12.8 SkillBuilder: Reading topographic maps at an advanced level

12.8.1 Tell me

What is reading a topographic map at an advanced level?

Topographic maps are more than just contour maps showing the height and shape of the land. They also include local relief and gradients and allow us to calculate the size of various areas. Reading this information requires more advanced skills.

Why is reading a topographic map at an advanced level useful?

All topographic maps use similar symbols to show the main features in the landscape. These conventional symbols make it easy for map readers to quickly identify the features shown in the legend. Using advanced skills in map reading, you can make inferences about the interconnection of environments, landforms, climate and human activity. You can learn a great deal about an environment with advanced topographic map-reading skills.

Topographic maps are also useful for:

- showing the changing shape of the land
- determining water flows across a region
- considering infrastructure, such as roads and railways
- revealing land use, such as farming.

A good reading of a topographic map at an advanced level uses:

- the key, or legend, to locate features
- grid references to locate places
- spot heights to calculate local relief
- contours to calculate distances, contour interval and gradient
- scale to calculate area.

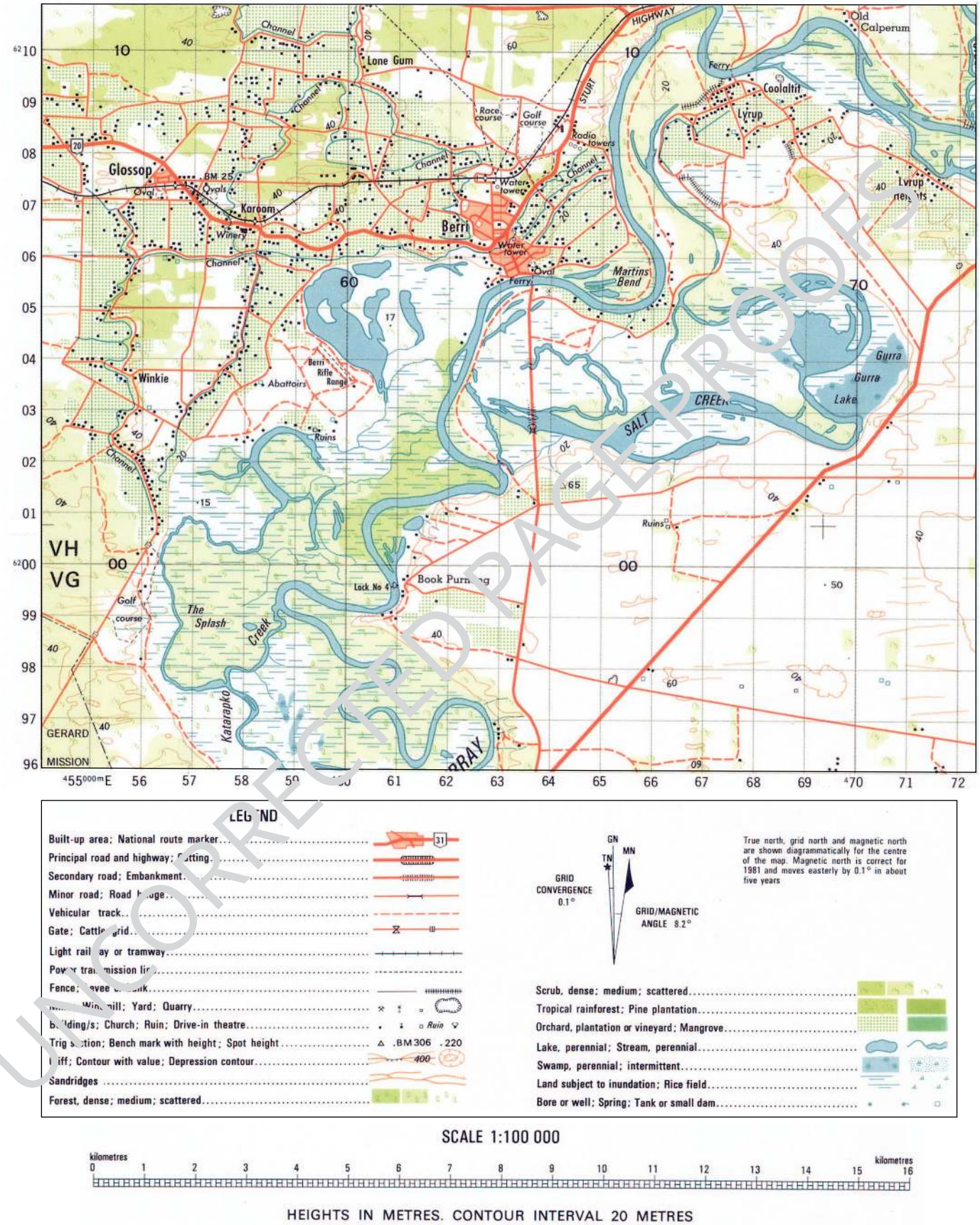
12.8.2 Show me

How to read a topographic map at an advanced level

Model

The local relief between Berri township and the village of Lone Gum (602098) is 20 metres. You will notice there is a 20-metre contour in Berri and a 40-metre contour in Lone Gum, so the local relief is 20 metres. The gradient of the area is 1:200. The area of Gurra Gurra Lake is 1.5 square kilometres, and the township of Berri covers an area of three square kilometres. It is surrounded by an irrigation area to the west and south-west of about 34 square kilometres.

FIGURE 1 Topographic map of Berri, South Australia



Source: Map supplied by MAPLAND, Environmental and Geographic Information, Department for Environment and Heritage, South Australia

You will need:

- a topographic map of the region being considered
- a piece of tracing paper
- a pencil
- a ruler.

Procedure:

To calculate local relief, gradient and area, you must have a topographic map and identify an area to study.

STEP 1

Revise your skills: check the legend symbols, determine the map scale, and check your grid reference skills. These skills should have been covered in your previous Geography studies.

STEP 2

Cast your eye over the map, and make interpretations of the area. What are the obvious features of this map? In **FIGURE 1**, the land is not high and much of the land use is irrigated land. Are there any unusual features as well? In **FIGURE 1** there is a large area that is covered by water with unusual water features. Can the road system tell you anything about the importance of Berri in the region?

STEP 3

Look very closely at the map. Discovering the local relief of the area is best done using spot heights. A symbol for spot heights should be included in the key/legend. These are small dots on the map with a number written beside them. Spot heights are used to indicate the highest or lowest point, but can also be given across a map when the land is flat and few contours appear. Find a spot height of 17 metres (grid reference 608047) south-west of Berri township.

STEP 4

Calculate the local relief within the region. Local relief is the measure of the difference in height between the highest and lowest points within a relatively small area. In **FIGURE 1**, in the Berri township area, the highest point is 60 metres and the lowest point is 20 metres or less, so the local relief is 40+ metres. Because this is a low number, the change in height across the area is minimal.

STEP 5

Gradient is the measurement of the steepness of the land between two places. To calculate the gradient, you need (a) the difference in height between two places — the vertical interval or 'rise'; and (b) the horizontal distance between two places — called the 'run'. The gradient is expressed as a ratio, so both the rise and the run must be expressed in the same units of measurement, generally metres. The example below calculates the gradient between the township of Winkie (40 metres) and the abattoirs at 582035 (20 metres) with a distance of two kilometres (2000 metres) between the places.

$$\frac{\text{Vertical interval (rise)}}{\text{Horizontal distance (run)}}$$

$$= \frac{20}{2000}$$

$$= \frac{1}{500}$$

= The land rises one metre in height for every 100 metres in distance.

STEP 6

To calculate the area of an unusual shape on the map, a scaled grid can be placed over the map and the parts can be added up to give a squared area. On a piece of tracing paper, use a pencil and ruler to draw a grid in accordance with the scale of the map. Maps of 1:100 000 mean that each grid square is one square kilometre. That is, each side of the grid square is one square kilometre. If the scale is 1:500 000, then you need to draw a grid with each line two centimetres apart. Each complete square then represents one square kilometre.

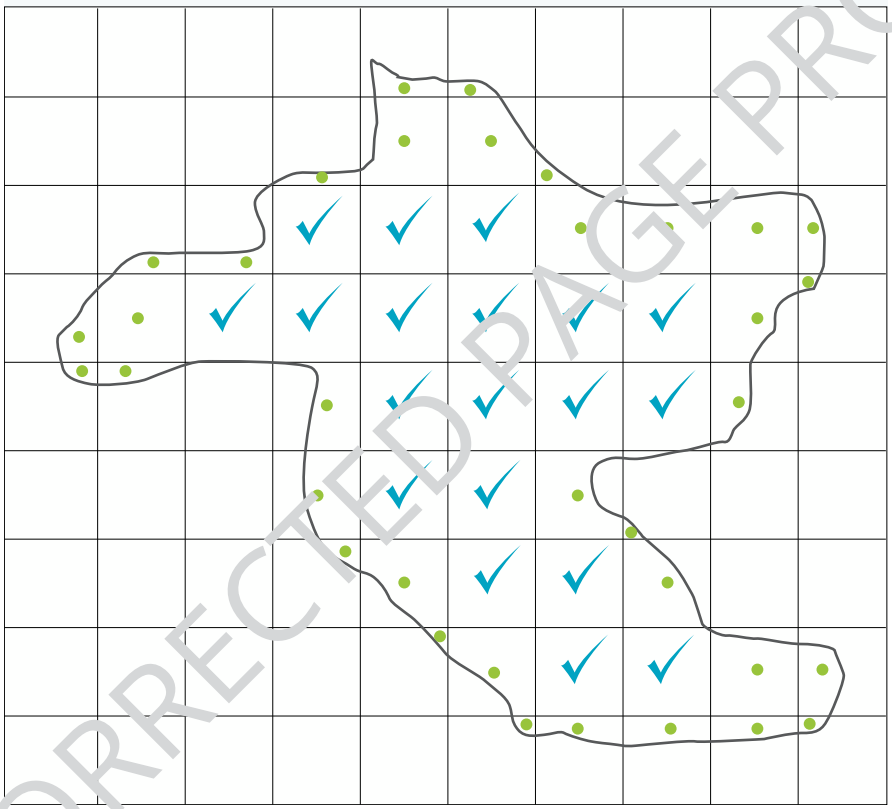
STEP 7

Lay the tracing paper over the mapped area and mark the squares that are complete in the mapped area. Add up this number. In the example shown in **FIGURE 2**, there are 19 complete squares — these are shown with a green tick. In the case of Berri township, there is one complete square.

STEP 8

Now mark the incomplete squares and count them as half squares. That is, halve the number of incomplete squares. In **FIGURE 2**, there are 35 incomplete squares. When halved, this comes to 17.5. Berri township has two incomplete squares, so when halved, you get one. Add up the number of markings from steps 7 and 8 to obtain the total size of the area identified. For example, Berri township has an area of two square kilometres.

FIGURE 2 In this example, there are 19 complete grid squares and 35 incomplete grid squares. Halving the number of incomplete grid squares and adding this number (17.5) to 19 gives a total of 36.5 complete squares.



on Resources

Video eLesson	Reading topographic maps at an advanced level (eles-1749)
Interactivity	Reading topographic maps at an advanced level (int-3367)
Digital document	Topographic map of Berri, South Australia (doc-11570)
Google Earth	Berri

12.8.3 Let me do it

Complete the following activities to practise this skill.

Use the topographic map for the region west of Wentworth provided in the Resources tab (doc-11569) to complete the following calculations. Use the checklist to ensure you cover all aspects of the task.

1. Calculate the local relief between Cappits Creek and the Murray River.
2. Calculate the local relief between Frenchmans Creek, Bunberoo Creek and the Murray River.
3. Calculate the gradient from the top of the map to the bottom of the map.
4. Calculate the size of the area of land between Frenchmans Creek and the Murray River.
5. Calculate the area of Pink Lake.

Then apply your skills to answer the following questions.

1. How would you describe the topography of the mapped area? Refer to local relief.
2. Using your understanding of gradient, why is it necessary to control Frenchmans Creek with levees?
3. Calculate the area that is prone to inundation and shown as wetland.
4. What time of year would be the best time to drive on the road network of this region? Explain your answer.
5. Use grid references to suggest where an oxbow lake might form. Explain what will happen.

Checklist

I have used:

- the key/legend to locate features
- grid references to locate places
- spot heights to calculate local relief
- contours to calculate distances, contour interval and gradient
- scale to calculate area.