Probably About Probability

$p < .05$

1

Probability

- Inferential statistics allow us to decide if one condition of an experiment likely produced different results than another condition
- Inferential statistics are based on the concepts of probability
- Thus, probability is an essential aspect of statistics

2

What Is Probability?

- Probabilities often deal with *events*
- An event is something that happens
  - E.g. Rolling a 3 on a fair die is an event
- The probability of an event is given by the ratio of how often that event occurs and how often all events occur

3

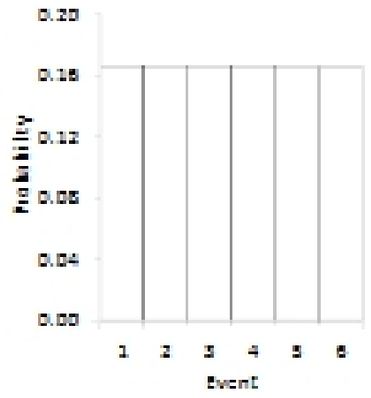
Probability of Events

- When you role a fair, 6 sided die, each of the six faces has an equal chance of coming up
- Thus, the probability of any single face appearing is given by 1 (how often that event occurs) divided by 6 (the total number of events)

4

1 Die (6 events)

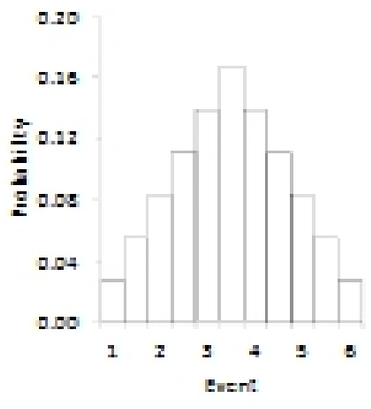
Event	f	p(Event)
1	1	1/6
2	1	1/6
3	1	1/6
4	1	1/6
5	1	1/6
6	1	1/6



5

Mean of 2 Dice (36 events)

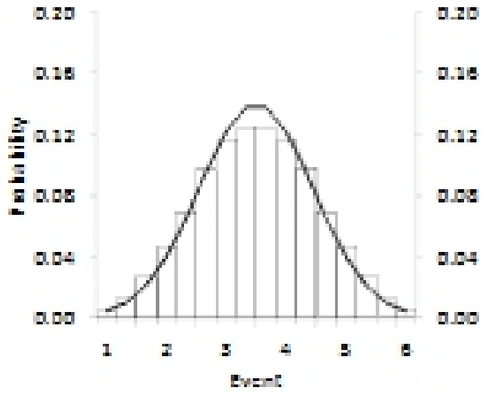
Mean	f	p(mean)
1.0	1	1 / 36 = 0.0278
1.5	2	2 / 36 = 0.0556
2.0	3	3 / 36 =0.0833
2.5	4	4 / 36 =0.1111
3.0	5	5 / 36 = 0.1389
3.5	6	6 / 36 =0.1667
4.0	5	5 / 36 = 0.1389
4.5	4	4 / 36 =0.1111
5.0	3	3 / 36 =0.0833
5.5	2	2 / 36 = 0.0556
6.0	1	1 / 36 = 0.0278



6

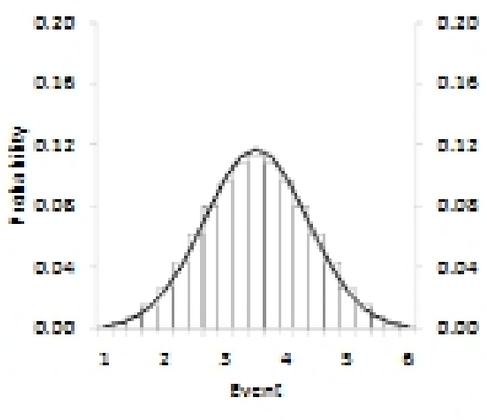
Mean of 3 Dice (216 events)

Mean	#	p(mean)
1.00	1	1 / 216 = 0.0046
1.33	3	3 / 216 = 0.0139
1.67	6	6 / 216 = 0.0278
2.00	10	10 / 216 = 0.0463
2.33	15	15 / 216 = 0.0694
2.67	21	21 / 216 = 0.0972
3.00	25	25 / 216 = 0.1157
3.33	27	27 / 216 = 0.125
3.67	27	27 / 216 = 0.125
4.00	25	25 / 216 = 0.1157
4.33	21	21 / 216 = 0.0972
4.67	15	15 / 216 = 0.0694
5.00	10	10 / 216 = 0.0463
5.33	6	6 / 216 = 0.0278
5.67	3	3 / 216 = 0.0139
6.00	1	1 / 216 = 0.0046



Mean of 4 Dice (1296 events)

Mean	#	p(mean)
1	1	0.0007716
1.25	4	0.0030864
1.5	10	0.0077160
1.75	20	0.0154321
2	35	0.0270062
2.25	56	0.0432151
2.5	80	0.0617778
2.75	104	0.0802317
3	125	0.0964141
3.25	140	0.1080247
3.5	146	0.1126543
3.75	140	0.1080247
4	125	0.0964141
4.25	104	0.0802317
4.5	80	0.0617778
4.75	56	0.0432151
5	35	0.0270062
5.25	20	0.0154321
5.5	10	0.0077160
5.75	4	0.0030864
6	1	0.0007716



Mean of 8 Dice (1,679,616 events)