Notes 9.1-9.2

The Central Limit Theorem. "Samples on the Curve"

Slide 1

A class of 24 students responded to the following question:
"Are you using an Apple phone?" 50% of students replied "Yes".
If I survey a sample of 5 random students, sample proportion will vary from sample to sample.

	A	B
1	Student	Yes = 1
2	Mia	1
3	Chloe	1
4	Caden	1
5	Madison	0
6	Amelia	0
7	William	1
8	Jayce	1
9	Joshua	0
10	Nicholas	1
11	Landon	1
12	Gavin	0
13	Hunter	0
14	Kylie	0
15	Lucy	1
16	Dominic	0
17	John	0
18	Claire	1
19	Kennedy	0
20	Violet	1
21	Nolan	1
22	Declan	0
23	Jake	1
24	Asher	0
25	Juliana	0
26		
27	Proportion of "yes"	0.5

Population

Samples:

	name	Yes = 1
5	Madison	0
10	Nicholas	1
13	Hunter	0
16	Dominic	0
19	Kennedy	0
	Sample Proportion	0.2

	name	Yes = 1
7	William	1
13	Hunter	0
14	Kylie	0
23	Jake	1
25	Juliana	0
	Sample Proportion	0.4

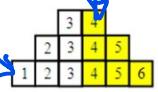
	name	Yes = 1
7	William	1
14	Kylie	0
16	Dominic	0
23	Jake	1
24	Asher	0
	Sample Proportion	0.4

	name	Yes = 1
8	Jayce	1
16	Dominic	0
20	Violet	1
21	Nolan	1
24	Asher	0
	Sample Proportion	0.6

Data:

1 2 2 3 3 3 4 4 4 5 5 6

Histogram:



Standard Error of a Sample Proportion
notation: SE
SE represents sample to sample variability of sample proportion, if samples are chosen at random.

$$SE = \sqrt{\frac{p(1-p)}{n}}$$

Standard Error Tool	
p =	0.5
n =	5
SE =	0.224

The Central Limit Theorem
(in your own words: "Samples on the Curve")
Sample proportions have Normal Distribution with
$mean = \mu = p\ (population\ proportion)$
$St.\,Dev.\ \text{of sample proportion} = Standard\ Error (short\ SE)$

$$SE = \sqrt{\frac{p(1-p)}{n}} = \sqrt{\frac{pop.prop.\,(1-pop.prop.)}{sample\ size}} = \sqrt{\frac{0.5\,(1-0.5)}{5}}$$

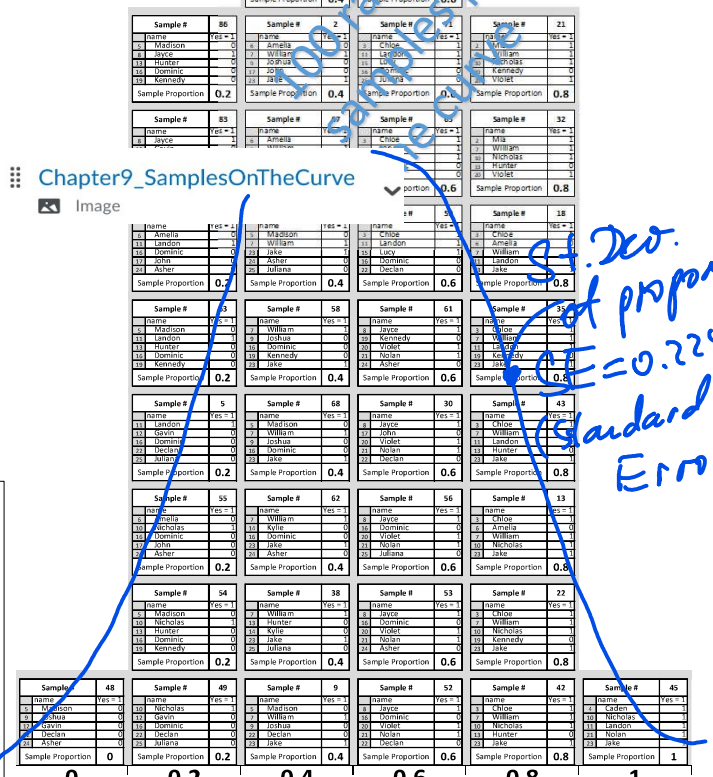
Stats_Calculator
Excel Spreadsheet

Chapters1-7 | Chapter9.1-

Standard Error Tool	
p =	0.5
n =	5
SE =	0.224

100 random samples put on the curve

Chapter9_SamplesOnTheCurve
Image



St. Dev. of proportions
SE = 0.224
(Standard Error)

Slide 2

A class of 24 students responded to the following question:
"Are you using an Apple phone?" 50% of students replied "Yes".
Represent the probability that in a sample of 5 randomly selected students 2 or fewer will reply "Yes" using samples on the curve.