

PART I. EXTREME EVENT ANALYSIS

The following table presents maximum discharge (in cfs) for Fall Creek at Millersville. Use the graph paper provided, the equations on the final sheet, and your knowledge of the analysis of extreme events to answer the following questions.

Fall Creek at Millersville, Indiana: Largest Floods for Each Year (1950 - 1964)

Water Year	Date	Peak Discharge (cfs)	Rank (m)	P
1950	01/05	1300.0		
1951	02/22	7400.0		
1952	01/28	12900.0		
1953	07/07	5130.0		
1954	04/05	10100.0		
1955	03/02	3020.0		
1956	05/28	5150.0		
1957	06/30	4590.0		
1958	06/11	7450.0		
1959	01/22	5770.0		
1960	02/10	2470.0		
1961	04/25	6050.0		
1962	01/27	3500.0		
1963	03/03	9020.0		
1964	04/21	2550.0		

1. Using the flood frequency curve for Fall Creek, find probabilities for the following discharges and convert them to recurrence intervals.

Discharge	P (%)	RI (years)
1500		
7500		
9000		
18 000		

2. Find the discharge that can be expected:

a) Every year.

b) Once every 5 years.

c) Once every 50 years.

3. What is the probability of having a flood event of:

a) 2500 cfs?

b) 8000 cfs?

c) 12000 cfs?

4. In what season does the maximum discharge occur in Indianapolis? Explain why?

PART II. CROSS-SECTIONS AND GRAPH-BASED CALCULATIONS

In the spring of 2000, a cross section of a river was surveyed before the spring flood (column 2). The same section was resurveyed after the spring flood (column 3)

SURVEY OF BED EROSION AND DEPOSITION

DISTANCE (cm)	Depth (m) before spring flood	Depth (m) after spring flood
0	0	0
20	0.02	0.02
40	0.045	0.03
60	0.075	0.08
80	0.09	0.10
100	0.12	0.13
120	0.15	0.13
140	0.16	0.15
160	0.19	0.16
180	0.22	0.18
200	0.22	0.23
220	0.20	0.24
240	0.25	0.27
260	0.255	0.30
280	0.27	0.32
300	0.28	0.29
320	0.29	0.28
340	0.29	0.26
360	0.28	0.19
380	0.22	0.18
400	0.10	0.10
420	0.05	0.07
440	0	0

1. Plot the two cross-sections (**before** and **after** the flood) on the same graph.
2. What is the vertical exaggeration of your plot? Show your calculations.
3. What was the net change in the cross-sectional area of the river as a consequence of the flood? Show how you arrived at your answer.
4. Compare the gradient before and after the flood from 2.80 m to 4.40 m expressed as feet per mile.