

Instructions: Show all work to receive full credit. You should note any formulas used or calculator functions used, their inputs and outputs. I cannot grade work if I don't know where an answer came from. Be sure complete all parts of each questions, including requests for interpretation and explanations. Be as thorough as possible.

1. Complete the table below for a binomial distribution with $n = 8$, and $p = 0.7$. Round your answers to 3 decimal places.

x	0	1	2	3	4	5	6	7	8
$p(x)$	6.6×10^{-5}	.001	.010	.047	.136	.254	.296	.198	.058

binomialpdf(8, .7, x)

2. A fair twelve sided die is rolled.
- What is the probability that a 4, 5, 7, 10 or 11 will come up?

$$\frac{5}{12}$$

- Call the set of results in (a) "success". What is the probability of getting exactly 5 successes if the die is rolled 10 times?

$$\text{binomialpdf}(10, \frac{5}{12}, 5) = 21.4\%$$

- What is the probability of getting 5 or more successes if the die is rolled 10 times?

$$0 \ 1 \ 2 \ 3 \ 4 \ | \ 5 \ 6 \ 7 \ \dots$$

$$1 - \text{binomialcdf}(10, \frac{5}{12}, 4) = 40.9\%$$

- What is the mean number of successes one should expect in 10 rolls?

$$10 * \frac{5}{12} = 4.17$$

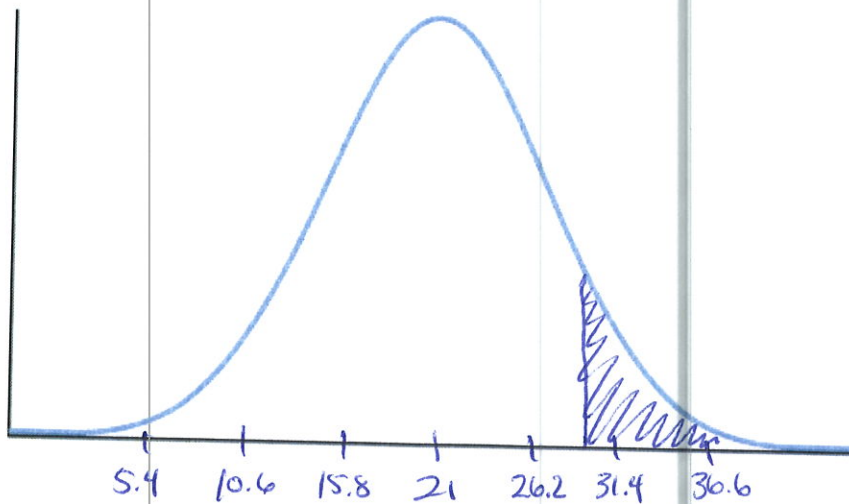
3. What is the condition(s) that need(s) to be satisfied if we want to approximate a binomial distribution with the normal distribution?

$$np > 5$$

and

$$n(1-p) > 5$$

4. The mean ACT score is 21 with a standard deviation of 5.2. Plot this information on the normal distribution below, plotting three standard deviations on each side of the mean. Find the probability of obtaining a score of 30 or higher.



$$\text{normalcdf}(30, E99, 21, 5.2) = .0417..$$

4.2%