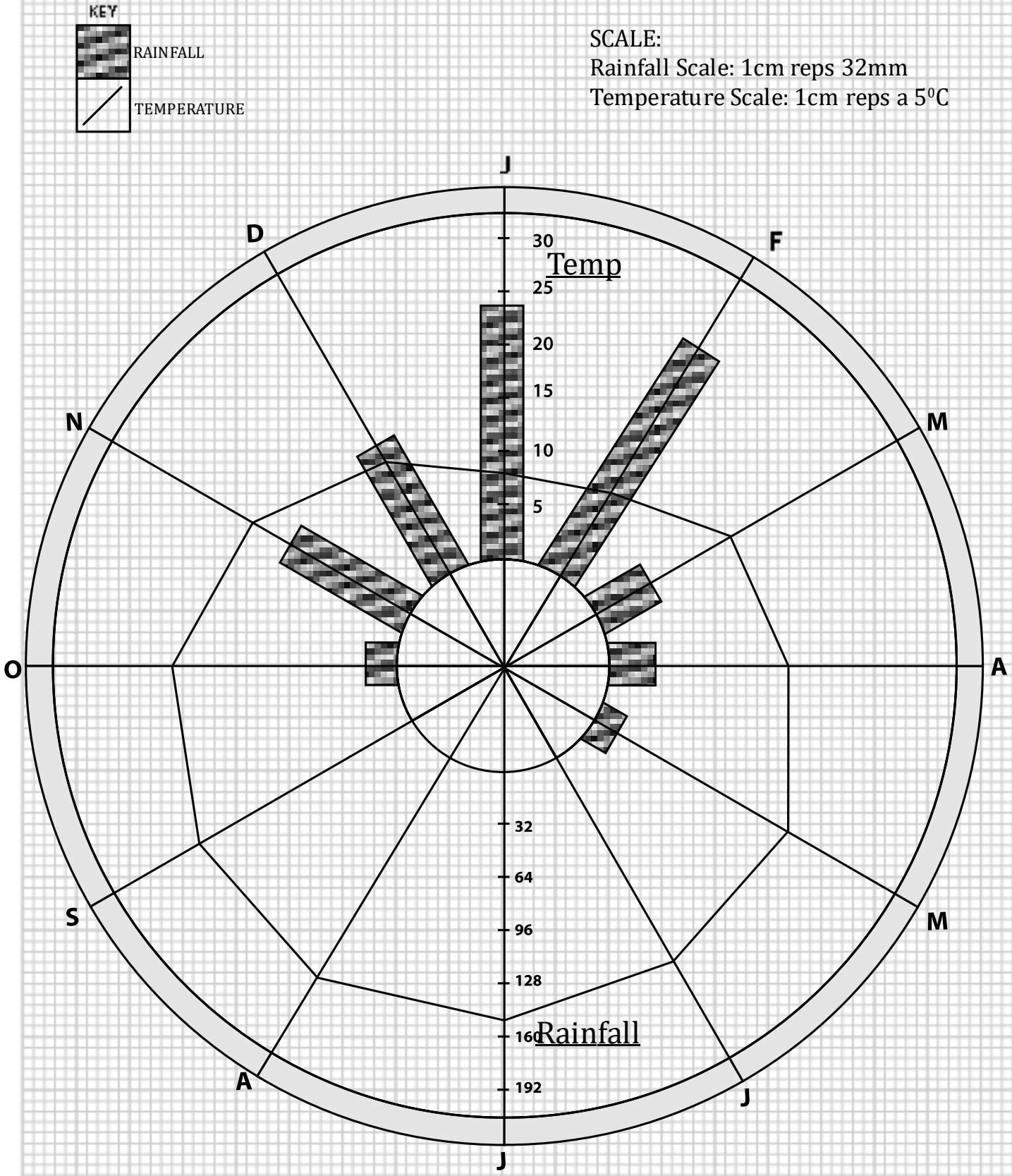
b) Draw a circle or convenient size not very small and not very large.

c) Adjust your compass and draw a small circle in the middle to show agricultural activities given in the table.

d) Bisect/ divide the circle in to twelve segments of equal size, each segments of equal size, each segment is equivalent to 30^0 i.e. $360/12 = 30^0$. The 12 o'clock represents **January** and the rest named up to December clockwise.

e) Bars are drawn either in segments or long the radii to represent rainfall amounts of each month. **Temperature** is indicated by a thick line connecting each month depicting the degrees per month.
f) Provide a key to describe each activity write a title and the scale used when writing months use the initials.

A SIMPLE GRAPH SHOWING THE CLIMATE CONDITIONS FOR A CERTAIN WEATHER CONDITION IN JERUSALEM



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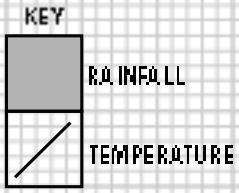
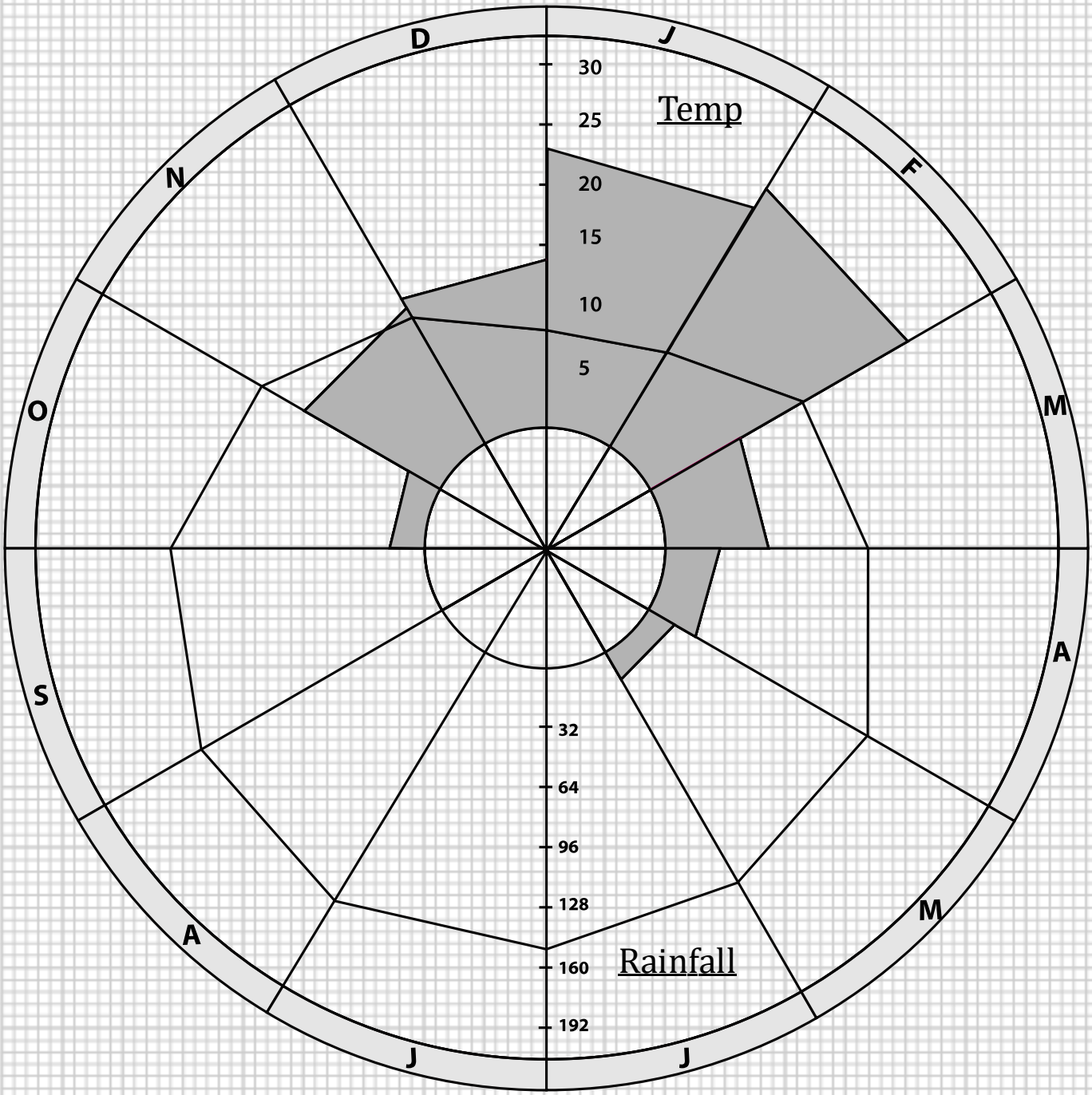


SCALE:
Rainfall Scale: 1cm reps 32mm
Temperature Scale: 1cm reps a 5^0C



PROPORTIONAL SPHERES

The proportional spheres is similar in concept to the proportional cube. It serves in the same purpose as the cube in that the introduction of a 3 dimensional figure allows a wide range of values to be represented, the volume of the sphere being proportional to the quantity being represented

Construction procedure

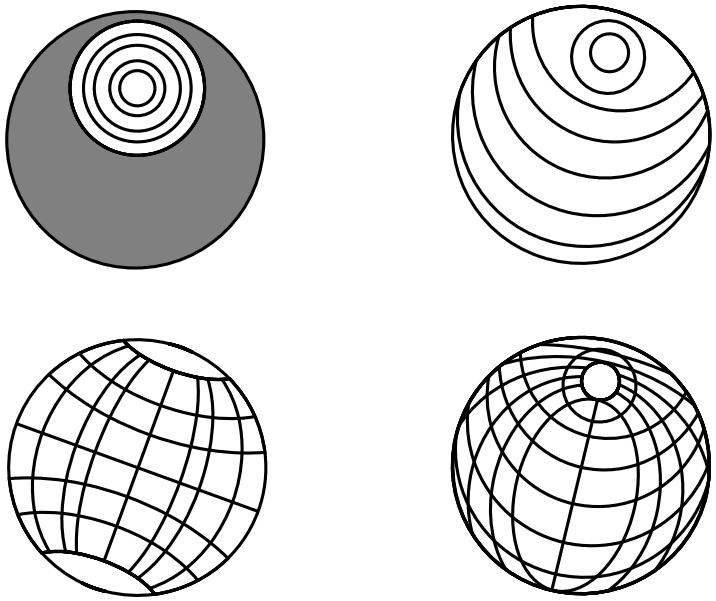
The radius of the sphere is determined by calculating the cube root ($\sqrt[3]{.}$) of the quantity to be represented.

When the values obtained from the roots are big such that they cannot be represented on the paper. We scale them down using appropriate scale, we should be consistent.

The sphere is the drawn in its correct location on the map

The actual drawing of the sphere is to be given 3 dimensional impression is by no mean easy

Several methods can be used for example



Example 1

Consider then table below showing tonnage of good handled at south African ports in 1970

PORTS	TONNAGES
Durban	28,883,764
Cape town	8,119,308
Port Elizabeth	7,198,308
Walvis bay	2,276,446
Mossel bay	209,664

a) Using proportional spheres to represent the above information.
b) State the merits and demerits of using the method above.

Procedures

1. Calculate the cube rot of the quantity to be represented ($\sqrt[3]{.}$)
2. When the values obtained from the roots are big such that they cannot be represented on the paper, we scale them down using appropriate scale which should be consistent.

Solution

Determination of the radius by calculating the ube root ($\sqrt[3]{.}$)

1 cm represents 200 tonnes

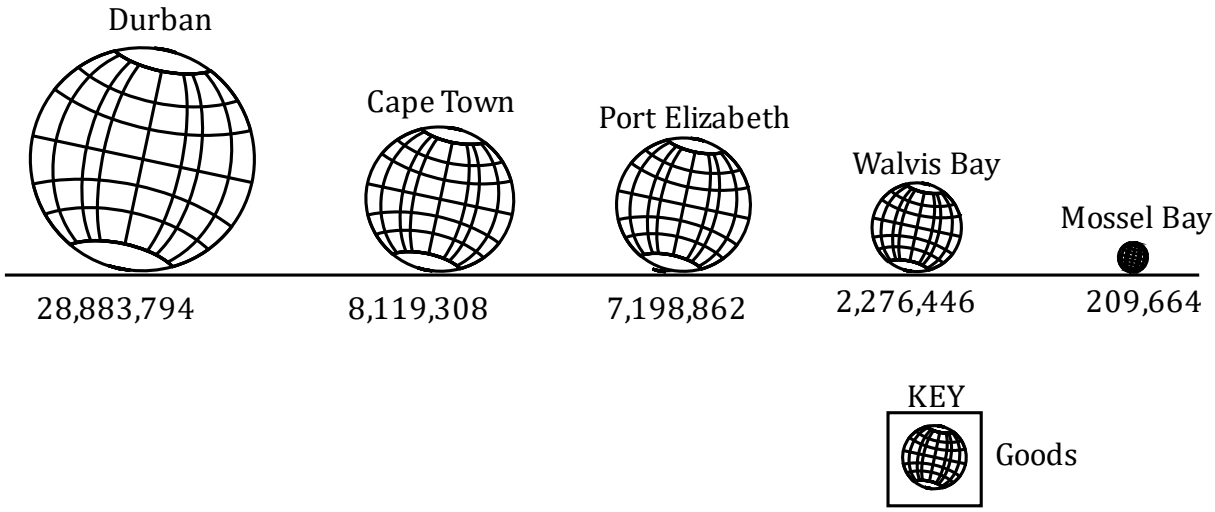
PORTS	($\sqrt[3]{.}$)	SCALE DOWN IN CM
Durban	$\sqrt[3]{28,883,764} = 306.82$	$\frac{306.82}{200} = 1.5cm$
Cape town	$\sqrt[3]{8,119,308} = 200.99$	$\frac{200.99}{200} = 1.00cm$
Port Elizabeth	$\sqrt[3]{7,198,862} = 193.09$	$\frac{193.09}{200} = 0.9cm$
Walvis bay	$\sqrt[3]{2,276,446} = 131.55$	$\frac{131.55}{200} = 0.6cm$
Mossel bay	$\sqrt[3]{209,664} = 59.41$	$\frac{59.41}{200} = 0.2cm$

3. When drawn on the base map, spheres must be drawn to the same patterns.
4. If drawn independently, the spheres should stand individually on a straight line for comparison purposes.
5. A key, and scale should be drawn.

6. It is better to write the relevant quantity on the face of the sphere.

PROPORTIONAL SPHERES SHOWING TONNAGE OF GOODS HANDLED AT SOUTH AFRICAN PORTS IN 1970

SCALE:
1cm rep 200tonnes



Example 2

Study the table below showing population agglomeration of Switzerland and answer the question that follow.

TOWN	URBAN AGGLOMERATION
Basel	364,000
Bern	258,000
Geneva	307,500
Lausenne	214,900
Lusern	148,500
Winter land	671,500

a) Using proportional spheres, represent the above information

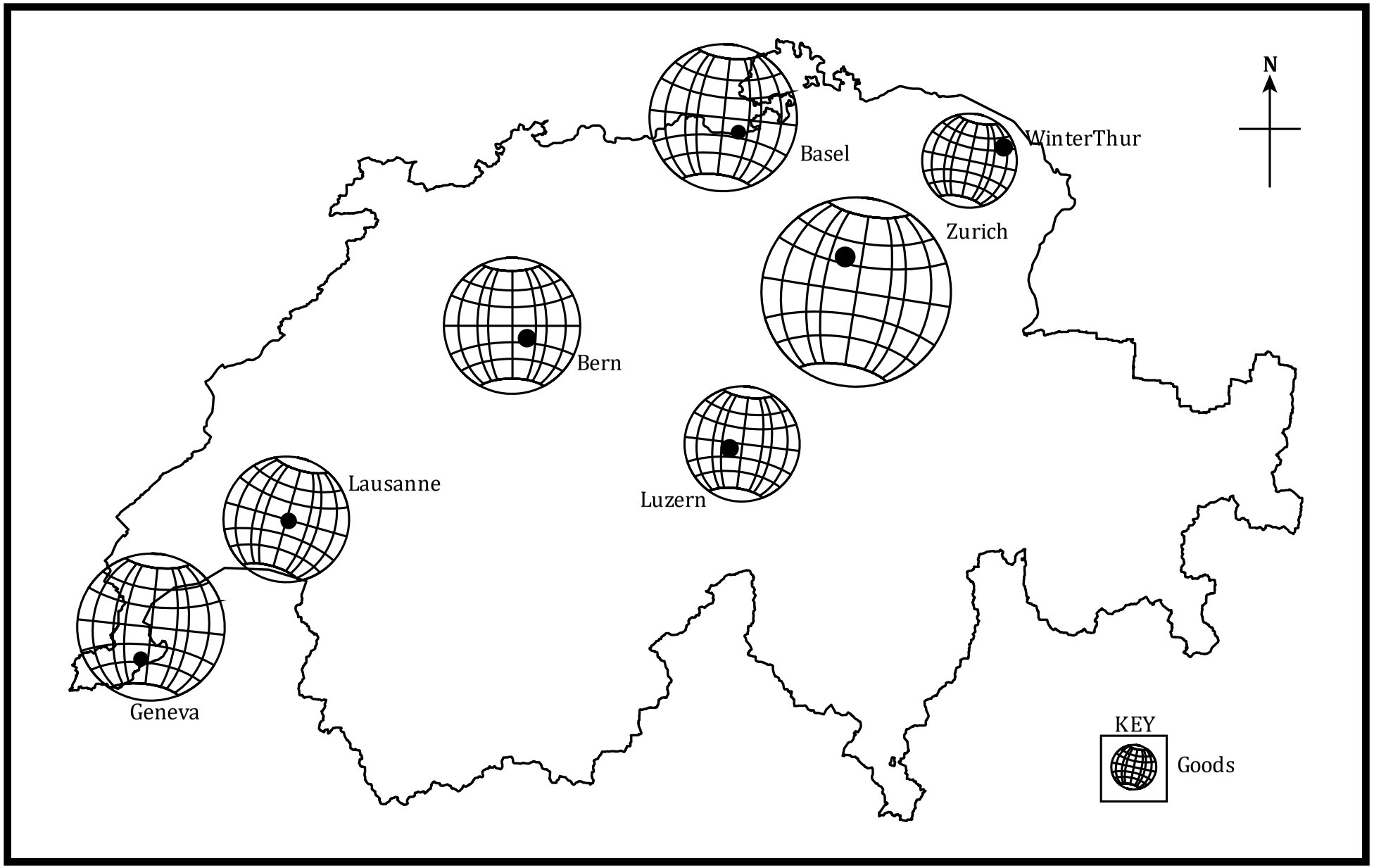
Determination of the radius by calculating the cube root ($\sqrt[3]{.}$)

TOWNS	$(\sqrt[3]{.})$	SCALE DOWN IN CM
Basel	$\sqrt[3]{364,000} = 71.4$	$\frac{71.4}{50} = 1.4cm$
Bern	$\sqrt[3]{288,000} = 66.0$	$\frac{66.0}{50} = 1.3cm$
Geneva	$\sqrt[3]{307,500} = 67.5$	$\frac{67.5}{50} = 1.4cm$
Lausenne	$\sqrt[3]{214,900} = 59.9$	$\frac{59.9}{50} = 1.2cm$
Lusern	$\sqrt[3]{148,500} = 52$	$\frac{52}{50} = 1.1cm$
Winterlhurt	$\sqrt[3]{104,600} = 47.1$	$\frac{47.1}{50} = 0.9cm$
Zurich	$\sqrt[3]{671,500} = 87.6$	$\frac{87.6}{50} = 1.8cm$

Assumed Scale 1 cm represents 50 tonnes

PROPORTIONAL SPHERES SHOWING POPULATION AGGLOMERATION OF SWITERLAND IN TONNES IN 1969

SCALE: 1CM REP 50TONNES



PROPORTIONAL CUBES

These can also be drawn independently or on abase map to show quantitative distribution or production . The quantity to be represented must be calculated if the cubes are not be drawn on the base map they should stand independently for the purposes of comparison on a straight line. On the base map cubes must be drawn with the same patterns. The length of the side of the proportional cubes varies directly related to the cube root of the quantity.

Mode of construction

Example 1

Consider the data below showing tonnage of goods handled at south Africa ports 1970.

PORTS	TONNAGES
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Walvis Bay	2,276,446
Mossel Bay	209,664

a) Using proportional cubes represents the above information.
b) State the merits and demerits of using the method above.

Procedures

a) Calculate the cube root of the quantity to be represented ($3\sqrt{.}$)
b) When the values obtained from the roots are big such that they cannot be represented on the paper we scale them down using appropriate scale which should be consistent.

1cm represents 200 tons

Cube root determination.

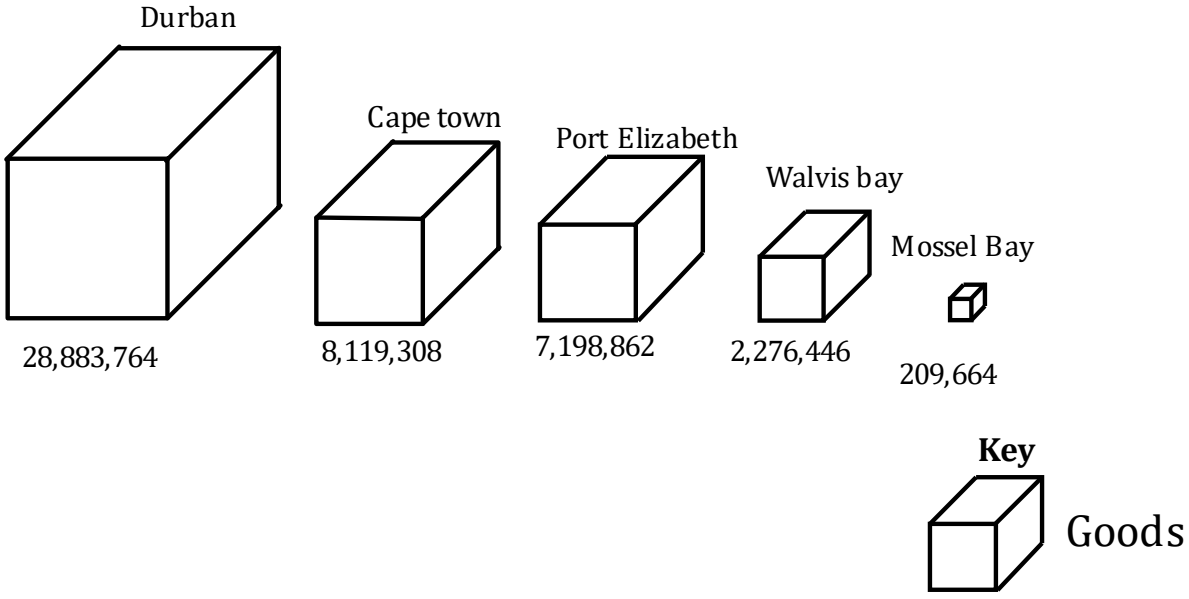
PORTS	$3\sqrt{.}$	Scaled down in cm
Durban	$3\sqrt{28,883,764} = 306.82$	$\frac{306.82}{200} = 1.5cm$
Cape town	$3\sqrt{8,119,308} = 200.99$	$\frac{200.99}{200} = 1.00cm$
Port Elizabeth	$3\sqrt{7,198,862} = 193.09$	$\frac{193.09}{200} = 1.5cm$
Walvis Bay	$3\sqrt{2,276,446} = 193.09$	$\frac{131.55}{200} = 1.5cm$

Mossel Bar	$3\sqrt{209,664} = 59.41$	$\frac{59.41}{200} = 1.5cm$

c) When drawn on the base map, cubes must be drawn to the same patterns
d) If drawn independently the cubes should stand individually on a straight line for comparison purposes.
e) A key, title and scale should be drawn it is better to write the relevant quantity on the face of the cube.

PROPORTIONAL CUBES SHOWING TONNAGE OF GOODS HANDLED AT SOUTH AFRICA PORTS IN 1970

SCALE 1CM represents 20 TONNES



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Winter thor	104,600
Zurich	671,500

a) Using proportional cubes represents the above information

Procedure

a) Cube root determination

TOWNS	$3\sqrt{.}$	SCALED DOWN
Bassel	$3\sqrt{364,000} = 71.4$	$\frac{71.4}{50} = 1.4cm$
Bern	$3\sqrt{288,000} = 63.7$	$\frac{63.7}{50} = 13cm$
Geneva	$3\sqrt{307,500} = 67.5$	$\frac{67.8}{50} = 1.4cm$
Lausanne	$3\sqrt{214,900} = 59.9$	$\frac{59.9}{50} = 1.2cm$
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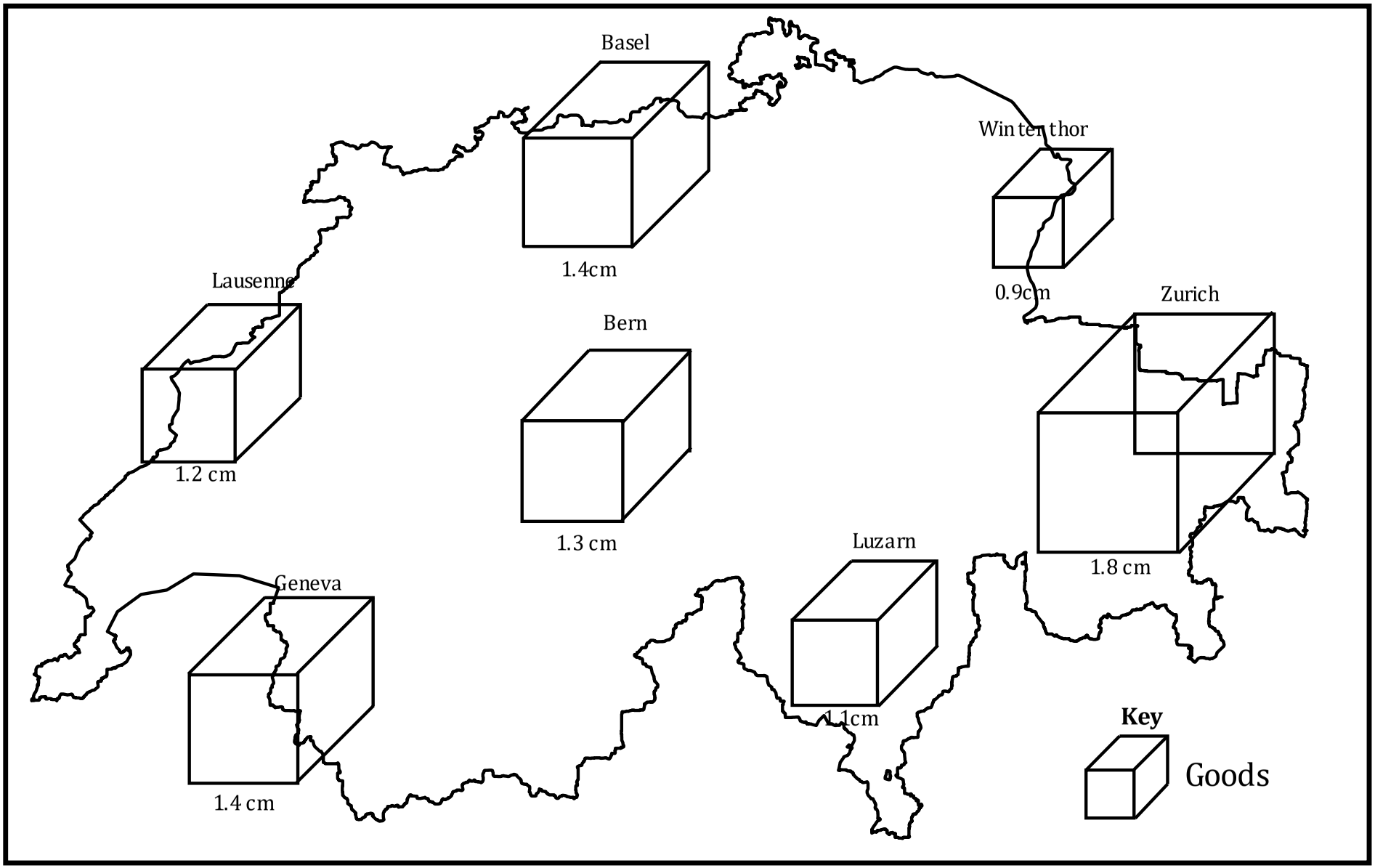
Winter thor	$3\sqrt{104,600} = 47.1$	$\frac{47.1}{50} = 0.9cm$
Zurich	$3\sqrt{671,500,876} = 87.6$	$\frac{87.6}{50} = 1.8$

PROPORTIONAL CUBES SHOWING POPULATION OF AGGLOMERATION OF SWITZERLAND

Scale: 1 cm represents 50 people per city



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