

4.3.1: Exercises

1. In a CDC survey, 37% of US high school students reported regular mental health struggles during the pandemic. An educator is concerned about the mental health of her students. She randomly surveys 8 students. Don tells Isabel that the probability that exactly 6 of the 8 students reported struggling with their mental health during the pandemic can be found using the following formula: $P(6) = (0.37)^6(0.63)^2$. What should Isabel say to Don to help him understand binomial probability better?
2. In a CDC survey, 37% of US high school students reported regular mental health struggles during the pandemic. An educator is concerned about the mental health of her students. She randomly surveys 8 students. Fill in the following table with the appropriate values. Round calculated values to four decimal places.

$X =$ number of students with mental health struggles	${}_nC_x$	$P(X)$
0	${}_8C_0 = \underline{\hspace{1cm}}$	$P(0) = (0.63)\underline{\hspace{1cm}} \approx 0.0248$
1	${}_8C_{\underline{\hspace{1cm}}} = 8$	$P(1) = 8 \cdot (0.37)\underline{\hspace{1cm}} \cdot (0.63)^7 \approx 0.1794$
2	${}_8C_{\underline{\hspace{1cm}}} = \underline{\hspace{1cm}}$	$P(2) = \underline{\hspace{1cm}} \cdot (\underline{\hspace{1cm}})^2 \cdot (0.63)^6 \approx 0.2397$
3	$\underline{\hspace{1cm}}C_{\underline{\hspace{1cm}}} = \underline{\hspace{1cm}}$	$P(3) = \underline{\hspace{1cm}} \cdot (\underline{\hspace{1cm}})^3 \cdot (0.63)\underline{\hspace{1cm}} \approx 0.2815$
4	$\underline{\hspace{1cm}}C_{\underline{\hspace{1cm}}} = \underline{\hspace{1cm}}$	$P(4) = \underline{\hspace{1cm}} \cdot (\underline{\hspace{1cm}}) \cdot (\underline{\hspace{1cm}})\underline{\hspace{1cm}} \approx 0.2067$
5	$\underline{\hspace{1cm}}C_{\underline{\hspace{1cm}}} = \underline{\hspace{1cm}}$	$P(\underline{\hspace{1cm}}) = \underline{\hspace{1cm}} \cdot (\underline{\hspace{1cm}})\underline{\hspace{1cm}} \cdot (\underline{\hspace{1cm}})\underline{\hspace{1cm}} \approx 0.0971$
6	$\underline{\hspace{1cm}}C_{\underline{\hspace{1cm}}} = \underline{\hspace{1cm}}$	$P(\underline{\hspace{1cm}}) = \underline{\hspace{1cm}} \cdot (\underline{\hspace{1cm}})\underline{\hspace{1cm}} \cdot (\underline{\hspace{1cm}})\underline{\hspace{1cm}} \approx \underline{\hspace{1cm}}$
7	$\underline{\hspace{1cm}}C_{\underline{\hspace{1cm}}} = \underline{\hspace{1cm}}$	$P(\underline{\hspace{1cm}}) = \underline{\hspace{1cm}} \cdot (\underline{\hspace{1cm}})\underline{\hspace{1cm}} \cdot (\underline{\hspace{1cm}})\underline{\hspace{1cm}} \approx \underline{\hspace{1cm}}$
8	$\underline{\hspace{1cm}}C_{\underline{\hspace{1cm}}} = \underline{\hspace{1cm}}$	$P(\underline{\hspace{1cm}}) = \underline{\hspace{1cm}} \cdot (\underline{\hspace{1cm}})\underline{\hspace{1cm}} \cdot (\underline{\hspace{1cm}})\underline{\hspace{1cm}} \approx \underline{\hspace{1cm}}$

3. Use the discrete probability distribution from 1. to find the probability that at most five of the randomly selected students have reported regular mental health struggles during the pandemic.
4. Use the discrete probability distribution from 1. to find the probability that at least six of the randomly selected students have reported regular mental health struggles during the pandemic.