

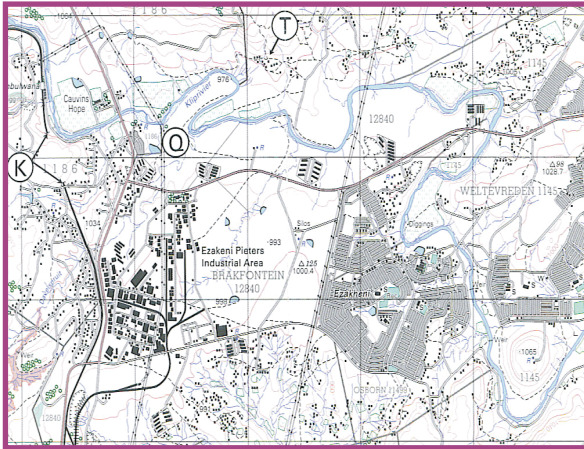
WELCOME

REFER to the map/orthophoto of Ladysmith:

A. CALCULATIONS

Refer to the extract provided:

Always use this scale. **1 cm represents 0.5 km**



1. Calculate the straight-line-distance (SLD) from .993 to trig beacon 98.

Map distance = 8.5 cm
Scale = 1 cm → 0.5 km
SLD = 8.5 X 0.5 km
= **4.25 km**

2. Calculate the average gradient between .993 and trig beacon 98.

Gradient = VI/HE
[VI = Higher - Lower
= 1027.7 m - 993 m
= 34.7 m
HE = SLD
= 4.25 km (calculated in 1)
= 4250 m (X 1000)]

Now substitute in formula above...

= 34.7/4250
= 1 : 122.478 (4250 / 34.7)
= **1 : 122 (rounded off)**

INTERPRETATION OF GRADIENT:

- 1 : 40 - suitable for construction of railways
- < 1 : 40 - gradient getting steep...roads can be constructed.
- [Hint: Check contours between places]
- > 1 : 40 - gradient very **gentle to flat** suitable for all types of construction less costly.
- 1 : 122 - very flat gradient - see the well-spaced contours.

3. Calculate area of mapped region (in extract):

AREA = L X B
= (16 X 0.5 km) X (9.5 X 0.5 km)
= 8 km X 4.75 km
= **38 square km.**



4. Provide the grid reference for trig beacon 98:

State the latitude : 28 37' and (2mm/37mm X 60/1)" S (= 3.243")
State the longitude: 29 54' and (23mm/32mm X 60/1)" E = (43.125")

Therefore Grid Reference of trig beacon 98 is:

28 37' 3" S and 29 54' 43" E.

5. Calculate the Mean Magnetic Declination for the map for 2008:

Step 1: Magnetic Declination for map for 2001 is 21 03' W.

Step 2: Mean Annual Change = 8' westwards
[Both steps 1 and 2 info obtained from map margin]

Difference in years = 2008 - 2001 = 7 years

Note: If MAC is WADD

Note: If MAC is ESUBTRACT

Step 3: Therefore magnetic decl for 2008 = Mag Decl (Step 1) + - (Difference in years X MAC) (Step 2)
= 21 03' + (7 X 8')
= 21 03' + 56'
= **21 59'W**

6. Calculate the TRUE/GEOGRAPHIC BEARING of .993 from trig beacon 98.

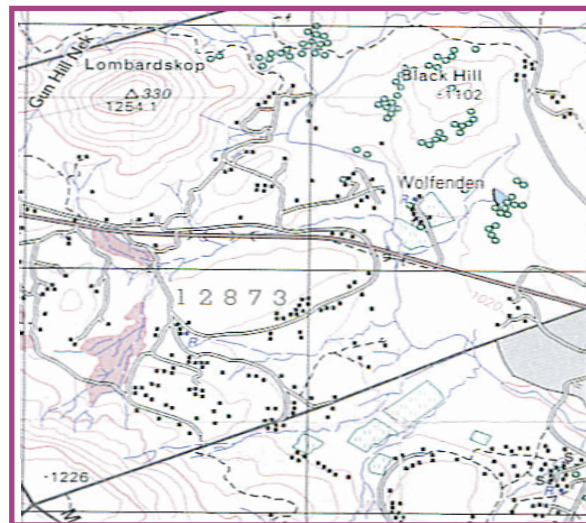
YOUR WORKING POINT IS THE PLACE MENTIONED FROM ...in this case 98.

Steps to follow:

1. Join both places with a pencil and ruler.
2. Draw the North - South line accurately using a set square and ruler through 98.
3. If need be draw the West - East line through 98.
4. NOW use your protractor to measure the angle formed in a CLOCKWISE Direction from 98 to the line joining .993.

In this case your answer should be more than 180 degrees and less than 270 degrees...in the 3rd quadrant.

[NB: True Bearing is a more accurate means of providing direction.]



7. Intervisibility

This refers to whether one point is visible from another, e.g. Are trig beacons 330 and 331 intervisible?

You may have to draw a CROSS SECTION to see whether two places are INTERVISIBLE or NOT. Only then will you be able to see if there are higher features between the two points or not. Where a cross section is not required, some learners can plot the values of all the contours between the two points (beacons) and work out whether both points are intervisible.

Look at the extract in the middle column:

Follow the following guide to work out intervisibility:

Mark the two points on a strip of paper. Indicate their heights on the paper: trig beacon 330 at 1254.1m and trig beacon 331 at 1221.5m
Now plot all the contours between the beacons and state their values. (Can be done on paper strip)

Are there any higher values than 1221.5 m found between both beacons? If there are then the two beacons are NOT intervisible as this would block the view of the other.

[Where you are asked to draw a cross section, use the points on the paper strip to plot them on a graph..you will see it more clearly].

8. Vertical Exaggeration

Formula: VERTICAL EXAGGERATION = VS/HS

[VS is the vertical scale this will be given, e.g. 1 cm represents 20 m see trial exams graph Q 2.2.1 & 2.2.2]

[HS is the horizontal scale this is the topo map scale and can be written as 1 : 50 000 OR 1/50 000 OR 1 : 500. This will be determined by the way in which your vertical scale is given.]

e.g. If the VS is 1cm rep 20 m then use the HS of 1 : 500.

VE = VS/HS
= 1/20 / 1/500 (division)
= 1/20 X 500/1 (invert & multiply)
= 500/20 (cross multiply & divide)
= **25 times**

INTERPRETATION

The best representation of reality is provided by an exaggeration of **not more** than 5 TIMES. Any exaggeration more than 5 X indicates a greater distortion of the feature from the real thing (reality).

In the above case the feature has been distorted 25 X.

Therefore it will be far from representing the real feature on the ground.

You need to learn the other sections: DRAINAGE and River Features, SETTLEMENT and Human activities, GIS and Map projections as well.

Studying for paper 1 (theory) will be a great help to these sections. Previous publications of **KZN 12** have all the above sections. Work with as many exam questions as possible from these publications and others. You will have to **LEARN OFF GIS and Map projections** from 2008 departmental papers (March, June and Sept) for your final exams.

Good Luck and God Bless