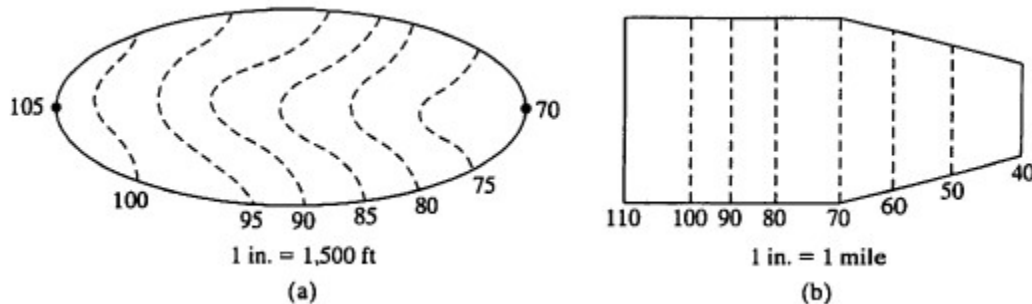


CVG3120, FALL 2016 ASSIGNMENT 1

Due date: Sunday, October 16, 2016, 23:59

Problem 1

For the following hypothetical watersheds, compute the hypsometric curve and compute D_m , F_p and H_a .



Tip: develop your own grid to measure areas.

Problem 2

1. Construct a hypsometric curve in standardized form for a semicircular watershed with the outlet at the center point of the circle. Assume a constant slope over the entire watershed.
2. Form a watershed that is a quarter of a circle that has the same total area as the watershed of part (a). Assume a constant slope over the entire watershed. Construct a hypsometric curve in standardized form and plot it on the same graph as the curve of part (a).
3. Comment on the expected flood runoff suggested by the hypsometric curves of the two watersheds.

Problem 3

Compute the channel slope between sections 1 and 6 and for each of the five reaches. Compute the average of the computed slopes for the five reaches and compare it to the estimate for the entire reach. Discuss the results.

| Section | Elevation (ft) | Distance from Outlet (ft) |
|---------|----------------|---------------------------|
| 1 | 134 | 0 |
| 2 | 141 | 4,300 |
| 3 | 146 | 5,600 |
| 4 | 180 | 7,800 |
| 5 | 235 | 10,400 |
| 6 | 242 | 11,300 |

Problem 4

Compute the predevelopment and post development t_c for the following conditions:

| Condition | L (ft) | Slope (%) | n | $R_{1/2}$ (ft) |
|-----------------|----------|-----------|-------|----------------|
| Predevelopment | 220 | 2.6 | 0.07 | 0.3 |
| | 460 | 2.2 | 0.04 | 0.7 |
| | 550 | 1.9 | 0.025 | 1.1 |
| Postdevelopment | 620 | 2.4 | 0.035 | 0.6 |
| | 590 | 2.1 | 0.012 | 0.9 |

Problem 5

A 40-acre watershed is developed such that 20 acres of residential (1/2 acre lots) lots are interspersed with 12 acres of woodland (good condition) and 8 acres of grassed parkland (good condition). The watershed has C soils.

1. Estimate the runoff volume from this watershed for a 10in precipitation.
2. A playground is built in the parkland and its imperviousness went from 0 to 40%. What's the percentage increase in runoff?
3. What percentage of impervious areas should be disconnected in the residential area to compensate for the playground construction?