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Section 7.2 → Sampling Distributions for Sample Proportion

Review of Binomial Experiments

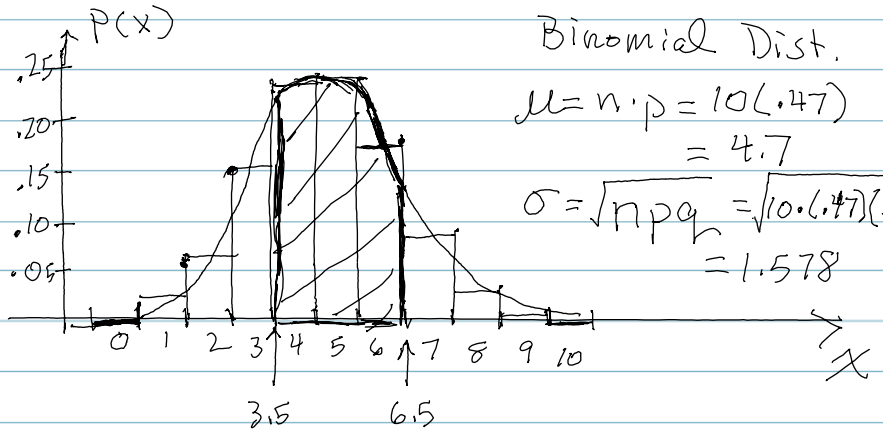
From a sample of $n = 10$ voters (likely), x = # of voters voting for Obama.

$p = P(\text{obama vote}) = .47$ ← population proportion

$q = 1 - p = .53$

$P(x) = {}_nC_x\, p^x q^{n-x} \rightarrow (10\ {}_nC_x\ x)(.47^x)(.53^{10-x})$

x	P(x)
0	.002
1	.02
2	.06
3	.15
4	.23
5	.24
6	.18
7	.09
8	.03
9	.01
10	.001



Binomial Dist.

$\mu = n \cdot p = 10(.47) = 4.7$

$\sigma = \sqrt{npq} = \sqrt{10(.47)(.53)} = 1.578$

Using Binomial Probabilities

$P(4 \le x \le 6) = P(4 \text{ or } 5 \text{ or } 6)$
$= P(4) + P(5) + P(6)$
$= .23 + .24 + .18 = 0.65$

Using the Smooth normal curve.

$P(4 \le x \le 6) = P(3.5 < x < 6.5)$
$= P(-0.76 < z < 1.14)$

$x = 3.5$

$z = \frac{x - \mu}{\sigma} = \frac{3.5 - 4.7}{1.578}$

$= -0.76$

TABLE A1

$z \rightarrow 0.06$

$-0.7 \rightarrow .2236$

$x = 6.5$

$z = \frac{x - \mu}{\sigma} = \frac{6.5 - 4.7}{1.578}$

$= 1.14$

TABLE A1

$z \rightarrow .04$

$1.1 \rightarrow .8729$

$= .8729 - .2236$
$= .6493$
$\approx .65$