1. In probability and statistics, what is each repetition of an experiment called?

Each repetition of an experiment is called (1) _____

(1) ○ a mean. ○ a success.
○ an event.
○ a trial.
○ a probability.

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2. What is the binomial distribution?

Select the correct choice below.

○ **A.** The binomial distribution generalizes the concepts of Bernoulli trials.
○ **B.** The binomial distribution is the number of outcomes that contain exactly x successes in n Bernoulli trials.
○ **C.** The binomial distribution is the probability distribution for the number of failures in a sequence of Bernoulli trials.
○ **D.** The binomial distribution is the probability distribution for the number of successes in a sequence of Bernoulli trials.

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3. Evaluate the binomial coefficient below.

$$\binom{8}{3}$$

$$\binom{8}{3} = \square$$

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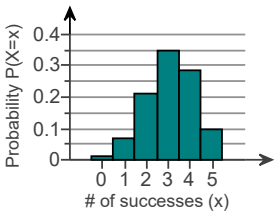
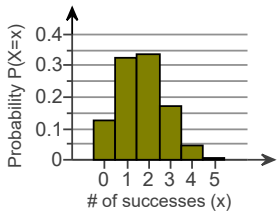
4.

For each of the probability histograms of binomial distributions to the right, specify whether the success probability is less than, equal to, or greater than 0.5.

(a)



(b)



a. According to histogram (a), is the success probability less than, equal to, or greater than 0.5?

○ **A.** The success probability, p, is greater than 0.5.
○ **B.** The success probability, p, is less than 0.5.
○ **C.** The success probability, p, is equal to 0.5.

b. According to histogram (b), is the success probability less than, equal to, or greater than 0.5?

○ **A.** The success probability, p, is greater than 0.5.
○ **B.** The success probability, p, is less than 0.5.
○ **C.** The success probability, p, is equal to 0.5.

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5. Shown below are the number of trials and success probability for some Bernoulli trials. Let X denote the total number of successes.

n = 4 and p = 0.6

a. Determine P(X = 2) using the binomial probability formula.
b. Determine P(X = 2) using a table of binomial probabilities. Compare this answer to part (a).

Click here for the binomial probability table.[1]

a. Using the binomial formula, P(X = 2) is [ ].
(Round to three decimal places as needed.)

b. Using the binomial probability table, P(X = 2) is [ ].
(Round to three decimal places as needed.)

Compare this result to the probability found in part (a). Choose the correct answer below.

- **A.** The two probabilities are approximately equal at 3 decimal places.
- **B.** The probability from part (a) is much larger than the probability from part (b).
- **C.** The two probabilities are exactly equal at 3 decimal places.
- **D.** The probability from part (b) is much larger than the probability from part (a).

1: Binomial probabilities for values of n, x, and p

		p										
n	x	0.1	0.2	0.25	0.3	0.4	0.5	0.6	0.7	0.75	0.8	0.9
1	0	0.900	0.800	0.750	0.700	0.600	0.500	0.400	0.300	0.250	0.200	0.100
	1	0.100	0.200	0.250	0.300	0.400	0.500	0.600	0.700	0.750	0.800	0.900
2	0	0.810	0.640	0.563	0.490	0.360	0.250	0.160	0.090	0.063	0.040	0.010
	1	0.180	0.320	0.375	0.420	0.480	0.500	0.480	0.420	0.375	0.320	0.180
	2	0.010	0.040	0.063	0.090	0.160	0.250	0.360	0.490	0.563	0.640	0.810
3	0	0.729	0.512	0.422	0.343	0.216	0.125	0.064	0.027	0.016	0.008	0.001
	1	0.243	0.384	0.422	0.441	0.432	0.375	0.288	0.189	0.141	0.096	0.027
	2	0.027	0.096	0.141	0.189	0.288	0.375	0.432	0.441	0.422	0.384	0.243
	3	0.001	0.008	0.016	0.027	0.064	0.125	0.216	0.343	0.422	0.512	0.729
4	0	0.656	0.410	0.316	0.240	0.130	0.063	0.026	0.008	0.004	0.002	0.000
	1	0.292	0.410	0.422	0.412	0.346	0.250	0.154	0.076	0.047	0.026	0.004
	2	0.049	0.154	0.211	0.265	0.346	0.375	0.346	0.265	0.211	0.154	0.049
	3	0.004	0.026	0.047	0.076	0.154	0.250	0.346	0.412	0.422	0.410	0.292
	4	0.000	0.002	0.004	0.008	0.026	0.063	0.130	0.240	0.316	0.410	0.656
5	0	0.590	0.328	0.237	0.168	0.078	0.031	0.010	0.002	0.001	0.000	0.000
	1	0.328	0.410	0.396	0.360	0.259	0.156	0.077	0.028	0.015	0.006	0.000
	2	0.073	0.205	0.264	0.309	0.346	0.312	0.230	0.132	0.088	0.051	0.008
	3	0.008	0.051	0.088	0.132	0.230	0.312	0.346	0.309	0.264	0.205	0.073
	4	0.000	0.006	0.015	0.028	0.077	0.156	0.259	0.360	0.396	0.410	0.328
	5	0.000	0.000	0.001	0.002	0.010	0.031	0.078	0.168	0.237	0.328	0.590
6	0	0.531	0.262	0.178	0.118	0.047	0.016	0.004	0.001	0.000	0.000	0.000
	1	0.354	0.393	0.356	0.303	0.187	0.094	0.037	0.010	0.004	0.002	0.000
	2	0.098	0.246	0.297	0.324	0.311	0.234	0.138	0.060	0.033	0.015	0.001
	3	0.015	0.082	0.132	0.185	0.276	0.313	0.276	0.185	0.132	0.082	0.015
	4	0.001	0.015	0.033	0.060	0.138	0.234	0.311	0.324	0.297	0.246	0.098
	5	0.000	0.002	0.004	0.010	0.037	0.094	0.187	0.303	0.356	0.393	0.354
	6	0.000	0.000	0.000	0.001	0.004	0.016	0.047	0.118	0.178	0.262	0.531
7	0	0.478	0.210	0.133	0.082	0.028	0.008	0.002	0.000	0.000	0.000	0.000
	1	0.372	0.367	0.311	0.247	0.131	0.055	0.017	0.004	0.001	0.000	0.000
	2	0.124	0.275	0.311	0.318	0.261	0.164	0.077	0.025	0.012	0.004	0.000
	3	0.023	0.115	0.173	0.227	0.290	0.273	0.194	0.097	0.058	0.029	0.003
	4	0.003	0.029	0.058	0.097	0.194	0.273	0.290	0.227	0.173	0.115	0.023
	5	0.000	0.004	0.012	0.025	0.077	0.164	0.261	0.318	0.311	0.275	0.124
	6	0.000	0.000	0.001	0.004	0.017	0.055	0.131	0.247	0.311	0.367	0.372
	7	0.000	0.000	0.000	0.000	0.002	0.008	0.028	0.082	0.133	0.210	0.478

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6. Shown below are the number of trials and success probability for some Bernoulli trials. Let X denote the total number of successes.

n = 6 and p = 0.2

a. Determine P(X = 4) using the binomial probability formula.
b. Determine P(X = 4) using a table of binomial probabilities. Compare this answer to part (a).

[2] Click the icon to view the binomial probability table.

a. Using the binomial probability formula, P(X = 4) is [ ].
(Round to three decimal places as needed.)

b. Using the binomial probability table, P(X = 4) is [ ].
(Round to three decimal places as needed.)

Compare this result to the probability found in part (a). Choose the correct answer below.

- **A.** The two probabilities are exactly equal at 3 decimal places.
- **B.** The two probabilities are approximately equal at 3 decimal places.
- **C.** The probability from part (b) is much larger than the probability from part (a).
- **D.** The probability from part (a) is much larger than the probability from part (b).

2: Binomial probabilities for values of n, x, and p

		p										
n	x	0.1	0.2	0.25	0.3	0.4	0.5	0.6	0.7	0.75	0.8	0.9
1	0	0.900	0.800	0.750	0.700	0.600	0.500	0.400	0.300	0.250	0.200	0.100
	1	0.100	0.200	0.250	0.300	0.400	0.500	0.600	0.700	0.750	0.800	0.900
2	0	0.810	0.640	0.563	0.490	0.360	0.250	0.160	0.090	0.063	0.040	0.010
	1	0.180	0.320	0.375	0.420	0.480	0.500	0.480	0.420	0.375	0.320	0.180
	2	0.010	0.040	0.063	0.090	0.160	0.250	0.360	0.490	0.563	0.640	0.810
3	0	0.729	0.512	0.422	0.343	0.216	0.125	0.064	0.027	0.016	0.008	0.001
	1	0.243	0.384	0.422	0.441	0.432	0.375	0.288	0.189	0.141	0.096	0.027
	2	0.027	0.096	0.141	0.189	0.288	0.375	0.432	0.441	0.422	0.384	0.243
	3	0.001	0.008	0.016	0.027	0.064	0.125	0.216	0.343	0.422	0.512	0.729
4	0	0.656	0.410	0.316	0.240	0.130	0.063	0.026	0.008	0.004	0.002	0.000
	1	0.292	0.410	0.422	0.412	0.346	0.250	0.154	0.076	0.047	0.026	0.004
	2	0.049	0.154	0.211	0.265	0.346	0.375	0.346	0.265	0.211	0.154	0.049
	3	0.004	0.026	0.047	0.076	0.154	0.250	0.346	0.412	0.422	0.410	0.292
	4	0.000	0.002	0.004	0.008	0.026	0.063	0.130	0.240	0.316	0.410	0.656
5	0	0.590	0.328	0.237	0.168	0.078	0.031	0.010	0.002	0.001	0.000	0.000
	1	0.328	0.410	0.396	0.360	0.259	0.156	0.077	0.028	0.015	0.006	0.000
	2	0.073	0.205	0.264	0.309	0.346	0.312	0.230	0.132	0.088	0.051	0.008
	3	0.008	0.051	0.088	0.132	0.230	0.312	0.346	0.309	0.264	0.205	0.073
	4	0.000	0.006	0.015	0.028	0.077	0.156	0.259	0.360	0.396	0.410	0.328
	5	0.000	0.000	0.001	0.002	0.010	0.031	0.078	0.168	0.237	0.328	0.590
6	0	0.531	0.262	0.178	0.118	0.047	0.016	0.004	0.001	0.000	0.000	0.000
	1	0.354	0.393	0.356	0.303	0.187	0.094	0.037	0.010	0.004	0.002	0.000
	2	0.098	0.246	0.297	0.324	0.311	0.234	0.138	0.060	0.033	0.015	0.001
	3	0.015	0.082	0.132	0.185	0.276	0.313	0.276	0.185	0.132	0.082	0.015
	4	0.001	0.015	0.033	0.060	0.138	0.234	0.311	0.324	0.297	0.246	0.098
	5	0.000	0.002	0.004	0.010	0.037	0.094	0.187	0.303	0.356	0.393	0.354
	6	0.000	0.000	0.000	0.001	0.004	0.016	0.047	0.118	0.178	0.262	0.531
7	0	0.478	0.210	0.133	0.082	0.028	0.008	0.002	0.000	0.000	0.000	0.000
	1	0.372	0.367	0.311	0.247	0.131	0.055	0.017	0.004	0.001	0.000	0.000
	2	0.124	0.275	0.311	0.318	0.261	0.164	0.077	0.025	0.012	0.004	0.000
	3	0.023	0.115	0.173	0.227	0.290	0.273	0.194	0.097	0.058	0.029	0.003
	4	0.003	0.029	0.058	0.097	0.194	0.273	0.290	0.227	0.173	0.115	0.023
	5	0.000	0.004	0.012	0.025	0.077	0.164	0.261	0.318	0.311	0.275	0.124
	6	0.000	0.000	0.001	0.004	0.017	0.055	0.131	0.247	0.311	0.367	0.372
	7	0.000	0.000	0.000	0.000	0.002	0.008	0.028	0.082	0.133	0.210	0.478
		0.1	0.2	0.25	0.3	0.4	0.5	0.6	0.7	0.75	0.8	0.9
		p										

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7. If we repeatedly toss a balanced coin, then, in the long run, it will come up heads about half the time. But what is the probability that such a coin will come up heads exactly half the time in 30 tosses?

The probability that the coin will come up heads exactly half the time in 30 tosses is [ ].
(Round to three decimal places as needed.)

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8. According to a daily newspaper, the probability is about 0.62 that the favorite in a horse race will finish in the money (first, second, or third place). Complete parts (a) through (j) below.

a. In the next five races, what is the probability that the favorite finishes in the money exactly twice?

The probability that the favorite finishes in the money exactly twice is ☐.
(Round to three decimal places as needed.)

b. In the next five races, what is the probability that the favorite finishes in the money exactly four times?

The probability that the favorite finishes in the money exactly four times is ☐.
(Round to three decimal places as needed.)

c. In the next five races, what is the probability that the favorite finishes in the money at least four times?

The probability that the favorite finishes in the money at least four times is ☐.
(Round to three decimal places as needed.)

d. In the next five races, what is the probability that the favorite finishes in the money between two and four times, inclusive?

The probability that the favorite finishes in the money between two and four times, inclusive, is ☐.
(Round to three decimal places as needed.)

e. Determine the probability distribution of the random variable X, the number of times the favorite finishes in the money in the next five races. List the possible values of x in ascending order.

x	P(X = x)
☐	☐
☐	☐
☐	☐
☐	☐
☐	☐
☐	☐

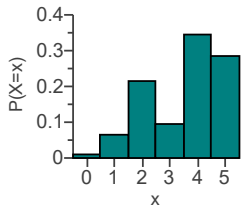
(Use ascending order. Round to three decimal places as needed.)

f. Identify the probability distribution of X as right skewed, symmetric, or left skewed without consulting its probability distribution or drawing its probability histogram.

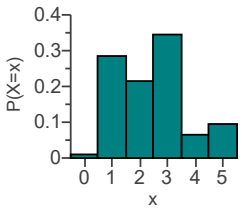
The probability distribution of X is (1) _____

g. Draw a probability histogram for X. Choose the correct histogram below.

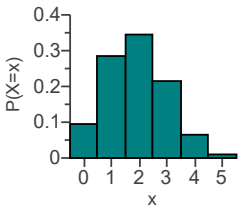
A.



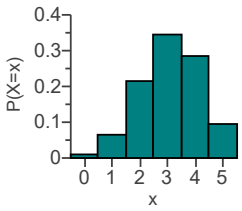
B.



C.



D.



h. Use your answer from part (e) and the formulas for the mean and standard deviation of a discrete random variable to obtain the mean and standard deviation of the random variable X.

The mean of X, calculated using the discrete random variable formula, is ☐ times.
(Round to two decimal places as needed.)

The standard deviation of X, calculated using the discrete random variable formula, is ☐ times.
(Round to two decimal places as needed.)

i. Use the formulas for the mean and standard deviation of a binomial random variable to obtain the mean and standard deviation of the random variable X.

The mean of X is [ ] times.
(Round to two decimal places as needed.)

The standard deviation of X is [ ] times.
(Round to two decimal places as needed.)

j. Interpret your answer for the mean in words. Choose the correct interpretation of the mean below.

- **A.** Out of the five races, the mean gives the at most number of favorites that finish in the money.
- **B.** Out of the five races, the mean gives the average number of favorites that finish in the money.
- **C.** Out of the five races, the mean gives the least number of favorites that finish in the money.
- **D.** Out of the five races, the mean gives the exact number of favorites that finish in the money.

(1)
- left skewed.
- right skewed.
- symmetric.

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