

EX: A company manufacturing inexpensive analog function generators measures the frequency they produce when set to 1 kHz. They measure the following values in Hz:

$$f_1 = 998 \quad f_2 = 997 \quad f_3 = 1003 \quad f_4 = 1001 \quad f_5 = 999 \quad f_6 = 1001$$

$$f_7 = 998 \quad f_8 = 1002 \quad f_9 = 1000 \quad f_{10} = 1001 \quad f_{11} = 1000$$

Make a quantile plot of the data.

SOL'N: The quantile plot shows what fraction of data values are less than a given data value. After the data are ordered from lowest to highest, the values are assigned sequential numbers, i :

	997,	998,	998,	999,	1000,	1000,	1001,	1001,	1001,	1002,	1003
$i =$	1	2	3	4	5	6	7	8	9	10	11

Given the total number of data points, $n = 11$, we use the following formula that produces the quantile value, q_i :

$$q_i = \frac{i - \frac{3}{8}}{n + \frac{1}{4}}$$

The offsets in the numerator and denominator are adjustments for the use of discrete integer values. Note that if $i = 1$ and $n = 1$, the quantile would be $5/8$ over $5/4$, implying that half the data is less than the single data point.

