Geography

CLASS TEXT & STUDY GUIDE

Susan Rushton

GRADE

12

CAPS

3-in-1

THE ANSWER SERIES
Your Key to Exam Success

Grade 12 **Geography** 3-in-1 CAPS

CLASS TEXT & STUDY GUIDE

This well-illustrated Grade 12 Geography 3-in-1 study guide uses concise explanations and a wide range of practice exam questions with memos, to help you master all the concepts in the curriculum.

Key Features:

• Comprehensive notes arranged into modules and units

• Exam questions and memos per module

• Mapwork section with notes and examples of various types of exam questions and calculations

• Colour topographical map and orthophoto

This study guide is an ideal learning companion for all Grade 12 Geography learners, from those who are struggling to grasp basic concepts to those who are determined to achieve top marks.

THE ANSWER SERIES *Your Key to Exam Success*

GRADE

12

CAPS

3-in-1

Geography

Susan Rushton

THIS CLASS TEXT & STUDY GUIDE INCLUDES

1 Notes

2 Questions and Memos per Module

3 Mapwork

Orthophoto and colour Topographical Map included

eBook available

THE **ANSWER** SERIES *Your Key to Exam Success*

CONTENTS

NOTE:

When interpreting a synoptic weather map, one must be able to:

1. Identify the season e.g. summer, winter.

2. Read and interpret the isobars and isobaric patterns.

3. Identify and name the three high pressure systems (South Atlantic, South Indian, Kalahari).

4. Identify the mid-latitude cyclones and associated frontal systems (cold, warm, occluded).

5. Draw a cross section of a frontal system labelling the main features.

6. Identify the air movement and the associated wind (remember a wind is named by the direction from which it blows).

7. Identify and explain the origin and effect of berg winds, coastal lows, tropical cyclones.

8. Predict the weather conditions as the frontal systems approach or move over a weather station.

9. Describe the weather conditions by analysing the information of a weather station.

10. Compare the synoptic weather map with a satellite image and identify relative frontal systems and pressure zones.
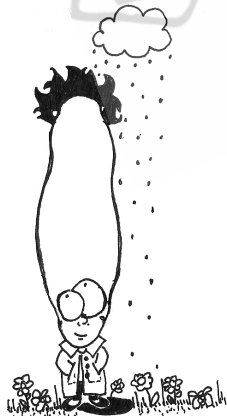
TROPICAL CYCLONES

General characteristics

▸ Tropical cyclones occur from late summer to early autumn.

▸ They move from east to west as they form in the tropical easterly wind belt.

▸ They affect the east coasts of continents.

▸ They dissipate when they reach cooler latitudes or as they reach land (friction slows the wind and there is less moisture to provide energy).

▸ They are named alphabetically. The first tropical cyclone of the season starts with the letter A, followed by B, C etc., e.g. Cyclone Eline – 5th cyclone of the season.

▸ The centre of the tropical cyclone is called the **'eye'** and has:

  ▹ a calm central point
  ▹ light or no winds
  ▹ no rain
  ▹ very low pressure (960 hPa)
  ▹ a 30 - 50 km area of subsiding air
  ▹ high temperatures (± 32ºC)
  ▹ towering cumulonimbus clouds surrounding it

Cross section through a tropical cyclone
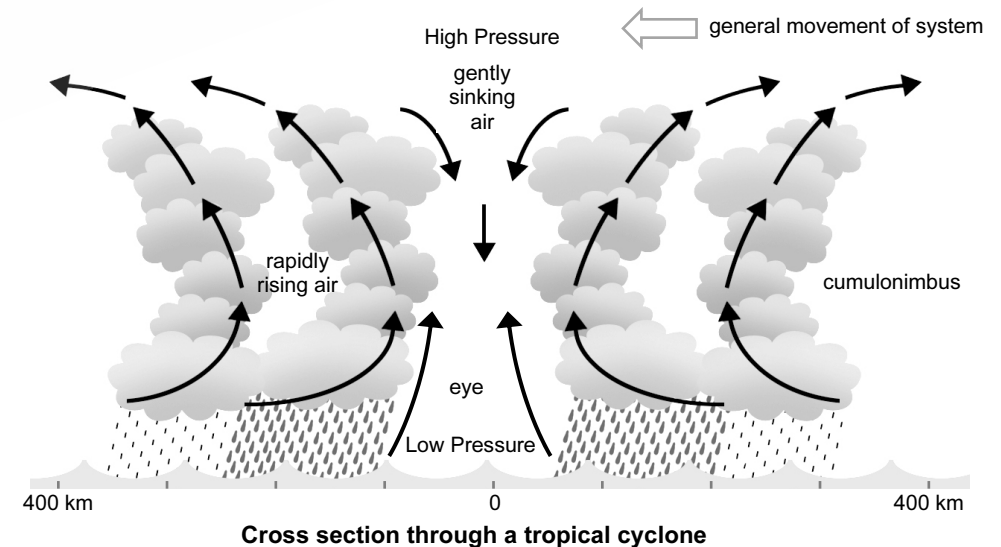
Development of travelling disturbances associated with anticyclonic circulation

Moisture front and Line thunderstorms
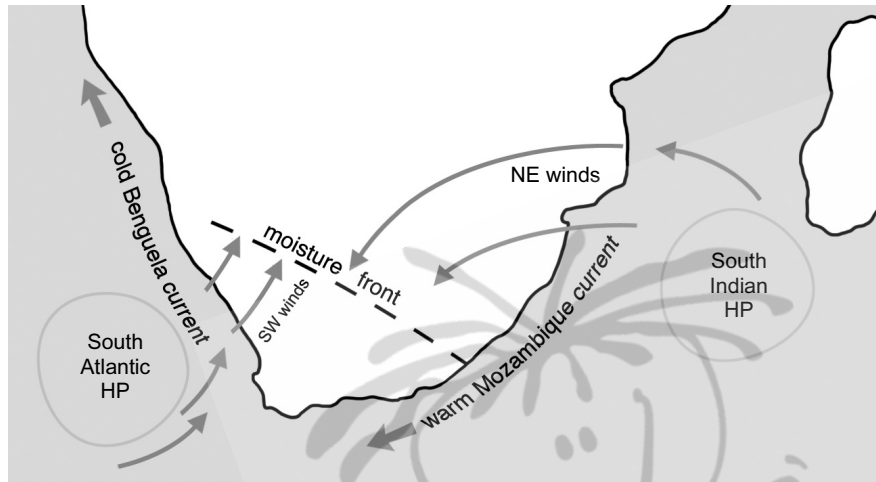
The moisture front and formation of line thunderstorms

▸ A moisture front is formed at the convergence zone of air masses from the Atlantic and the Indian Ocean.

▸ The South Atlantic High Pressure brings in SW winds from the Atlantic Ocean. This air is cold and does not hold much moisture. The Atlantic Ocean (Benguela current) is cold and so feeds cold, dry air onto the land from the west.

NB: Cold air cannot hold much moisture.

▸ The South Indian High Pressure brings in NE winds from the Indian Ocean. This air is warm and moist. The Indian Ocean (Mozambique current) is warm, so warm moist air is fed onto the land from the east.

NB: Warm air can hold more moisture.

▸ The cold, dense Atlantic air (SW) moves in underneath the warm, moist Indian air (NE), forcing it upwards. This results in a moisture front and causes condensation and convection clouds to develop.

▸ The moisture front brings a **line of thunderstorms** and heavy rainfall over the central parts of South Africa. Also called a 'storm line'.

Coastal Low Pressure system

▸ Coastal low pressures develop over the coast of Namibia and move around the coast.

▸ The circulation is clockwise and this causes onshore winds on the one side and off-shore winds on the other side.

South African berg wind

▸ A berg (mountain) wind usually occurs during winter.

▸ It is a hot, dry wind and is followed by a cold front and cold, wet weather.

▸ **Formation of a berg wind:**
  ‣ High pressure over the interior; low pressure on the coast.
  ‣ Cold front approaches the land and sets up a pressure gradient between the interior high and coastal low pressure.
  ‣ This causes warm air to move from the interior towards the coastal area.
  ‣ As these winds blow down from the plateau/mountains to the coast, they heat up adiabatically and bring warm, dry conditions.
  ‣ Berg winds usually occur along the east coast and move along the coast towards KwaZulu-Natal.

▸ Berg winds bring warm, dry conditions and consequently a threat of veld fires.
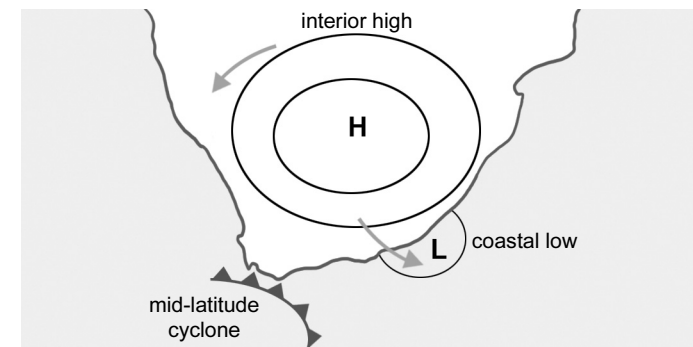
Berg wind

QUESTION 13

The diagrams below are representations of a city's climate.

[Adapted from http://www.buzzle.com/articles/causes-and-effects-of-temperature-inversion.html]
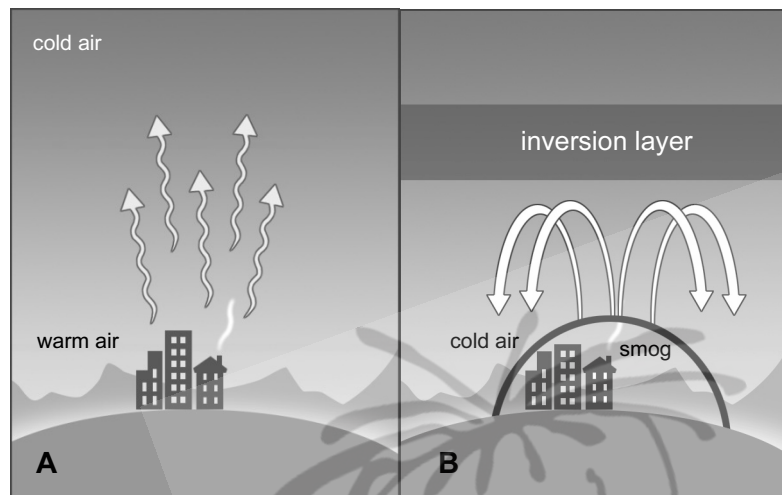
13.1 Which sketch, **A** or **B**, represents the daytime city climate? (1×1) (1)

13.2 Give ONE reason to support your answer to Question 13.1. (1×2) (2)

13.3 Give ONE reason for the occurrence of smog in sketch **B**. (1×2) (2)

13.4 Suggest ONE reason for the absence of smog in sketch **A**. (1×2) (2)

13.5 In a paragraph of approximately EIGHT lines, discuss various
sustainable solutions to limit the formation of smog in a city. (4×2) (8)

QUESTION 14

Refer to the diagram on city climates below. Choose the correct word(s) from those given in brackets. Write only the word(s) next to the question number (14.1 - 14.8).
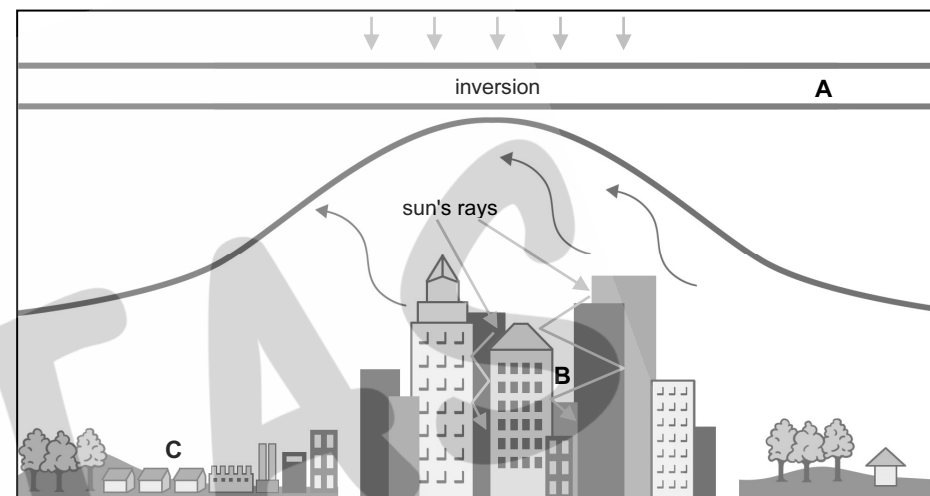
[Source: Examiner's own sketch]

14.1 The sketch shows a (day/night) situation.

14.2 The inversion layer is found at a (higher/lower) altitude during the night.

14.3 The inversion layer (increases/decreases) pollution concentration over the city during the night.

14.4 The heating of the city at **B** is the result of (multiple reflections of heat/terrestrial radiation).

14.5 The channelling of wind between tall buildings (increases/decreases) the wind speed.

14.6 Temperature (increases/decreases) from **B** to **C**.

14.7 The influence of evapotranspiration on cooling the air will be (less/more) at **B** compared to at **C**.

14.8 Area **B** is associated with (more/less) cloud coverage compared to area **C**. (8×1) (8)

QUESTION 5

Refer to the photograph below of a river channel pattern, and answer the questions that follow.
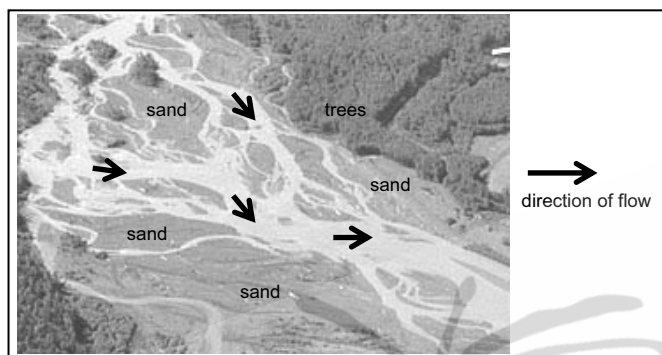
[Adapted from http://www.geologyclass.org/Stream%20Concepts_files/image002.jpg]

5.1 Name the river channel pattern in the photograph. (1 × 1) (1)

5.2 State ONE stream process that would have encouraged the formation of this stream channel pattern. (1 × 1) (1)

5.3 In which course of the river would you find the stream channel pattern in the photograph? (1 × 1) (1)

5.4 Describe the process involved in the river breaking up into smaller channels. (2 × 2) (4)

5.5 Analyse the role that the trees would have played in the stream discharge. (2 × 2) (4)

5.6 Suggest, with a reason, whether the stream channel pattern in the photograph would be found permanently, or seasonally, in rivers in the interior of South Africa. (2 × 2) (4)

QUESTION 6

Study the diagram below which shows the longitudinal profile of a graded river.
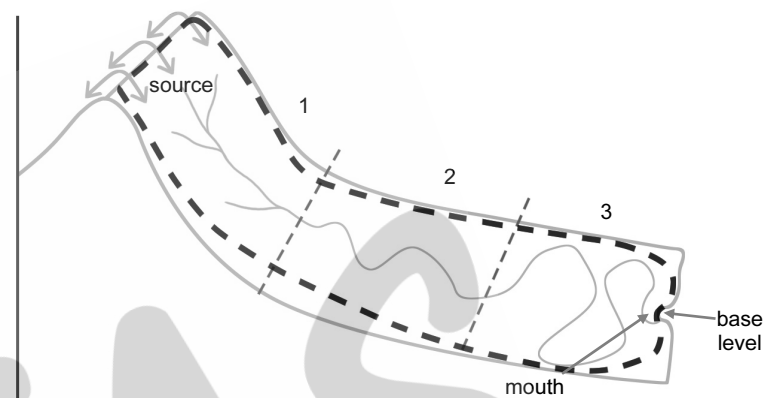
[Adapted from Yorkshiredalesrivertrust.com]

6.1 What is meant by the term *base level* of a river? (1 × 1) (1)

6.2 Why is the sea regarded as a permanent base level? (1 × 2) (2)

6.3 What evidence in the diagram indicates that this river is graded? (1 × 2) (2)

6.4 Why will a drop in sea level change the grading of the river? (2 × 2) (4)

6.5 Draw a simple longitudinal profile to show the impact of the drop in sea level, mentioned in Question 6.4, on the shape of the longitudinal profile. (1 × 2) (2)

6.6 Explain how the interaction between erosion and deposition in the upper and lower courses of a river help to maintain a graded profile. (2 × 2) (4)
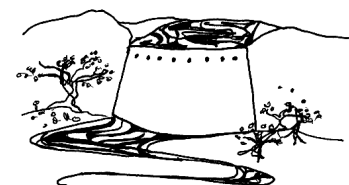
QUESTION 12

Study the diagrams below showing urban sprawl in an urban settlement from 1980 to 2020.

[Source: Unknown]

12.1 Define the term *urban sprawl*. (1 × 1) (1)

12.2 Describe the effect of urban sprawl on housing density in this urban settlement. (1 × 1) (1)

12.3 Give a possible reason why area **A** was not used for urban development in 1980. (1 × 2) (2)

12.4 (a) Which street pattern would be most suitable for area **A** in the diagram for 2020? (1 × 2) (2)

(b) Give ONE reason for your answer to Question 12.4(a). (1 × 2) (2)

12.5 In a paragraph of approximately EIGHT lines, evaluate the effect that urban sprawl will have on the natural environment at **A** in 2020. (4 × 2) (8)

QUESTION 13

Refer to the following extract on rural-urban migration.

HOPE

Susanne Melda, 26 November 2012

Rural-urban migration is believed to affect various dimensions of migrants' well-being. Desires, such as the opportunity to improve the standard of living and better services, are not always met.

The process of migration is often undertaken with an aspiration (desire) of improved opportunities for socio-economic advancement. However, it does not always entail improvement of living standard and poverty eradication. Rural migrants settling in big cities are the most vulnerable and may experience detrimental (unsafe) living conditions.

[Adapted from www.migratingoutofpoverty.org]

13.1 What is *rural-urban migration*? (1 × 1) (1)

13.2 The extract implies 'hope' from rural-urban migration. What are the migrants expecting in the urban areas? (1 × 2) (2)

13.3 Explain why rural-urban migration does not always lead to an improvement in the standard of living of rural migrants. (2 × 2) (4)

13.4 In a paragraph of approximately EIGHT lines, evaluate the negative impact of rural-urban migration on cities. (4 × 2) (8)

QUESTION 9

Refer to the diagram and graph below showing statistics on gold mining in January 2017.

GAUTENG GOLD MINES

VAAL RIVER OPERATIONS
473 000 oz
Gauteng, Anglogold, Ashanti

WEST WITS OPERATIONS
680 000 oz
Gauteng, Anglogold, Ashanti
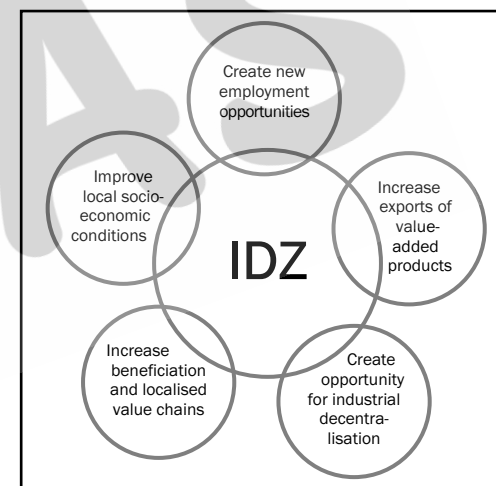
DRIEFONTEIN
603 600 oz
Gauteng Sibanya

KLOOF
513 700 oz
Gauteng Sibanya

SOUTH DEEP
302 000 oz
Gauteng Goldfields

SA GOLD PRODUCTION

120
110
100
90
80

2014   2015   2016   2017

GOLD PRODUCERS

KEY: mt – million tons

455 mt China
270 mt Australia
250 mt Russia
209 mt US
170 mt Canada
150 mt Peru
140 mt South Africa
125 mt Mexico
100 mt Uzbekistan
100 mt Indonesia
90 mt Ghana
70 mt Brazil

[Adapted from http://www.kitco.com/ind/Media/images/South_Africa.jpeg and http://www.statssa.gov.za/wp-content/uploads/2-18/02/Infographic_v04-1]

9.1 Name the province where the most gold is mined in South Africa.

9.2 Which gold mine in Gauteng produces the most gold per ounce (oz) in South Africa?

9.3 Name the mining company that produced the most gold.

9.4 Name the country with the highest production of gold in the world.

9.5 What is the ranking of South Africa in terms of gold production in the world?

9.6 Calculate the contribution that Africa made to the world's gold production in January 2017.

9.7 At the end of which year did South Africa's gold production drop to its lowest point?

9.8 Is the most recent production of gold in South Africa showing an increasing or decreasing trend? (8×1) (8)

QUESTION 10

Refer to the diagram below based on industrial development zones (IDZ), which create opportunities for industrial decentralisation.

Create new employment opportunities

Improve local socio-economic conditions

Increase exports of value-added products

IDZ

Increase beneficiation and localised value chains

Create opportunity for industrial decentra-lisation

[Source: Examiner's notes]

10.1 Give an example of an IDZ in South Africa. (1×1) (1)

10.2 What is the main aim of an IDZ? (1×1) (1)

10.3 How does an IDZ create the opportunity for industrial decentralisation? (2×2) (4)

10.4 State TWO advantages of industrial decentralisation for the core industrial regions in South Africa. (2×2) (4)

10.5 Explain how an IDZ will improve local socio-economic conditions. (2×2) (4)

Example:

▸ The map of Mapungubwe has a map sheet reference code of **2229AB**.

▸ This code can be broken down as follows:
  ⊳ 22 = 22º South (latitude)

  ⊳ 29 = 29º East (longitude)

  ⊳ AB refers to squares A and B
    The area of (1º × 1º) within
    these lines of latitude and
    longitude is divided into 4 big
    squares, labelled A, B, C
    and D. Each big square is
    subdivided into 4 smaller
    squares, also labelled
    A, B, C and D.
    (AB in the map sheet
    reference of Mapungubwe
    therefore refers to big
    square A and small square B).
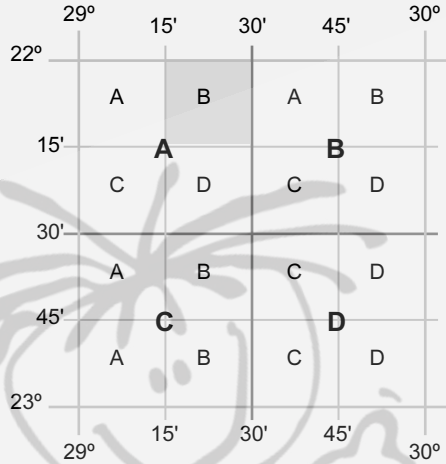
▸ The map sheet reference of Mapungubwe 2229AB is shaded on the grid above.

> *You must be able to give the map sheet reference in any direction from a given map sheet reference.*

Worked Examples

1. Give the map sheet reference of the map immediately to the east of Mapungubwe 2229AB.

   Answer: 2229BA

2. Give the map sheet reference of the map immediately to the north of Mapungubwe 2229AB.

   Answer: 2129CD

Test Your Understanding 2

(Answers on p. 125)

The map sheet reference of Clanwilliam is 3218BB.

1. Give the map sheet reference of the map directly to the south of 3218BB.

2. Give the map sheet reference of the map directly to the east of 3218BB.

Bearing

▸ Bearing is an accurate way of giving the direction of one place in relation to another. It is a compass point measured in degrees from 0º to 360º.

▸ We distinguish between **true bearing** and **magnetic bearing**.

True bearing

▸ **True bearing (TB)** is the angle measured clockwise from true north to a specific point or position.

> *True north is the direction towards the geographic north pole.*

Method

▸ Draw a north-south line through the place **from** which the measurement is to be taken (e.g. A).

▸ Draw a straight line between the two places, e.g. A and B.

▸ Place a protractor along the north-south line with 0º on the north-south line.

▸ Measure the angle in a clockwise direction from the true north line to the bearing line A to B.

▸ The answer will be in degrees, e.g. 129º.
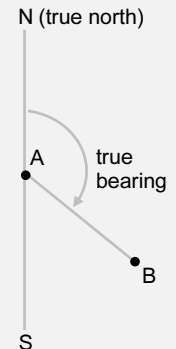
Worked Examples

1. On a topographical map (scale 1 : 50 000)

2,5 cm

A   B
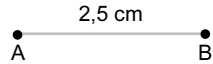
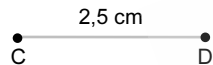Calculate the actual distance between point A and B in kilometres.

Answer:

Distance measured on topographical map in cm: 2,5 cm

Scale: 1 cm represents 0,5 km in reality

$\therefore$ Distance $= 2,5 \times 0,5$

            $= 1,25$ km

2. On an orthophoto map (scale 1 : 10 000)

2,5 cm

C   D

Calculate the actual distance between point C and D in kilometres.

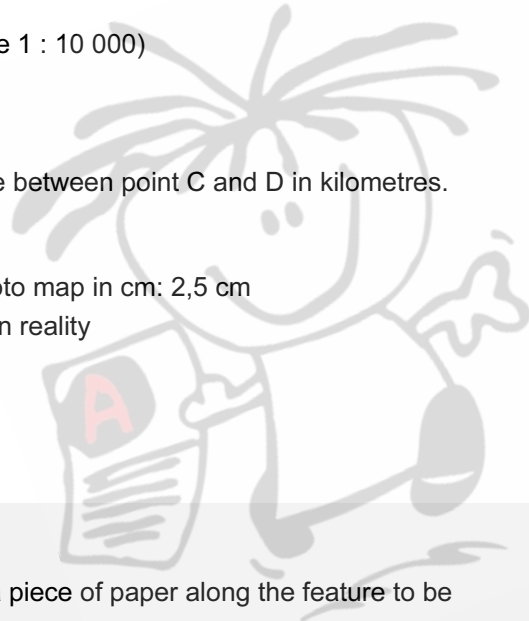**Answer:**

Distance measured on orthophoto map in cm: 2,5 cm

Scale: 1 cm represents 0,1 km in reality

$\therefore$ Distance $= 2,5 \times 0,1$

            $= 0,25$ km

Curved line distance

Method

▸ Place the straight edge of a piece of paper along the feature to be measured, e.g. road.

▸ Mark the beginning point of the feature on the edge of the paper. Hold the paper steady with the point of a pencil.

▸ Swivel the paper to follow the road.

▸ Mark where the paper intersects with the road.

▸ Mark the end point of the road on the paper.

▸ Measure the distance marked off on the paper.

▸ Calculate the distance in reality by using the scale of the map.

Worked Example

Calculate the distance along the international boundary from A to B, on the topographical map extract below, in kilometres.
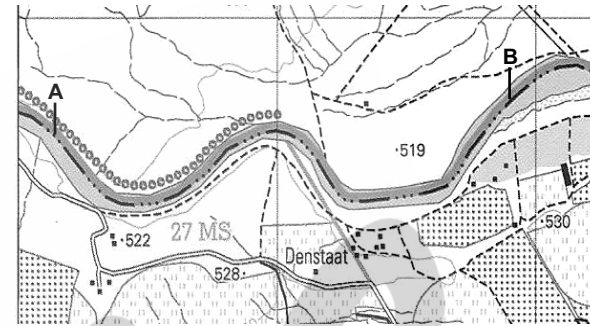
Answer:

Distance measured on map in cm: 7,5 cm

Scale: 1 cm represents 0,5 km in reality

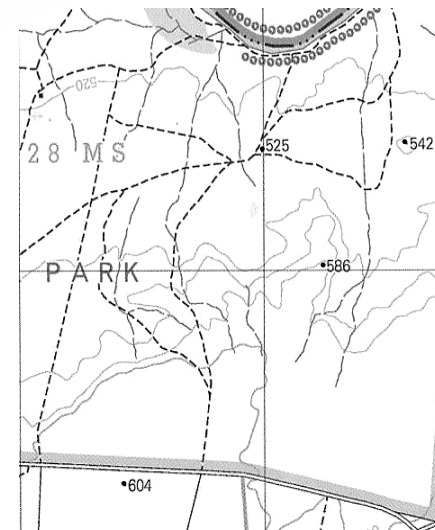$\therefore$ Distance $= 7,5 \times 0,5$

              $= 3,75$ km

Remember it is a topographical map with scale 1 : 50 000.

Test Your Understanding 6

(Answers on p. 126)

1. Calculate the following distances on the topographical map extract below.

1.3.1 What is *attribute data*? (1 × 2) (2)

1.3.2 Give ONE attribute provided by the bar graph. (1 × 2) (2)

1.3.3 Explain how you can use the attributes provided by the bar graph. (2 × 2) (4)

1.4 Refer to the orthophoto map which shows a high spatial resolution.

1.4.1 Explain the term *spatial resolution*. (1 × 2) (2)

1.4.2 Why can one say that the orthophoto map has a high spatial resolution? (1 × 2) (2)

1.5 How can GIS assist city planners to determine where a new shopping centre can be built in Harrismith? (2 × 2) (4)

/20/

QUESTION 2

2.1 Study the map below (Figure 2.1) which shows the path of the tornado that tore through Harrismith a few years ago. Many data layers were used to draw this map.

FIGURE 2.1
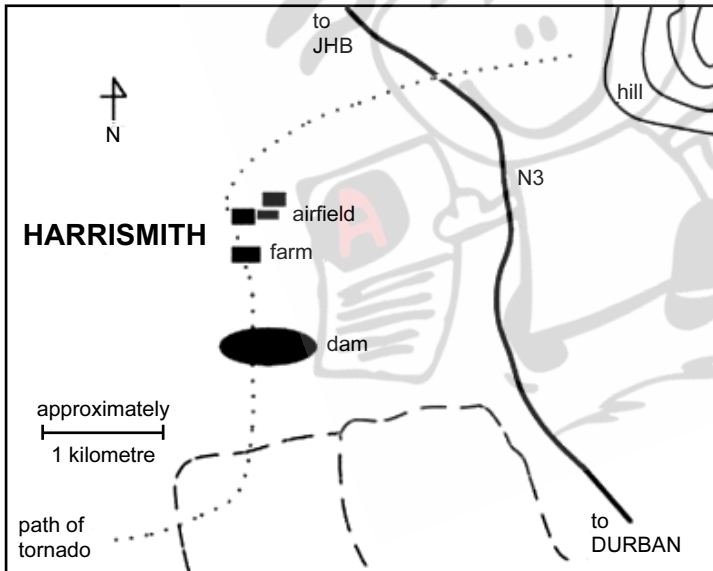
[Source: Goliger en Van Wyk]

2.1.1 Define the term *data layering (overlaying)*. (1 × 2) (2)

2.1.2 Name TWO data layers visible on the map (Figure 2.1). (2 × 2) (4)

2.1.3 GIS is useful in disaster management. Explain how it would have assisted the local authorities with planning after the tornado struck. (2 × 2) (4)

2.2 Study the photo (Figure 2.2) of the N3 that bypasses Harrismith and connects Durban and Johannesburg.

FIGURE 2.2

[Source: Google]

2.2.1 Differentiate between *spatial data* and *attribute data*. (2 × 2) (4)

2.2.2 What type of spatial object (point, line or polygon) is on the road? (1 × 2) (2)

2.2.3 Give ONE attribute that can be captured for the N3. (1 × 2) (2)

2.3 If a vehicle with a global positioning system (GPS) approaches Harrismith, how can the GPS assist the driver to find the hospital numbered **10** on the orthophoto map? (1 × 2) (2)

/20/

QUESTION 3

3.1 What does the term *data layering* mean? (1 × 2) (2)

3.2 Name any TWO layers of information that one can identify in block **G3** on the topographical map. (2 × 2) (4)

3.3 State TWO uses of data layering in GIS. (2 × 2) (4)

3.4 Explain the meaning of the following terms:

3.4.1 Buffering (1 × 2) (2)

3.4.2 Querying (1 × 2) (2)

/14/