Name:	Hour:	Date:	



## Do You Have the Senioritis-20 Virus?



A large high school in Michigan is concerned that too many of the Seniors have contracted the Senioritis-20 virus. The administrators have decided that if more than 30% of the Seniors have the virus, they will cancel Spring Break. To make this decision, they will select a random sample of 50 Seniors and have them tested.

Quick Review:

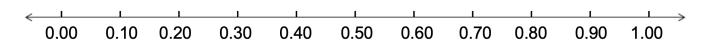
## Truth about the population

		H <sub>0</sub> is true	H <sub>a</sub> is true
Conclusion based on sample	Reject H <sub>0</sub>		
	Fail to reject H <sub>0</sub>		

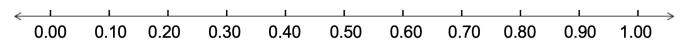
- 1. State appropriate hypotheses for performing a significance test. Use  $\alpha = 0.05$ .
- 2. (a) Describe a Type I error in this setting.
  - (b) Describe a Type II error in this setting.
  - (c) From the administrator's perspective, which error has more serious consequences?

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3. Draw a picture of the sampling distribution under the assumption that H<sub>0</sub> is true.

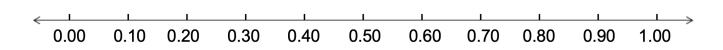


4. Suppose that the true percent of Seniors at this school with Senioritis-20 is 50%. Draw a picture of the sampling distribution under the assumption that H<sub>a</sub> is true.



5. In this setting, the power of the administrator's significance test is 0.91. Interpret.

6. Use the applet at <a href="https://istats.shinyapps.io/power/">https://istats.shinyapps.io/power/</a> and input the values from this context. Click Display Power. Sketch the graphs below.



- 7. The administration wants to **increase** the power of the test. How could they adjust each of the following factors to increase the power? Use the applet to explore each.
  - a. Sample size:
  - b.  $\alpha$  level:
  - c. Alternative p:

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	Type I and Type II Errors + Power			
Important	ideas:			
Check Your Understanding				
hypothes	ed hypothesis test is to be performed with a significance level of 0.05. Suppose that the null is is false. If a significance level of 0.01 were to be used instead of a significance level of 0.05, which owing would be true?			
A	Neither the probability of a Type II error nor the power of the test would change.			
B	Both the probability of a Type II error and the power of the test would decrease.			
С	Both the probability of a Type II error and the power of the test would increase.			
D	The probability of a Type II error would decrease and the power of the test would increase.			
E	The probability of a Type II error would increase and the power of the test would decrease.			