

Score: 40.74/48 Points 84.88 %

1.

Award: 1 out of 1.00 point

 You received credit for this question in a previous attempt

When $p = .5$, the binomial distribution will _____ be symmetric.

- ✓ always
- sometimes
- never

References

Multiple Choice

Learning Objective:
05-03 Use the
binomial distribution
to compute
probabilities.

2.

Award: 1 out of 1.00 point



You did not receive full credit for this question in a previous attempt

The internal auditor for your company believes that 10 percent of your invoices contain errors. To check this theory, 20 invoices are randomly selected, and 5 are found to have errors. What is the probability that of the 20 invoices selected, 5 or more would contain errors if the theory is valid?

- ✓ .0433
- .0319
- .9567
- .8660

$$P(x \geq 5) = .0319 + .0089 + .0020 + .0004 + 0001 = .0433$$

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

3.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

Of all individual tax returns, 37 percent include errors made by the taxpayer. If IRS examiners are assigned randomly selected returns in batches of 12, find the mean and standard deviation for the number of erroneous returns per batch.

- $\mu = 2.80, \sigma = 1.67$
- ✓ $\mu = 4.44, \sigma = 1.67$
- $\mu = 4.44, \sigma = 2.80$
- $\mu = 7.56, \sigma = 2.80$

$$\text{Mean} = np = 12(.37) = 4.44$$

$$\text{Standard Deviation} = \sqrt{(npq)} = \sqrt{[(12)(.37)(.63)]} = 1.67$$

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

4.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

For a binomial process, the probability of success is 40 percent and the number of trials is 5. Find $P(X > 4)$.

- ✓ .0102
- .0778
- .0870
- .3370

$$P(X = 5) = (.4)^5 = .0102$$

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

5.

Award: 1 out of 1.00 point



You did not receive full credit for this question in a previous attempt

Which one of the following statements is not an assumption of the binomial distribution?

- ✓ Sampling is with replacement.
- The experiment consists of n identical trials.
- The probability of success remains constant from trial to trial.
- Trials are independent of each other.
- Each trial results in one of two mutually exclusive outcomes.

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

6.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

If you were asked to play a game in which you tossed a fair coin three times and were given \$2 for every head you threw, how much would you expect to win on average?

- ✓ \$3
- \$2
- \$6
- \$9

$$\text{Expected return} = (0)\left(\frac{1}{8}\right) + (\$2)(1)\left(\frac{3}{8}\right) + (\$2)(2)\left(\frac{3}{8}\right) + (\$2)(3)\left(\frac{1}{8}\right) = 3.0$$

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

7.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

A fair die is rolled 36 times. What is the standard deviation of the even number (2, 4, or 6) outcomes?

- 18
- 9
- 5
- ✓ 3
- 1.732

Binomial standard deviation = $\sigma = \sqrt{(npg)} = \sqrt{[(36)(.5)(.5)]} = \sqrt{9} = 3$

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

8.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

The number of ways to arrange x successes among n trials is equal to

✓ $\frac{n!}{x!(n-x)!}$.

$\frac{n!}{(n-x)}$.

$\frac{n}{x}$.

$\frac{n!}{x!}$.

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

9.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

In the most recent election, 19 percent of all eligible college students voted. If a random sample of 20 students were surveyed, find the probability that none of the students voted.

- .0000
- .0014
- ✓ .0148
- .4997

$P(X) = \frac{n!}{[x!(n-x)!]} \times p^x(1-p)^{n-x}$, for $x = 0$ when $p = .19$ and $n = 20$.

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

10.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

A fair die is rolled 10 times. What is the probability that an odd number (1, 3, or 5) will occur fewer than 3 times?

- ✓ .0547
- .1172
- .1550
- .7752
- .8450

$\sum P(X) = n!/[x!(n-x)!] \times p^x(1-p)^{n-x}$, for $x = 1, 3, 5$; or look up in binomial table where $x = 1$ or 3 or 5 when $p = .3$ and $n = 10$.

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

11.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

If x is a binomial random variable, then the standard deviation of x is given by

- np .
- $(npq)^2$.
- ✓ \sqrt{npq} .
- npq .

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

12.

Award: 1 out of 1.00 point

 You received credit for this question in a previous attempt

Which of the following is a valid probability value for a discrete random variable?

- ✓ .2
- 1.01
- 7
- All of the choices are correct.

The probability of a discrete random variable can only be between 0 and +1.

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

13.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

Which of the following is not a discrete random variable?

- the number of times a light changes red in a 10-minute cycle
- ✓ the number of minutes required to run 1 mile
- the number of defects in a sample selected from a population of 100 products
- the number of criminals found in a five-mile radius of a neighborhood

References

Multiple Choice

Learning Objective:
05-01 Explain the difference between a discrete random variable and a continuous random variable.

14.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

If $p = .5$ and $n = 4$, then the corresponding binomial distribution is _____.

- right skewed
- left skewed
- ✓ symmetric
- bimodal

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

15.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

In the most recent election, 19 percent of all eligible college students voted. If a random sample of 20 students were surveyed, find the probability that exactly half voted in the election.

- .0000
- ✓ .0014
- .0148
- .4997

$P(X) = n!/[x!(n - x)!] \times p^x(1 - p)^{n-x}$, for $x = 10$, when $p = .19$ and $n = 20$.

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

16.

Award: 0 out of 1.00 point



You did not receive full credit for this question in a previous attempt

Determine the probability that a 3 will appear twice, if a single fair die is rolled 10 times.

.5010

→ .2907

✘ .2318

.0065

$$P(X = 2) = \binom{10!}{2!8!} \left(\frac{1}{6}\right)^2 \left(\frac{5}{6}\right)^8 = .2907$$

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

17.

Award: 0 out of 1.00 point



You did not receive full credit for this question in a previous attempt

According to data from the state blood program, 40 percent of all individuals have group A blood. Suppose that of six randomly selected individuals, three have group A blood. Would you believe the data from the state blood program?

→ Yes, probability is $> .05$.

✘ Yes, probability is $< .05$.

No

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

18.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

Using the following probability distribution table of the random variable x , what is the probability of $x = 3$?

X	$P(X)$
0	$5/15$
1	$4/15$
2	$1/15$
3	

- $3/15$
- ✓ $5/15$
- $1/15$
- $2/15$

All values of $P(X)$ need to sum to 1, so $5/15 + 4/15 + 1/15 = 10/15$ means $P(X = 3) = 5/15$.

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

19.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

For a binomial process, the probability of success is 40 percent and the number of trials is 5. Find the variance.

- 5.0
- ✓ 1.2
- 2.0
- 1.1

$$\sigma^2_x = (5)(.4)(.6) = 1.2$$

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

20. Award: 1 out of 1.00 point

 You received credit for this question in a previous attempt

According to a survey of adults, 64 percent have money in a bank savings account. If we were to survey 50 randomly selected adults, find the mean number of adults who would have bank savings accounts.

- 12
- 22
- ✓ 32
- 42

$$\text{Mean} = np = 50(.64) = 32$$

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

21. Award: 1.50 out of 3.00 points

 You did not receive full credit for this question in a previous attempt

39 percent of all customers who enter a store will make a purchase. Suppose that 6 customers enter the store and that these customers make independent purchase decisions.

(1) Use the binomial formula to calculate the probability that exactly five customers make a purchase. **(Round your answer to 4 decimal places.)**

Probability .0329 

(2) Use the binomial formula to calculate the probability that at least three customers make a purchase. **(Round your answer to 4 decimal places.)**

Probability .7829 

(3) Use the binomial formula to calculate the probability that two or fewer customers make a purchase. **(Round your answer to 4 decimal places.)**

Probability .5652 ✓

(4) Use the binomial formula to calculate the probability that at least one customer makes a purchase. **(Round your answer to 4 decimal places.)**

Probability .1977 ✗

References

Worksheet Learning Objective:
05-03 Use the
binomial distribution
to compute
probabilities.

39 percent of all customers who enter a store will make a purchase. Suppose that 6 customers enter the store and that these customers make independent purchase decisions.

(1) Use the binomial formula to calculate the probability that exactly five customers make a purchase. **(Round your answer to 4 decimal places.)**

Probability

(2) Use the binomial formula to calculate the probability that at least three customers make a purchase. **(Round your answer to 4 decimal places.)**

Probability

(3) Use the binomial formula to calculate the probability that two or fewer customers make a purchase. **(Round your answer to 4 decimal places.)**

Probability

(4) Use the binomial formula to calculate the probability that at least one customer makes a purchase. **(Round your answer to 4 decimal places.)**

Probability

Explanation:

(1)
 $P(x = 5) = .0330$

(2)

$$P(x \geq 3) = 1 - P(x \leq 2) = 1 - .5650 = .4350$$

(3)

$$P(x \leq 2) = .5650$$

(4)

$$P(x \geq 1) = 1 - P(x = 0) = 1 - .0515 = .9485$$

22.

Award: 1 out of 1.00 point



You did not receive full credit for this question in a previous attempt

A car wash loses \$30 on rainy days and makes \$120 on days when it does not rain. If the probability of rain is 0.15, calculate expected profit for the car wash.

- \$90
- \$76.50
- \$106.50
- ✓ \$97.50

$$\mu_x = (-30)(.15) + (120)(.85) = -4.50 + 102 = 97.50$$

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

23.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

A lawyer believes that the probability is .3 that she can win a discrimination suit. If she wins the case, she will make \$400,000; but if she loses, she gets nothing. Assume that she has to spend \$75,000 preparing the case. What is her expected gain?

- \$325,000
- ✓ \$45,000
- \$150,000
- \$22,500

$$\mu_x = .7(-75,000) + .3(325,000) = -52,500 + 97,500 = 45,000$$

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

24.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

X has the following probability distribution $P(X)$.

X	1	2	3	4
$P(X)$.1	.5	.2	.2

Compute the variance value of X .

rev: 10_17_2018_QC_CS-143769

- 1.58
- .955
- ✓ .85
- .625

$$E[X] = (1)(.1) + (2)(.5) + (3)(.2) + (4)(.2) = 2.5$$

$$\sigma^2_x = (1 - 2.5)^2(.1) + (2 - 2.5)^2(.5) + (3 - 2.5)^2(.2) + (4 - 2.5)^2(.2) = .85$$

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

25.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

The probability distribution of X is

X	$P(X)$
3	$1/8$
4	$1/8$
5	$3/8$
6	$3/8$

What is the expected value of X ?

- 1.0
- ✓ 5.0
- 2.25
- 2.24

$$E[X] = 3\left(\frac{1}{8}\right) + 4\left(\frac{1}{8}\right) + 5\left(\frac{3}{8}\right) + 6\left(\frac{3}{8}\right) = \frac{40}{8} = 5.0$$

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

26.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

A multiple-choice test has 30 questions and each one has five possible answers, of which only one is correct. If all answers were guesses, find the probability of getting exactly four correct answers.

- .0604
- ✓ .1325
- .2552
- .8000

Probability of getting question correct = .2. Four successes in 30 trials. Treat as a binomial.

$P(X) = \frac{n!}{x!(n-x)!} \times p^x(1-p)^{n-x}$, for $x = 4$, when $p = .20$ and $n = 30$.

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

27.

Award: 1 out of 1.00 point

 You received credit for this question in a previous attempt

For a random variable X , the mean value of the squared deviations of its values from their expected value is called its _____.

- standard deviation
- mean
- probability
- ✓ variance

References

Multiple Choice


Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

28.

Award: 3 out of 3.00 points

 You received credit for this question in a previous attempt

Sound City sells the ClearTone-400 satellite car radio. For this radio, historical sales records over the last 100 weeks show 3 weeks with no radios sold, 31 weeks with one radio sold, 35 weeks with two radios sold, 15 weeks with three radios sold, 12 weeks with four radios sold, and 4 weeks with five radios sold. Calculate μ_x , σ_x^2 , and σ_x , of x , the number of ClearTone-400 radios sold at Sound City during a week using the estimated probability distribution. **(Round your answers to 2 decimal places.)**

μ_x	2.14	
σ_x^2	1.40	
σ_x	1.18	

References

Worksheet

Learning Objective:
05-02 Find a
discrete probability
distribution and
compute its mean
and standard
deviation.

Sound City sells the ClearTone-400 satellite car radio. For this radio, historical sales records over the last 100 weeks show 3 weeks with no radios sold, 31 weeks with one radio sold, 35 weeks with two radios sold, 15 weeks with three radios sold, 12 weeks with four radios sold, and 4 weeks with five radios sold. Calculate μ_x , σ_x^2 , and σ_x , of x , the number of ClearTone-400 radios sold at Sound City during a week using the estimated probability distribution. **(Round your answers to 2 decimal places.)**

μ_x	2.14
σ_x^2	1.40
σ_x	1.18

Explanation:**(a)**

$$\mu_x = 0 \times 0.03 + 1 \times 0.31 + 2 \times 0.35 + 3 \times 0.15 + 4 \times 0.12 + 5 \times 0.04 = 2.14$$

(b)

$$\begin{aligned}\sigma_x^2 &= (0-2.14)^2 \times 0.03 + (1-2.14)^2 \times 0.31 + (2-2.14)^2 \times 0.35 + (3-2.14)^2 \times 0.15 + \\ & (4-2.14)^2 \times 0.12 + (5-2.14)^2 \times 0.12 \\ &= 0.1374 + 0.4029 + 0.0069 + 0.1109 + 0.4152 + 0.3272 = 1.40\end{aligned}$$

(c)

$$\sigma_x = \text{SQRT}(1.40) = 1.18$$

29.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

One die is thrown. What is the expected value of the number of dots on the top face of the die?

- 1.0
- ✓ 3.5
- 4.0
- 3.0

$$E[X] = 1\left(\frac{1}{6}\right) + 2\left(\frac{1}{6}\right) + 3\left(\frac{1}{6}\right) + 4\left(\frac{1}{6}\right) + 5\left(\frac{1}{6}\right) + 6\left(\frac{1}{6}\right)$$

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

30.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

Which of the following statements about the binomial distribution is not correct?

- Each trial results in a success or failure.
- Trials are independent of each other.
- The probability of success remains constant from trial to trial.
- ✓ The random variable of interest is continuous.
- The experiment consists of n identical trials.

References

**Multiple
Choice**

Learning Objective:
05-03 Use the
binomial distribution
to compute
probabilities.

31.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

According to data from the state blood program, 40 percent of all individuals have group A blood. If six individuals give blood, find the probability that none of the individuals has group A blood.

- .0041
- .0410
- .4000
- ✓ .0467

$$P(x = 0) = .0467$$

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

32.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

A study conducted by a local university found that 25 percent of college freshmen support increased spending on environmental issues. If 6 college freshmen are randomly selected, find the probability that fewer than 4 support increased spending on environmental issues.

- .0330
- .7844
- ✓ .9624
- .9954

$\sum P(X) = n!/[x!(n-x)!] \times p^x(1-p)^{n-x}$, for $x = 0, 1, 2, 3$ when $p = .25$ and $n = 6$.

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

33.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

A total of 50 raffle tickets are sold for a contest to win a car. If you purchase one ticket, what are your odds against winning?

- ✓ 49 to 1
- 50 to 1
- .05
- .01

Probability of losing = $1 - \text{probability of winning} = 1 - 1/50 = 49/50$.

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

34.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

A vaccine is 95 percent effective. What is the probability that it is not effective for more than 1 out of 20 individuals?

- .7359
- .3585
- ✓ .2641
- .3774

$$\begin{aligned} P(X \geq 2) &= 1 - [P(X = 0) + p(X = 1)] \\ &= 1 - [.3585 + .3774] = .2641 \end{aligned}$$

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

35.

Award: 1 out of 1.00 point



You did not receive full credit for this question in a previous attempt

The binomial distribution is characterized by situations that are analogous to

- drawing balls from an urn.
- ✓ coin tossing.
- counting defects on an item.
- measuring the length of an item.

Binomial distributions assume a constant probability of success.

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

36.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

If $p = .1$ and $n = 5$, then the corresponding binomial distribution is _____.

- ✓ right skewed
- left skewed
- symmetric
- bimodal

References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

37.

Award: 1 out of 1.00 point

 You received credit for this question in a previous attempt

The mean of the binomial distribution is equal to

- p .
 np .
 $p^x(1-p)^{n-x}$.
 $(n)(p)(1-p)$.
 $\sqrt{np}(1-p)$.


References

Multiple Choice

Learning Objective:
05-03 Use the binomial distribution to compute probabilities.

38.

Award: 1.74 out of 3.00 points

 You did not receive full credit for this question in a previous attempt

Suppose that x is a binomial random variable with $n = 5$, $p = 0.6$, and $q = .40$.

(b) For each value of x , calculate $p(x)$. **(Round final answers to 4 decimal places.)**

$p(0) = \underline{.0102}$ , $p(1) = \underline{.0768}$ , $p(2) = \underline{.2304}$ , $p(3) = \underline{.3456}$ 
 $p(4) = \underline{.2592}$ , $p(5) = \underline{.0778}$ 

(c) Find $P(x = 3)$. **(Round final answer to 4 decimal places.)**

$P(x=3) \quad \underline{.3456}$ 

(d) Find $P(x \leq 3)$. **(Do not round intermediate calculations. Round final answer to 4 decimal places.)**

$$P(x \leq 3) \quad \underline{.6630} \quad \checkmark$$

(e) Find $P(x < 3)$. (Do not round intermediate calculations. Round final answer to 4 decimal places.)

$$P(x < 3) = P(x \leq 2) \quad \underline{.3174} \quad \checkmark$$

(f) Find $P(x \geq 4)$. (Do not round intermediate calculations. Round final answer to 4 decimal places.)

$$P(x \geq 4) \quad \underline{.3370} \quad \checkmark$$

(g) Find $P(x > 2)$. (Do not round intermediate calculations. Round final answer to 4 decimal places.)

$$P(x > 2) \quad \underline{.6826} \quad \checkmark$$

(h) Use the probabilities you computed in part *b* to calculate the mean μ_x , the variance, σ_x^2 , and the standard deviation, σ_x , of this binomial distribution. Show that the formulas for μ_x , σ_x^2 , and σ_x given in this section give the same results. (Do not round intermediate calculations. Round final answers to μ_x in to 2 decimal places, σ_x^2 and σ_x in to 4 decimal places.)

μ_x	<u>1.00</u>	✗
σ_x^2	<u>9.20</u>	✗
σ_x	<u>3.0333</u>	✗

(i) Calculate the interval $[\mu_x \pm 2\sigma_x]$. Use the probabilities of part *b* to find the probability that x will be in this interval. *Hint*: When calculating probability, round up the lower interval to next whole number and round down the upper interval to previous whole number. (Round your answers to 4 decimal places. A negative sign should be used instead of parentheses.)

The interval is [-5.0666 ✗, 7.0666 ✗].
 $P(-5.0666 \leq x \leq 7.0666) = 1.0000$ ✗

rev: 04_20_2015_QC_CS-13118

References

Worksheet Learning Objective:
05-03 Use the
binomial distribution
to compute
probabilities.

Suppose that x is a binomial random variable with $n = 5$, $p = 0.6$, and $q = .40$.

(b) For each value of x , calculate $p(x)$. **(Round final answers to 4 decimal places.)**

$$p(0) = \boxed{.0102 \pm .0001}, p(1) = \boxed{.0768 \pm .0001}, p(2) = \boxed{.2304 \pm .0001}, p(3) = \boxed{.3456 \pm .0001}$$

$$p(4) = \boxed{.2592 \pm .0001}, p(5) = \boxed{.0778 \pm .0001}$$

(c) Find $P(x = 3)$. **(Round final answer to 4 decimal places.)**

$$P(x=3) = \boxed{.3456 \pm .0001}$$

(d) Find $P(x \leq 3)$. **(Do not round intermediate calculations. Round final answer to 4 decimal places.)**

$$P(x \leq 3) = \boxed{.6630 \pm .0001}$$

(e) Find $P(x < 3)$. **(Do not round intermediate calculations. Round final answer to 4 decimal places.)**

$$P(x < 3) = P(x \leq 2) = \boxed{.3174 \pm .0001}$$

(f) Find $P(x \geq 4)$. **(Do not round intermediate calculations. Round final answer to 4 decimal places.)**

$$P(x \geq 4) = \boxed{.3370 \pm .0001}$$

(g) Find $P(x > 2)$. **(Do not round intermediate calculations. Round final answer to 4 decimal places.)**

$$P(x > 2) = \boxed{.6826 \pm .0001}$$

(h) Use the probabilities you computed in part *b* to calculate the mean μ_x , the variance, σ_x^2 , and the standard deviation, σ_x , of this binomial distribution. Show that the formulas for μ_x , σ_x^2 , and σ_x given in this section give the same results. **(Do not round intermediate calculations. Round final answers to μ_x in to 2 decimal places, σ_x^2 and σ_x in to 4 decimal places.)**

μ_x	3.00 ± 0.01
σ_x^2	1.20 ± 0.01
σ_x	1.0954 ± 0.0005

(i) Calculate the interval $[\mu_x \pm 2\sigma_x]$. Use the probabilities of part *b* to find the probability that x will be in this interval. *Hint:* When calculating probability, round up the lower interval to next whole number and round down the upper interval to previous whole number. **(Round your answers to 4 decimal places. A negative sign should be used instead of parentheses.)**

$$\text{The interval is } [\boxed{.8091 \pm .0001}, \boxed{5.1909 \pm .0001}].$$

$$P(\boxed{.8091 \pm .0001} \leq x \leq \boxed{5.1909 \pm .0001}) = \boxed{.9898 \pm .0001}$$

Explanation:

MTB > cdf;

SUBC> pois 6.

BINOMIAL WITH N = 0.6

K	P(X LESS OR = K)
0	.0102
1	.0768
2	.2304
3	.3456
4	.2592
5	.0778

MTB > cdf;

SUBC> pois 6.

BINOMIAL WITH N = 0.6

K	P(X LESS OR = K)
0	.0102
1	.0870
2	.3174
3	.6630
4	.9222
5	1.0000

(f)

$$P(x \geq 4) = 1 - P(x \leq 3) = 1 - .6630 = .3370$$

(g)

$$P(x > 2) = 1 - P(x \leq 2) = 1 - .3174 = .6826$$

(h)

$$\mu_x = \sum_{\text{All } x} xp(x) = 0(.0102) + 1(.0768) + 2(.2304) + 3(.3456) + 4(.2592) + 5(.0778) = 3.00$$

$$\mu_x = np = 5.0(0.6) = 3.00$$

$$\sigma_x^2 = \sum_{\text{All } x} (x - \mu_x)^2 p(x)$$

$$= (0 - 3.0)^2(.0102) + (1 - 3.0)^2(.0768) + (2 - 3.0)^2(.2304) + (3 - 3.0)^2(.3456) + (4 - 3.0)^2(.2592) + (5 - 3.0)^2(.0778) = 1.2000$$

$$\sigma_x^2 = npq = 5.0(0.6)(.40) = 1.2000$$

$$\sigma_x = \sqrt{\sigma_x^2} = \sqrt{1.20} = 1.0955$$

$$\sigma_x = \sqrt{npq} = \sqrt{5(0.6)(.4000)} = 1.095354$$

39.

Award: 1 out of 1.00 point



You received credit for this question in a previous attempt

A pharmaceutical company has determined that if a new cholesterol-reducing drug is manufactured (introduced to the market), the following probability distribution will describe the contribution of this drug to their profits during the next six months.

<u>Profit Contribution</u>	<u>Probability of Profit Contribution</u>
-\$ 3,000,000 (negative profit)	.20
\$ 5,000,000	.50
\$ 2,000,000	.30

The company management has decided to market this product if the expected contribution to profit for the next six months is more than \$1,000,000. Based on the information given above, should the company begin manufacturing the new drug? Explain your answer.

- ✓ Yes, begin manufacturing.
- No, do not begin manufacturing.

$$\mu_x = .2(-\$3,000,000) + .5(\$5,000,000) + .3(\$2,000,000) = \$2,500,000$$

$$\$2,500,000 > \$1,000,000$$

References

Multiple Choice

Learning Objective:
05-02 Find a discrete probability distribution and compute its mean and standard deviation.

40.

Award: 0.50 out of 3.00 points



You did not receive full credit for this question in a previous attempt

The United States Golf Association requires that the weight of a golf ball must not exceed 1.62 oz. The association periodically checks golf balls sold in the United States by sampling specific brands stocked by pro shops. Suppose that a manufacturer claims that no more than 6 percent of its

brand of golf balls exceed 1.62 oz. in weight. Suppose that 24 of this manufacturer's golf balls are randomly selected, and let x denote the number of the 24 randomly selected golf balls that exceed 1.62 oz. Refer to the Binomial table given below.

Excel Output of the Binomial Distribution with $n = 24$, $p = 0.06$, and $q = 0.94$
Binomial distribution with $n = 24$ and $p = 0.06$

x	$P(X=x)$
0	0.2265
1	0.3470
2	0.2547
3	0.1192
4	0.0400
5	0.0102

(Note: The Excel output may not include all of the x values.)

(a) Find $P(x = 0)$, that is, find the probability that none of the randomly selected golf balls exceeds 1.62 oz. in weight. **(Use table values rounded to 4 decimal places for calculations. Round your answer to 4 decimal places.)**

$P(x = 0)$.2265 ✓

(b) Find the probability that at least one of the randomly selected golf balls exceeds 1.62 oz. in weight. **(Use table values rounded to 4 decimal places for calculations. Round your answer to 4 decimal places.)**

$P(x \geq 1)$ n/r ✗

(c) Find $P(x \leq 3)$. **(Use table values rounded to 4 decimal places for calculations. Round your answer to 4 decimal places.)**

$P(x \leq 3)$ n/r ✗

(d) Find $P(x \geq 2)$. **(Use table values rounded to 4 decimal places for calculations. Round your answer to 4 decimal places.)**

$P(x \geq 2)$ n/r ✗

(e) Suppose that 2 of the 24 randomly selected golf balls are found to exceed 1.62 oz. Using your result from part *d*, do you believe the claim that no more than 6 percent of this brand of golf balls exceed 1.62 oz. in weight?

n/r ✗, the probability of this result is n/r ✗ if the claim is true.

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References

Worksheet Learning Objective:
05-03 Use the
binomial distribution
to compute
probabilities.

The United States Golf Association requires that the weight of a golf ball must not exceed 1.62 oz. The association periodically checks golf balls sold in the United States by sampling specific brands stocked by pro shops. Suppose that a manufacturer claims that no more than 6 percent of its brand of golf balls exceed 1.62 oz. in weight. Suppose that 24 of this manufacturer's golf balls are randomly selected, and let x denote the number of the 24 randomly selected golf balls that exceed 1.62 oz. Refer to the Binomial table given below.

Excel Output of the Binomial Distribution with $n = 24$, $p = 0.06$, and $q = 0.94$
Binomial distribution with $n = 24$ and $p = 0.06$

x	$P(X=x)$
0	0.2265
1	0.3470
2	0.2547
3	0.1192
4	0.0400
5	0.0102

(Note: The Excel output may not include all of the x values.)

(a) Find $P(x = 0)$, that is, find the probability that none of the randomly selected golf balls exceeds 1.62 oz. in weight. **(Use table values rounded to 4 decimal places for calculations. Round your answer to 4 decimal places.)**

$$P(x = 0) \quad \boxed{.2265}$$

(b) Find the probability that at least one of the randomly selected golf balls exceeds 1.62 oz. in weight. **(Use table values rounded to 4 decimal places for calculations. Round your answer to 4 decimal places.)**

$$P(x \geq 1) \quad \boxed{.7735}$$

(c) Find $P(x \leq 3)$. **(Use table values rounded to 4 decimal places for calculations. Round your answer to 4 decimal places.)**

$$P(x \leq 3) \quad \boxed{.9474}$$

(d) Find $P(x \geq 2)$. **(Use table values rounded to 4 decimal places for calculations. Round your answer to 4 decimal places.)**

$$P(x \geq 2) \quad \boxed{.4265 \pm .0001}$$

(e) Suppose that 2 of the 24 randomly selected golf balls are found to exceed 1.62 oz. Using your result from part d, do you believe the claim that no more than 6 percent of this brand of golf balls exceed 1.62 oz. in weight?

Yes , the probability of this result is large if the claim is true.

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Explanation:

(a)

$$P(x = 0) = .2265$$

(b)

$$P(x \geq 1) = 1 - P(x = 0) = 1 - .2265 = .7735$$

(c)

$$P(x \leq 3) = .2265 + .3470 + .2547 + .1192 = .9474$$

(d)

$$P(x \geq 2) = 1 - P(x \leq 1) = 1 - .5735 = .4265$$