

Practice 5. Broward College

Determine whether the following is a probability distribution. If not, identify the requirement that is not satisfied.

- 1) If a person is randomly selected from a certain town, the probability distribution for the number, x , of siblings is as described in the accompanying table. 1) _____

x	$P(x)$
0	0.27
1	0.28
2	0.23
3	0.10
4	0.06
5	0.02

Find the mean and the standard deviation of the given probability distribution.

- 2) Mean: _____ Standard deviation: _____

x	$P(x)$
0	0.23
1	0.20
2	0.37
3	0.06
4	0.14

- 3) The accompanying table shows the probability distribution for x , the number that shows up when a loaded die is rolled. Mean: _____ Standard deviation: _____

x	$P(x)$
1	0.12
2	0.15
3	0.13
4	0.11
5	0.12
6	0.37

Answer the question.

- 4) Focus groups of 13 people are randomly selected to discuss products of the Yummy Company. It is determined that the mean number (per group) who recognize the Yummy brand name is 10.1, and the standard deviation is 0.55. Would it be unusual to randomly select 13 people and find that fewer than 7 recognize the Yummy brand name? 4) _____
 A) Yes B) No

- 5) Focus groups of 11 people are randomly selected to discuss products of the Famous Company. It is determined that the mean number (per group) who recognize the Famous brand name is 5.7, and the standard deviation is 0.50. Would it be unusual to randomly select 11 people and find that greater than 9 recognize the Famous brand name? 5) _____
 A) Yes B) No

Assume that a researcher randomly selects 14 newborn babies and counts the number of girls selected, x . The probabilities corresponding to the 14 possible values of x are summarized in the given table. Answer the question using the table.

Probabilities of Girls

$x(\text{girls})$	$P(x)$	$x(\text{girls})$	$P(x)$	$x(\text{girls})$	$P(x)$
0	0.000	5	0.122	10	0.061
1	0.001	6	0.183	11	0.022
2	0.006	7	0.209	12	0.006
3	0.022	8	0.183	13	0.001
4	0.061	9	0.122	14	0.000

- 6) Find the probability of selecting 9 or more girls. 6) _____
 A) 0.122 B) 0.001 C) 0.061 D) 0.212

Provide an appropriate response.

- 7) In a game, you have a $\frac{1}{20}$ probability of winning \$76 and a $\frac{19}{20}$ probability of losing \$9. What is your expected value? 7) _____
 A) \$12.35 B) -\$8.55 C) \$3.80 D) -\$4.75

- 8) Suppose you pay \$3.00 to roll a fair die with the understanding that you will get back \$5.00 for rolling a 1 or a 2, nothing otherwise. What is your expected value? 8) _____
 A) -\$1.33 B) -\$3.00 C) \$5.00 D) \$3.00

Determine whether the given procedure results in a binomial distribution. If not, state the reason why.

- 9) Rolling a single die 36 times, keeping track of the "fives" rolled. 9) _____
 A) Not binomial: the trials are not independent.
 B) Procedure results in a binomial distribution.
 C) Not binomial: there are too many trials.
 D) Not binomial: there are more than two outcomes for each trial.

- 10) Spinning a roulette wheel 6 times, keeping track of the occurrences of a winning number of "16". 10) _____
 A) Not binomial: there are more than two outcomes for each trial.
 B) Not binomial: the trials are not independent.
 C) Procedure results in a binomial distribution..
 D) Not binomial: there are too many trials.

Assume that a procedure yields a binomial distribution with a trial repeated n times. Use the binomial probability formula to find the probability of x successes given the probability p of success on a single trial. Round to three decimal places.

- 11) $n = 4, x = 3, p = \frac{1}{6}$ 11) _____
 A) 0.004 B) 0.012 C) 0.015 D) 0.023

- 12) $n = 5, x = 2, p = 0.70$ 12) _____
 A) 0.198 B) 0.464 C) 0.700 D) 0.132

- 13) $n = 64, x = 3, p = 0.04$ 13) _____
 A) 0.221 B) 0.375 C) 0.091 D) 0.139

Find the indicated probability. Round to three decimal places.

- 14) A test consists of 10 true/false questions. To pass the test a student must answer at least 9 questions correctly. If a student guesses on each question, what is the probability that the student will pass the test? 14) _____
A) 0.011 B) 0.999 C) 0.010 D) 0.001
- 15) A machine has 12 identical components which function independently. The probability that a component will fail is 0.2. The machine will stop working if more than three components fail. Find the probability that the machine will be working. 15) _____
A) 0.795 B) 0.927 C) 0.206 D) 0.133
- 16) A car insurance company has determined that 8% of all drivers were involved in a car accident last year. Among the 14 drivers living on one particular street, 3 were involved in a car accident last year. If 14 drivers are randomly selected, what is the probability of getting 3 or more who were involved in a car accident last year? 16) _____
A) 0.096 B) 0.926 C) 0.074 D) 0.407

Find the indicated probability.

- 17) The brand name of a certain chain of coffee shops has a 57% recognition rate in the town of Coffleton. An executive from the company wants to verify the recognition rate as the company is interested in opening a coffee shop in the town. He selects a random sample of 10 Coffleton residents. Find the probability that exactly 4 of the 10 Coffleton residents recognize the brand name. 17) _____
A) 0.106 B) 0.140 C) 0.000667 D) 0.0604
- 18) The brand name of a certain chain of coffee shops has a 50% recognition rate in the town of Coffleton. An executive from the company wants to verify the recognition rate as the company is interested in opening a coffee shop in the town. He selects a random sample of 9 Coffleton residents. Find the probability that the number that recognize the brand name is not 4. 18) _____
A) 0.164 B) 0.246 C) 0.754 D) 0.00195
- 19) In a survey of 300 college graduates, 46% reported that they entered a profession closely related to their college major. If 9 of those survey subjects are randomly selected without replacement for a follow-up survey, what is the probability that 3 of them entered a profession closely related to their college major? 19) _____
A) 0.0973 B) 0.797 C) 0.203 D) 0.102
- 20) An archer is able to hit the bull's-eye 55% of the time. If she shoots 8 arrows, what is the probability that she gets exactly 4 bull's-eyes? Assume each shot is independent of the others. 20) _____
A) 0.172 B) 0.0915 C) 0.263 D) 0.00375
- 21) A tennis player makes a successful first serve 46% of the time. If she serves 8 times, what is the probability that she gets exactly 3 first serves in? Assume that each serve is independent of the others. 21) _____
A) 0.147 B) 0.0973 C) 0.250 D) 0.00447
- 22) A multiple choice test has 7 questions each of which has 5 possible answers, only one of which is correct. If Judy, who forgot to study for the test, guesses on all questions, what is the probability that she will answer exactly 3 questions correctly? 22) _____
A) 0.00800 B) 0.275 C) 0.115 D) 0.885

- 23) Suppose that 10% of people are left handed. If 6 people are selected at random, what is the probability that exactly 2 of them are left handed? 23) _____
- A) 0.197 B) 0.0984 C) 0.0146 D) 0.0100

Find the mean, μ , for the binomial distribution which has the stated values of n and p . Round answer to the nearest tenth.

- 24) $n = 37; p = 0.2$ 24) _____
- A) $\mu = 7.7$ B) $\mu = 8.1$ C) $\mu = 7.4$ D) $\mu = 6.9$

- 25) $n = 32; p = 3/5$ 25) _____
- A) $\mu = 19.9$ B) $\mu = 18.7$ C) $\mu = 19.5$ D) $\mu = 19.2$

- 26) $n = 625; p = 0.7$ 26) _____
- A) $\mu = 439.2$ B) $\mu = 436.0$ C) $\mu = 437.5$ D) $\mu = 438.8$

Find the standard deviation, σ , for the binomial distribution which has the stated values of n and p . Round your answer to the nearest hundredth.

- 27) $n = 41; p = 0.2$ 27) _____
- A) $\sigma = 5.83$ B) $\sigma = 0.15$ C) $\sigma = 6.68$ D) $\sigma = 2.56$

- 28) $n = 42; p = 3/5$ 28) _____
- A) $\sigma = 3.17$ B) $\sigma = 7.29$ C) $\sigma = 0.76$ D) $\sigma = 6.44$

- 29) $n = 693; p = 0.7$ 29) _____
- A) $\sigma = 15.33$ B) $\sigma = 9.65$ C) $\sigma = 12.06$ D) $\sigma = 16.18$

- 30) $n = 35; p = 0.2$ 30) _____
- A) $\sigma = -0.04$ B) $\sigma = 6.49$ C) $\sigma = 5.64$ D) $\sigma = 2.37$

- 31) $n = 20; p = 3/5$ 31) _____
- A) $\sigma = -0.22$ B) $\sigma = 6.31$ C) $\sigma = 5.46$ D) $\sigma = 2.19$

- 32) $n = 581; p = 0.7$ 32) _____
- A) $\sigma = 15.17$ B) $\sigma = 8.64$ C) $\sigma = 14.32$ D) $\sigma = 11.05$

Use the given values of n and p to find the minimum usual value $\mu - 2\sigma$ and the maximum usual value $\mu + 2\sigma$. Round your answer to the nearest hundredth unless otherwise noted.

- 33) $n = 103, p = 0.26$ 33) _____
- A) Minimum: -12.85; maximum: 66.41 B) Minimum: 35.68; maximum: 17.88
- C) Minimum: 22.33; maximum: 31.23 D) Minimum: 17.88; maximum: 35.68

- 34) $n = 166, p = 0.15$ 34) _____
- A) Minimum: 20.3; maximum: 29.5 B) Minimum: 34.1; maximum: 15.7
- C) Minimum: 15.7; maximum: 34.1 D) Minimum: -17.43; maximum: 67.23

- 35) $n = 1070, p = 0.88$ 35) _____
- A) Minimum: 926.57; maximum: 956.63 B) Minimum: 930.97; maximum: 952.23
- C) Minimum: 920.34; maximum: 962.86 D) Minimum: 962.86; maximum: 920.34