

Physical Geology Lab – Topographic Maps

Date: _____ Section: _____ Name: _____

Introduction

Your lab instructor will review several important concepts about maps and the use of standardized “Quadrangle” maps which have been published for over 100 years by the USGS (United States Geological Survey). These basics include:

- North arrow and north, south, east and west basic directions
- The latitude-longitude coordinate system
- Three kinds of scales (graphic, fractional or ratio, verbal)
- Symbols used for cultural features, water features, and others
- Land elevation as expressed by contour lines and spot elevations
- Creating topographic maps and topographic profiles

Do not mark on, contaminate, or otherwise deface the maps in this lab!

Objectives

During this lab the student should become familiar with:

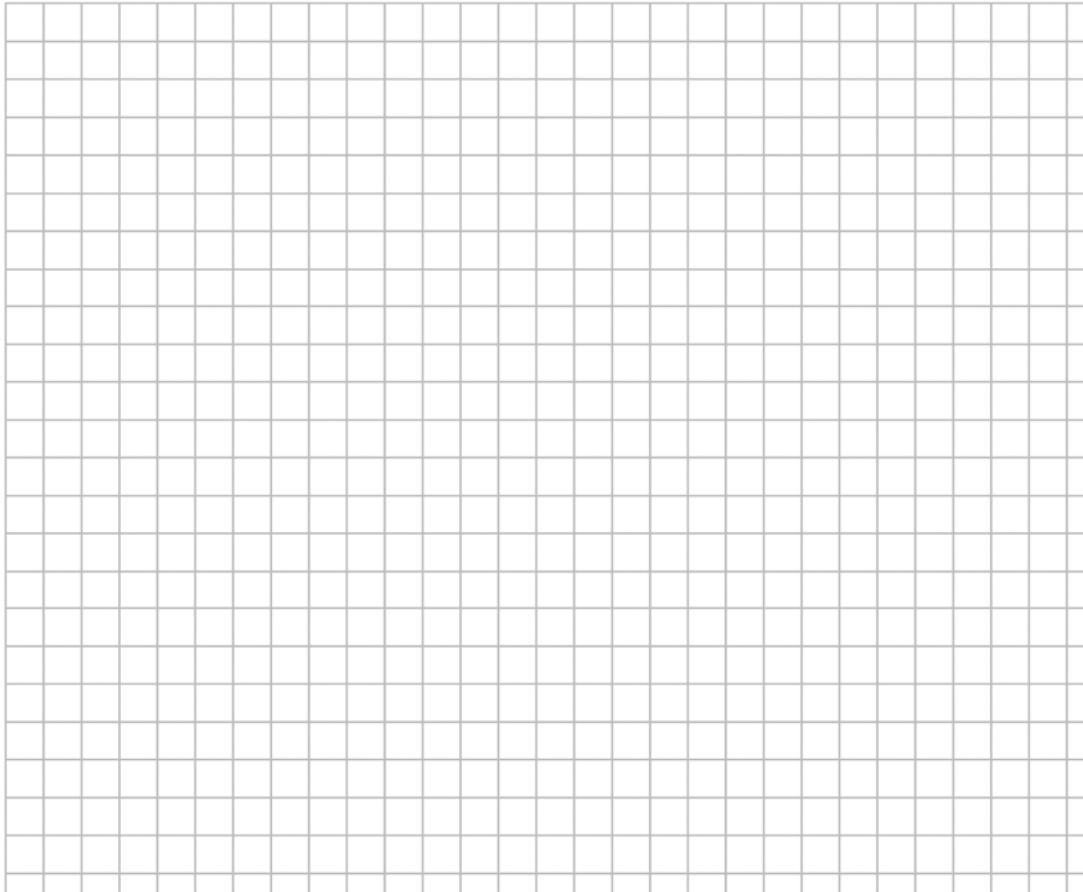
- Interpreting the symbols used on a standardized Quadrangle Map
- Using the map scales to correctly determine ground distances from a map
- Locating a point on the map by its latitude and longitude coordinates
- Determining the elevation of places on the map
- The process of creating a topographic map
- The process of creating a topographic profile

Students interested in a more in depth study of topographic maps and increasing their skills with maps should refer to http://geology.isu.edu/geostac/Field_Exercise/topomaps/ Review of this site would also be good preparation for this lab exercise.

Part A: 7.5' Edinburg Quadrangle

Locate and use the Edinburg, TX (2002) map. Have a copy of a Legend handy.

1. What year(s) was the data on the map checked? What year
was the map published?
2. What is the ratio scale for this map?
3. What is the contour interval on this map?
4. What is the approximate latitude and longitude of the center of UTPA campus?
5. Is most of UTPA campus higher or lower than 95 feet?
6. Accurately measure the distance on the map in inches along Highway 107 from Jackson Road east to 26th Ave.



Part B: Bright Angel Quadrangle

1. This map area located in which National Park?
2. What is the scale of the map? (give both *fractional* and *verbal* scales)
3. What is the contour interval of the light brown contours?
4. What is the contour interval of the dark brown contours—the *index contours*?
5. What is the latitude of the top of the map (degrees, minutes, seconds, direction)?
6. What is the latitude of the bottom of the map (deg, min, sec, dir)?
7. What is the difference between the two (deg, min, sec)? **Show your work**
8. What is the longitude of the right edge of the map (deg, min, sec, dir)?
9. What is the longitude of the left edge of the map (deg, min, sec, dir)?
10. What is the difference between the two?
11. Notice that the map is closer to a rectangle than a square. Where on the Earth are quadrangles closest to being square (circle one)?
the equator the poles
12. Which map covers a larger area of the Earth's surface (circle one)?
Bright Angle Quadrangle Edinburg Quadrangle
13. What is the elevation of Bright Angle Creek at the edge of the map (near the northeast corner)?
14. What is the elevation of the junction of Bright Angle Creek with the Colorado River?
15. What is the distance on the map (in cm) between the two points designated in Questions 13 and 14?

16. Use the fractional map scale to convert the answer to Question 15 to distance on the ground, in meters. (Hint: how many cm in 1 meter?)
17. What is the average slope (rise/run = vertical distance/horizontal distance) of Bright Angle Creek from the edge of the map to the Colorado River? Your answer should be dimensionless (no units). (Hint: you should convert elevation values to meters first.)

Answer: **slope**= _____ Multiply the slope by 100 to get **percent slope**= _____

18. Isis Temple (center of the map) is a: (circle one)

Hill Ridge Valley

Part C: Drawing a topographic map

On the map below are shown several spot elevations and some streams which flow into a lake. Draw the contour lines in this map area using a contour interval of 10 meters.

Rules:

- ✓ Contour lines connect points of equal elevation
- ✓ Contour lines do not cross
- ✓ Contour lines make a "V" pointing upstream when they cross a stream
- ✓ Water flows downhill
- ✓ Contour lines may only end at the map edge, or make closed loops

