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← STAT 2910, section 91, Fall 2025

Assignment #2 (Homework)

Due Date: THU, OCT 9, 2025 11:59 PM EDT

Current Score: 90 / 90 POINTS | 100.0 %

Scoring and Assignment Information

QUESTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
POINTS	3 / 3	1 / 1	1 / 1	1 / 1	2 / 2	6 / 6	4 / 4	3 / 3	1 / 1	1 / 1	1 / 1	5 / 5	6 / 6	4 / 4	3 / 3	3 / 3	10 / 10	3 / 3	1 / 1	1 / 1	1 / 1	4 / 4	5 / 5	2 / 2	4

Instructions

This assignment contains sections 4.1-4.6 and 4.8; 5.1-5.4; 6.1-6.3 from the textbook.

Assignment Submission

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or c

Assignment Scoring

Your last submission is used for your score.

1. **[3 / 3 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 4.E.015.

In a genetics experiment, the researcher mated two *Drosophila* fruit flies and observed the traits of 300 offspring. The results are shown in the table.

	Wing Size	
Eye Color	**Normal**	**Miniature**
Normal	132	5
Vermillion	2	161

One of these offspring is randomly selected and observed for the two genetic traits. (Enter your probabilities as fractions.)

(a) What is the probability that the fly has normal eye color and normal wing size?

11/25 ✓

(b) What is the probability that the fly has vermillion eyes?

163/300 ✓

(c) What is the probability that the fly has either vermillion eyes or miniature wings, or both?

14/25 ✓

Resources

Read It

2. **[1 / 1 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 4.E.022.

In how many ways can you select two people from a group of 16 if the order of selection is not important?

120 ✓ ways

Resources

Read It

3. **[1 / 1 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 4.E.025.

Two balls are selected from a box containing 12 balls. The order of selection is not important. How many simple events are in the sample space?

66 ✓ simple events

Resources

Read It

4. **[1 / 1 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

A student prepares for an exam by studying a list of 10 problems. She can solve 8 of them. For the exam, the instructor selects 7 questions at random from the that the student can solve all 7 problems on the exam? (Enter your probability as a fraction.)

1/15 ✓

Resources

Read It

5. **[2 / 2 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 4.E.047.MI.

Suppose that $P(A) = 0.3$ and $P(B) = 0.2$. If events A and B are independent, find these probabilities.

(a) $P(A \cap B)$

0.06 ✓

(b) $P(A \cup B)$

0.44 ✓

Resources

Read It Master It

6. **[6 / 6 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 4.E.050.

An experiment can result in one or both of events A and B with the probabilities shown in this probability table.

	A	A^C
B	0.33	0.49
B^C	0.13	0.05

Find the following probabilities. (Round your answers to three decimal places.)

(a) $P(A)$
0.46 ✓

(b) $P(B)$
0.82 ✓

(c) $P(A \cap B)$
0.33 ✓

(d) $P(A \cup B)$
0.95 ✓

(e) $P(A|B)$
0.402 ✓

(f) $P(B|A)$
0.717 ✓

Resources

Read It

7. **[4 / 4 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

A university student frequents one of two coffee houses on campus, choosing Tim Hortons 60% of the time and Starbucks 40% of the time. Regardless of where coffee on 90% of her visits.

(a) The next time she goes into a coffee house on campus, what is the probability that she goes to Tim Hortons and orders a decaffeinated coffee? (Ente places.)
0.54 ✓

(b) Are the two events in part (a) independent? Explain.

- (●) Yes, because the probability that the student orders a decaffeinated coffee is 0.9 regardless of whether the student visits Tim Hortons or Starbucks.
- ( ) No, because the probability that the student orders a decaffeinated coffee depends on whether the student visits Tim Hortons or Starbucks.

✓

(c) If she goes into a coffee house and orders a decaffeinated coffee, what is the probability that she is at Starbucks?
0.40 ✓

(d) What is the probability that she goes to Tim Hortons or orders a decaffeinated coffee or both? (Enter your answer to two decimal places.)
0.96 ✓

Resources

Read It

8. **[3 / 3 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

The maximum patent life for a new drug is, in most cases, 20 years. Subtracting the length of time required by Health Canada for testing and approval of the dr the drug—that is, the length of time that a company has to recover research and development costs and make a profit. Suppose the distribution of the lengths o shown here.

Years, *x*	3	4	5	6	7	8	9	10	11	12	13
p(x)	0.03	0.05	0.07	0.10	0.14	0.20	0.18	0.12	0.07	0.03	0.01

(a) Find the expected number of years of patent life for a new drug. (Enter your answer to two decimal places.)

7.90 ✓ yr

(b) Find the standard deviation of X. (Round your answer to four decimal places.)

2.1749 ✓ yr

(c) Find the probability that X falls into the interval $\mu \pm 2\sigma$. (Enter your answer to two decimal places.)

0.96 ✓

Resources

Read It

9. **[1 / 1 Points]** DETAILS MY NOTES PREVIOUS ANSW

MendStatC4 4.TB.015.

If $P(A/B) = P(A)$, or $P(B/A) = P(B)$, which of the following best describes the events A and B?

- ○ They are disjoint.
- ○ They are dependent.
- ◉ They are independent.
- ○ They are mutually exclusive.

✓

Resources

Read It

10. **[1 / 1 Points]** DETAILS MY NOTES PREVIOUS ANSW

MendStatC4 4.TB.016.

If $P(A) = 0.80$, $P(B) = 0.70$, and $P(A \cup B) = 0.90$, then what is the value of $P(A \cap B)$?

- ○ 0.56
- ○ 0.72
- ◉ 0.60
- ○ 0.63

✓

Resources

Read It

11. **[1 / 1 Points]** DETAILS MY NOTES PREVIOUS ANSW

MendStatC4 4.TB.035.

The probability distribution of the number of accidents in North York, Ontario, each day is given by

x	0	1	2	3	4	5
$P(x)$	0.20	0.15	0.25	0.15	0.20	0.05

Based on this distribution, what would be the expected number of accidents on a given day?

- ○ 4.62
- ○ 1.81
- ○ 1.47
- ◉ 2.15 ✓

Resources

Read It

12. **[5 / 5 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 5.E.001.

Consider a binomial random variable with $n = 5$ and $p = 0.8$. Let X be the number of successes in the sample. (Round your answers to three decimal places.)

(a) Find the probability that X is 3 or less.

0.263 ✓

(b) Find the probability that X is 3 or more.

0.942 ✓

(c) Find $P(X < 3)$.

0.058 ✓

(d) Find $P(X = 3)$.

0.205 ✓

(e) Find $P(3 \le X \le 4)$.

0.614 ✓

Resources

Read It

13. **[6 / 6 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

Car colour preferences change over the years and according to the particular model that the customer selects. In a recent year, 10% of all luxury cars sold were type are randomly selected, find the following probabilities. (Round your answers to three decimal places.)

(a) At least six cars are black.
0.033 ✓

(b) At most seven cars are black.
0.998 ✓

(c) More than four cars are black.
0.098 ✓

(d) Exactly four cars are black.
0.138 ✓

(e) Between three and six cars (inclusive) are black.
0.453 ✓

(f) More than 20 cars are not black.
0.902 ✓

Resources

Read It

14. **[4 / 4 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 5.E.036.

Consider a Poisson random variable X with $\mu = 1.5$. Use the Poisson formula to calculate the following probabilities. (Round your answers to six decimal places.)

(a) $P(X = 0)$
0.223130 ✓

(b) $P(X = 1)$
0.334695 ✓

(c) $P(X = 2)$
0.251021 ✓

(d) $P(X \leq 2)$
0.808846 ✓

Resources

Read It

15. **[3 / 3 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 5.E.(

Let X be a binomial random variable with $n = 20$ and $p = 0.1$.

(a) Calculate $P(X \le 5)$ using the Cumulative Binomial Probabilities table to obtain the exact binomial probability. (Enter your answer to three decimal pla
$P(X \le 5) =$ 0.989 ✓

(b) Use the Poisson approximation to calculate $P(X \le 5)$. (Round your answer to three decimal places.)
$P(X \le 5) =$ 0.983 ✓

(c) Compare the results of parts (a) and (b). Is the approximation accurate?

- (●) Yes, the difference between the values in parts (a) and (b) is less than 0.01.
- ( ) No, the difference between the values in parts (a) and (b) is at least 0.01.

✓

Resources

Read It

16. **[3 / 3 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

The number X of people entering the intensive care unit at a particular hospital on any one day has a Poisson probability distribution with mean equal to four pe

(a) What is the probability that the number of people entering the intensive care unit on a particular day is two? (Round your answer to three decimal pl
0.147 ✓

What is the probability that the number of people entering the intensive care unit on a particular day is less than or equal to two? (Round your answer t
0.238 ✓

(b) Is it likely that X will exceed 8? Explain.

- ( ) Yes, X is less than 2 standard deviations above the mean.
- (●) No, X is more than 2 standard deviations above the mean.

✓

Resources

Read It

17. **[10 / 10 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 5.E.052.

Let X be a hypergeometric random variable with $N = 19$, $n = 3$, and $M = 7$.

(a) Calculate $p(0)$, $p(1)$, $p(2)$, and $p(3)$. (Round your answers to two decimal places.)

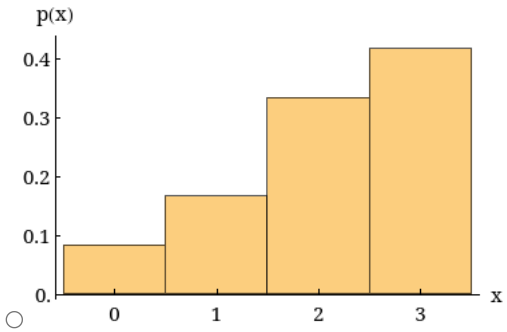
$p(0) =$ 0.23 ✓

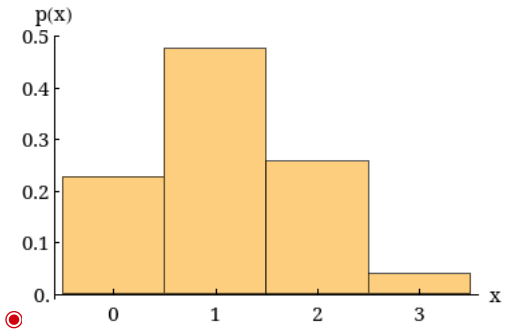
$p(1) =$ 0.48 ✓

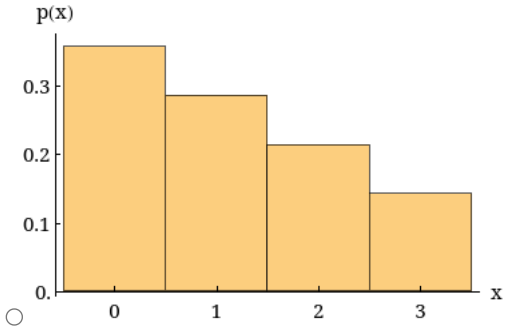
$p(2) =$ 0.26 ✓

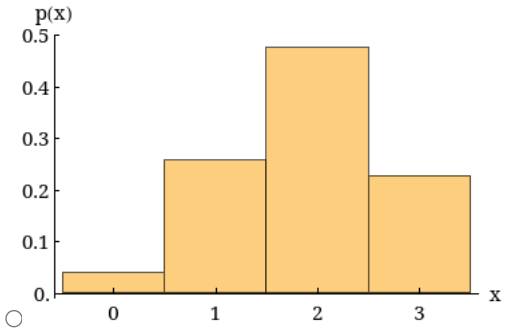
$p(3) =$ 0.04 ✓

(b) Construct the probability histogram for x.









✓

(c) Use the formulas below to calculate $\mu = E(x)$ and σ^2. (Round your answer for μ to one decimal place and your answer for σ^2 to five decimal places.)

$$\mu = n\left(\frac{M}{N}\right)$$

$$\sigma^2 = n\left(\frac{M}{N}\right)\left(\frac{N-M}{N}\right)\left(\frac{N-n}{N-1}\right)$$

$\mu =$ 1.1 ✓

$\sigma^2 =$ 0.62050 ✓

(d) What proportion of the population of measurements fall into the interval $(\mu \pm 2\sigma)$? (Round your answer to two decimal places.)

0.96 ✓

What proportion of the population of measurements fall into the interval $(\mu \pm 3\sigma)$? (Round your answer to two decimal places.)

1.00 ✓

Do these results agree with those given by Tchebysheff's Theorem?

- (●) Yes
- ( ) No

✓

Resources

Read It

18. **[3 / 3 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

Seeds are often treated with a fungicide for protection in poor-draining, wet environments. In a small-scale trial prior to a large-scale experiment to determine w apply, five treated seeds and ten untreated seeds were planted in clay soil and the number of plants emerging from the treated and untreated seeds were recorc effective and only four plants emerged. Let X represent the number of plants that emerged from treated seeds. (Round your answers to three decimal places.)

(a) Find the probability that $X = 4$.

0.004 ✓

(b) Find $P(X \le 3)$.

0.996 ✓

(c) Find $P(2 \le X \le 3)$.

0.403 ✓

Resources

Read It

19. **[1 / 1 Points]** DETAILS MY NOTES PREVIOUS ANSW

MendStatC4 5.TB.001.

Which of the following is NOT a characteristic of a binomial experiment?

- ○ Each trial has two possible outcomes, which are traditionally labelled "failure" and "success," and the probability of success p is the same on each trial.
- ◉ The probability of failure may differ from trial to trial.
- ○ There are n identical trials, and all trials are independent.
- ○ We are interested in x, the number of successes observed during the n trials.

✓

Resources

Read It

20. **[1 / 1 Points]** DETAILS MY NOTES PREVIOUS ANSW

The number of traffic accidents per day on a certain section of highway is thought to be Poisson distributed with a mean to equal 2.19. Which of the following be accidents occurring on this section of highway during a one-day period?

- ○ 0.296
- ◉ 0.112
- ○ 0.457
- ○ 0.318

✓

Resources

Read It

21. **[1 / 1 Points]** DETAILS MY NOTES PREVIOUS ANSW

The number of traffic accidents per day on a certain section of highway is thought to be Poisson distributed with a mean equal to 2.19. Based on this, how many during a period of one week?

- ◉ 15.33
- ○ approximately 10.36
- ○ 10.95
- ○ approximately 12.21

✓

Resources

Read It

22. **[4 / 4 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 6.E.001.

Consider a standard normal random variable with $\mu = 0$ and standard deviation $\sigma = 1$. (Round your answers to four decimal places.)

(a) $P(z < 1) =$ 0.8413 ✓

(b) $P(z > 1.15) =$ 0.1251 ✓

(c) $P(-2.39 < z < 2.39) =$ 0.9832 ✓

(d) $P(z < 1.84) =$ 0.9671 ✓

You may need to use the appropriate appendix table or technology to answer this question.

Resources

Read It

23. **[5 / 5 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 6.E.005.

Find the following probabilities for the standard normal random variable z. (Round your answers to four decimal places.)

(a) $P(-1.43 < z < 0.67)$ = 0.6722 ✓

(b) $P(0.52 < z < 1.72)$ = 0.2588 ✓

(c) $P(-1.59 < z < -0.49)$ = 0.2562 ✓

(d) $P(z > 1.33)$ = 0.0918 ✓

(e) $P(z < -4.34)$ = 0.0000 ✓

You may need to use the appropriate appendix table or technology to answer this question.

Resources

Read It

24. **[2 / 2 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 6.E.009.

(a) Find a z_0 that has area 0.9406 to its left. (Round your answer to two decimal places.)

z_0 = 1.56 ✓

(b) Find a z_0 that has area 0.06 to its left. (Round your answer to two decimal places.)

z_0 = -1.56 ✓

You may need to use the appropriate appendix table or technology to answer this question.

Resources

Read It

25. **[4 / 4 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

MendStatC4 6.E.011.

Find the following *percentiles* for the standard normal random variable z. (Round your answers to two decimal places.)

(a) 90th percentile

$z =$ 1.28 ✓

(b) 95th percentile

$z =$ 1.65 ✓

(c) 98th percentile

$z =$ 2.05 ✓

(d) 99th percentile

$z =$ 2.33 ✓

You may need to use the appropriate appendix table or technology to answer this question.

Resources

Read It

26. **[2 / 2 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

A normal random variable X has an unknown mean and standard deviation. The probability that X exceeds 5 is 0.9772, and the probability that X exceeds 6 is 0.

$\mu =$ 9 ✓

$\sigma =$ 2 ✓

Resources

Read It

27. **[5 / 5 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

An experimenter publishing in the *Annals of Botany* investigated whether the stem diameters of the dicot sunflower would change depending on whether the pla or was artificially supported. Suppose that the unsupported stem diameters at the base of a particular species of sunflower plant have a normal distribution with 35 millimetres (mm) and a standard deviation of 3 mm.

(a) What is the probability that a sunflower plant will have a stem diameter of more than 40 mm? (Round your answer to four decimal places.)

0.0478 ✓

(b) If two sunflower plants are randomly selected, what is the probability that both plants will have a stem diameter of more than 40 mm? (Round your a

0.0000 ✓

(c) Within what limits would you expect the stem diameters to lie, with probability 0.95? (Round your answers to two decimal places.)

lower limit 29.12 ✓ mm

upper limit 40.88 ✓ mm

(d) What diameter represents the 90th percentile of the distribution of diameters? (Round your answer to two decimal places.)

38.84 ✓ mm

Resources

Read It

28. **[3 / 3 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

It is estimated that the mean life span of oil-drilling bits is 77 hours. Suppose an oil exploration company purchases drill bits that have a life span that is approximat equal to 77 hours and a standard deviation equal to 12 hours. (Round your answers to four decimal places.)

(a) What proportion of the company's drill bits will fail before 62 hours of use?

0.1056 ✓

(b) What proportion will last at least 62 hours?

0.8944 ✓

(c) What proportion will have to be replaced after more than 92 hours of use?

0.1056 ✓

You may need to use the appropriate appendix table or technology to answer this question.

Resources

Read It

29. **[1 / 1 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

A manufacturing plant uses 3000 electric light bulbs whose life spans are normally distributed, with mean and standard deviation equal to 500 and 40 hours, res number of bulbs that burn out during operating hours, all the bulbs are replaced after a given period of operation. How often should the bulbs be replaced if we to burn out between replacement periods? (Round your answer to one decimal place.)

407.0 ✓ hr

Resources

Read It

30. **[3 / 3 Points]** DETAILS MY NOTES PREVIOUS ANSWERS ASK YOUR TEACH

Suppose that the Canada Revenue Agency assigns auditing rates per province by randomly selecting 13 auditing percentages from a normal distribution with a n deviation of 0.25%.

(a) What is the probability that a particular province would have more than 2% of its tax returns audited? (Round your answer to four decimal places.)

0.1587 ✓

(b) What is the expected value of x, the number of provinces that will have more than 2% of their income tax returns audited? (Round your answer to th

2.063 ✓

(c) Is it likely that as many as 6 of the 13 provinces will have more than 2% of their income tax returns audited?

- ○ Yes
- ◉ No ✓

Resources

Read It

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