Geology: Peak Flow Problem

1. Activity 1: Using Data Tables
    The table below shows the highest flow (in cubic feet per second, cfs) in each year on the Gila River at Gila, NM since 1928.

Water Year	Date of Measurement	Flow (cfs)	Water Year	Date of Measurement	Flow (cfs)	Water Year	Date of Measurement	Flow (cfs)
1928	Aug. 23, 1928	1,600	1956	Oct. 03, 1955	1,760	1984	Oct. 02, 1983	15,000
1929	Aug. 10, 1929	3,100	1957	Aug. 24, 1957	2,230	1985	Dec. 28, 1984	35,200
1930	Aug. 12, 1930	3,300	1958	Mar. 23, 1958	4,120	1986	Oct. 11, 1985	9,320
1931	Aug. 10, 1931	1,050	1959	Aug. 23, 1959	682	1987	Nov. 03, 1986	2,460
1932	Feb. 11, 1932	2,310	1960	Jan. 12, 1960	2,040	1988	Sep. 21, 1988	14,400
1933	Sep. 15, 1933	732	1961	Jun. 17, 1961	318	1989	Jul. 30, 1989	451
1934	Aug. 26, 1934	875	1962	Aug. 02, 1962	5,040	1990	Sep. 24, 1990	687
1935	Sep. 03, 1935	615	1963	Feb. 11, 1963	842	1991	Mar. 02, 1991	4,670
1936	Jul. 02, 1936	1,520	1964	Sep. 24, 1964	5,160	1992	Feb. 14, 1992	2,780
1937	Feb. 16, 1937	6,110	1965	Jul. 17, 1965	1,710	1993	Feb. 20, 1993	14,200
1938	Mar. 04, 1938	1,820	1966	Dec. 23, 1965	6,240	1994	Mar. 21, 1994	404
1939	Sep. 15, 1939	1,190	1967	Aug. 13, 1967	5,210	1995	Nov. 12, 1994	16,700
1940	Oct. 08, 1939	2,370	1968	Aug. 05, 1968	1,620	1996	Sep. 15, 1996	2,530
1941	Sep. 29, 1941	25,400	1969	Sep. 09, 1969	702	1997	Sep. 22, 1997	18,200
1942	Aug. 15, 1942	930	1970	Sep. 18, 1970	439	1998	Mar. 27, 1998	2,120
1943	Aug. 09, 1943	730	1971	Aug. 14, 1971	1,010	1999	Aug. 06, 1999	2,780
1944	Aug. 18, 1944	2,500	1972	Oct. 25, 1971	9,130	2000	Aug. 28, 2000	111
1945	Aug. 16, 1945	530	1973	Oct. 20, 1972	12,500	2001	Nov. 05, 2000	1,370
1946	Aug. 29, 1946	605	1974	Jul. 16, 1974	712	2002	Sep. 12, 2002	1,400
1947	Aug. 30, 1947	1,980	1975	Sep. 08, 1975	3,620	2003	Mar. 26, 2003	216
1948	Mar. 31, 1948	480	1976	Feb. 10, 1976	2,460	2004	Apr. 05, 2004	775
1949	Jan. 13, 1949	12,000	1977	Aug. 20, 1977	696	2003	Mar. 26, 2003	216
1950	Jul. 29, 1950	318	1978	Mar. 03, 1978	4,790	2004	Apr. 05, 2004	775
1951	Mar. 11, 1951	105	1979	Dec. 18, 1978	32,400			
1952	Jan. 19, 1952	4,870	1980	Feb. 15, 1980	3,430			
1953	Mar. 10, 1953	930	1981	Aug. 06, 1981	862			
1954	Mar. 24, 1954	2,100	1982	Feb. 26, 1982	944			
1955	Jul. 20, 1955	1,350	1983	Mar. 04, 1983	1,830			

A. Using the table of values answer the following questions.
   a. What was the highest peak flow on the Gila since 1928? In what year did it occur?
   b. What was the lowest peak flow on the Gila since 1928? In what year did it occur?
   c. In how many years have the peak flow on the Gila been greater than 10,000 cfs?
B. Calculate the chance that a flood greater than 10,000 cfs could occur in any year. To do this divide your answer from part (1c) above by the total number of years of data (78). Round the answer to two digits and then multiply by 100 to obtain the percent chance.
C. The recurrence interval is a measure of the average time between floods of a given flow. One way to calculate the recurrence interval of a flood of 10,000 cfs is to divide the total number of years of data (78) by your answer from part (1c) above. The result is the reciprocal of your answer to part (2) above. Round the answer to two digits.

2. Activity 2: Graphing

   ▪ Plot the flood frequency curve.
   ▪ Describe the flood frequency curve: Linear or Not?

3. Activity 3: Interpretation

   ▪ Discuss the consequence of a linear or nonlinear assumption.
   ▪ For a linear assumption find the slope and equation for the flood frequency curve.
   ▪ Use the graph to determine recurrence intervals.
   ▪ Use the equation to determine recurrence intervals.
   ▪ Apply the information on the relationship between peak flow and recurrence intervals to hazard assessment.