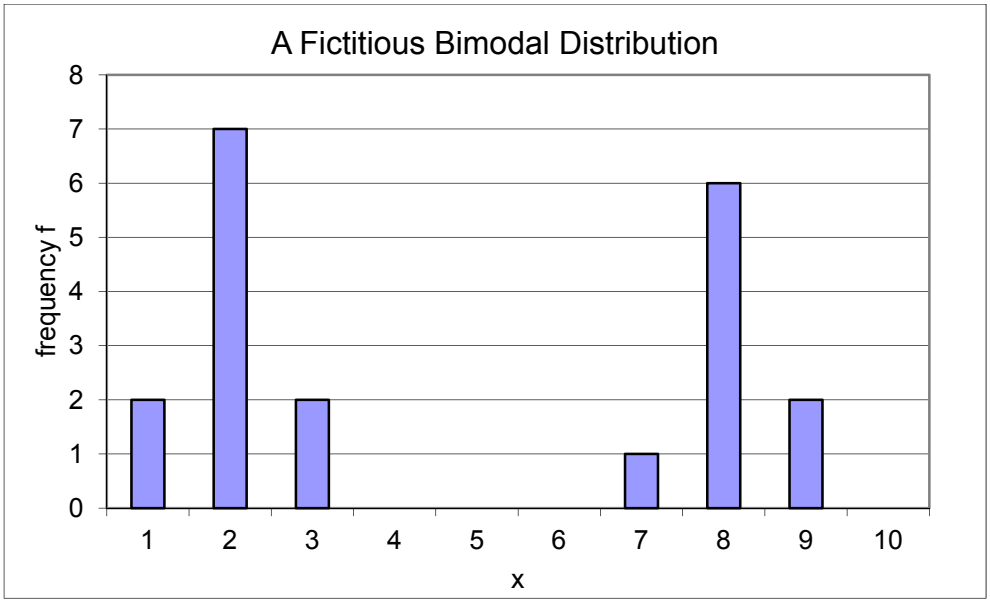
Math 189 – Section 3.3: Tchebysheff & Empirical Rules

Consider the following data set, where *x* is the value of the variable and *f* is the frequency with which it occurs.

x	*f*
1	2
2	7
3	2
4	0
5	0
6	0
7	1
8	6
9	2
10	0

It has the following frequency histogram.



Here's how the data stack up using Tchebysheff and the Empirical Rule:

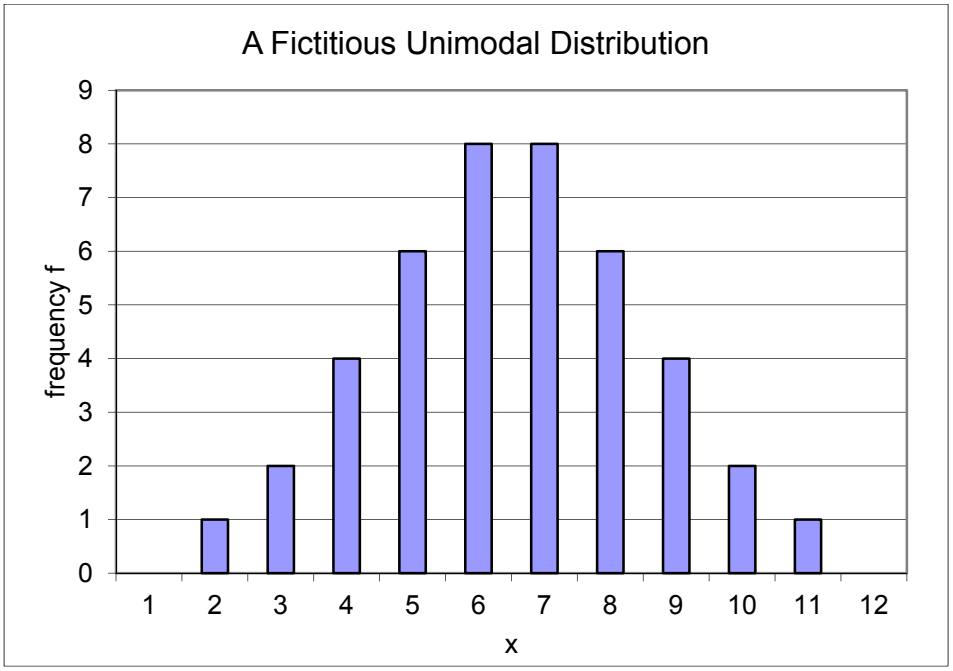
k	x - ks	x + ks	Actual number	Actual %	Tcheby %	Empirical %
1	1.57	7.93	10	50.0	≥ 0	≈ 68
2	-1.60	11.10	20	100.0	≥ 75.0	≈ 95
3	-4.78	14.28	20	100.0	≥ 88.9	≈ 99.7

Tcheby works?	Empirical works?
Yes	No
Yes	Sort of
Yes	Yes

Consider another data set.

x	f
1	0
2	1
3	2
4	4
5	6
6	8
7	8
8	6
9	4
10	2
11	1
12	0

It has the following histogram.



Here's how the data stack up using Tchebysheff and the Empirical Rule:

k	x - ks	x + ks	Actual number	Actual %	Tcheby %	Empirical %
1	4.46	8.54	28	66.7	≥ 0	≈ 68
2	2.42	10.58	40	95.2	≥ 75.0	≈ 95
3	0.38	12.62	42	100.0	≥ 88.9	≈ 99.7

Tcheby works?	Empirical works?
Yes	Not too badly
Yes	Yes
Yes	Yes