PRACTICE MIDTERM 1 (not graded) - Attempt only when you have studied and prepared your cheat sheet for the exam

Due Jun 13 at 8am **Points** 29 **Questions** 29 **Available** Apr 23 at 8pm - Jun 13 at 8am about 2 months
Time Limit None **Allowed Attempts** 10

Instructions

- **This is just a practice midterm for you to practice. It will not be graded.**
- **Your midterm in Spring 22 will be a Cognella quiz, which works like the ones you have been doing, and will be different from this one. Questions in your actual exam will contain work questions where you must show detailed work, multiple choice and other types of questions, on all course content found in our Bruinlearn course web site.**
- **You must attempt the exam if you want to see the correct answers.**
- **There is no point in you just looking at the answers. For the practice exam to be helpful you should do it after you have prepared your cheat sheets and have studied for the exam as if it was an in-person exam.**
- **Remember, the actual midterm's questions will be different from the ones here and will be on any aspect of what was required for you to watch, read or do this quarter. Prepare a nice summary of your own, to save times. Read the instructions for the exam.**

Try to see if you can do this practice exam in less than 3 hours (the practice exam is an exam that can be done in less than 3 hours).

REQUIRED: Please, read the page in the Midterm Spring 2022 module with instructions for you actual exam in Winter 2022. Reading the instructions is required. Your midterm in Spring 2022 is going to be done in Cognella and all those instructions must be followed.

Failure to read the instructions and ask about what you don't understand in those instructions will result in point deductions from your exam grade. It is in your interest to read those instructions first and ask before Friday 4/29/2022, 11 AM any question you may have.

Email Dr. Sanchez if any of the instructions is not clear (email before 4/29/2022, 11 AM).

Take the Quiz Again

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	2,858 minutes	15.75 out of 29 *

* Some questions not yet graded

Submitted Apr 27 at 10:43am

Unanswered

Question 1

Not yet graded / 1 pts

A Z generation student has 3000 songs in their playlist. 15% of these songs are classic rock. The student selects their songs at random. What is the probability that in the next 100 songs chosen, the number of classic rock songs is larger than 70? Show work and justify your answer.

Your Answer:

Question 2

1 / 1 pts

Imagine that you conducted a survey of randomly chosen foreign exchange students to get data to answer the question: "are you from a European country or not"? You collected recently a random sample of 3000 foreign exchange students from among the very large population of all foreign exchange students in the United States. The goal was to estimate the parameter "p" (the probability that a randomly chosen foreign exchange student in the United States is from Europe).

Your estimate of p, based on that random sample was 0.3. If this 0.3 was indeed the true proportion of foreign exchange students in the United States that are from Europe, what is the probability that a randomly chosen sample of 10 foreign exchange students taken today from the population of foreign exchange students in the United States without replacement contains some from Europe?

Correct!

- (●) 0.9717525
- ( ) Approximately 0
- ( ) 0.02824752
- ( ) 0.1210608

Question 3

1 / 1 pts

There are 30 students enrolled in the "Sports fans club" in a University. In this club, 13 of the members have had a relative infected with COVID-19 in the last year and 17 of them have not. We would like to sample 6 students at random without replacement in order to interview them for the College magazine. What is the probability that we would get 3 students with a previously infected family member?

Correct!

- (●) 0.3275315
- ( ) 0.2961279
- ( ) approximately 0
- ( ) approximately 1

Question 4

0.5 / 1 pts

Match the following

You Answered

A geometric random variable with parameter p	Geometric

Correct Answer A negative binomial with parameters p and r=1

Correct!

A model for the number of amber alerts per week — Poisson

Other Incorrect Match Options:

- Binomial
- Geometric
- Negative binomial with parameters p and r=1/p

Question 5

1 / 1 pts

During several randomly chosen days, a data scientist enters an amusement park as soon as it opens and stands near the shown Hammer game in the amusement park. Each day, the data scientist observes individuals that try the game to see whether they hit the 100 strength. The data scientist leaves the park as soon as a person hits the 100 strength mark. On average, the number of people observed is 10. The data scientist then publishes in the park's annual bulletin the estimated probability that a random player of this game hits the 100 mark strength in this game. Which value should the data scientist publish for that probability, based on the evidence?

Correct!

- (selected) 0.1
- 0.9
- 0.3
- 0.01

Question 6

1 / 1 pts

Students applying to graduate schools usually try the GRE exams several times until they get a score that they are satisfied with. That costs money, say $200. The random variable X measures the number of attempts until satisfied with the score. Assuming that money is not a limitation for how many attempts a student can make, and that *p* represents the probability that a student is satisfied by an attempt, what is the variance of the cost?

Correct!

- (selected) $\frac{400-400p}{p^2}$
- $200\,(np\,(1-p))$, where n is the number of attempts.
- 400p(1-p)
- 200p(1-p)

Question 7

0.5 / 1 pts

$$\begin{aligned} P(X \le x) &= P(X=1)+P(X=2)\cdots P(X=x) \\ &= p+qp+q^2p\cdots+q^{x-1}p \\ &= p[1-q^x]/(1-q) \\ &= 1-q^x \end{aligned}$$

If X is a geometric random variable with parameter p and q=1-p, and the above results is correct, what is the following probability equal to?

$P(X > 10|X > 6)$

Correct!

- [x] q^4

Correct Answer

- [ ] P(X>4)
- [ ] q^6
- [ ] $(1-q^6)$

Unanswered

Question 8

Not yet graded / 1 pts

Is the die fair? Watch the video in this link.

You can type math by going to insert - equation in the editor

If you can not see the video in this question, you can answer the question that is asking anyway.

Question:

A friend tells me that a six-sided die that we are using for a game is fair.
You roll the die 100 times and find 75 numbers that are even.
Is the die fair or not?

Your Answer:

Question 9

0 / 1 pts

We have talked in several lectures about modeling data. Some data follow the geometric, other the negative binomial, for other we could use the binomial, for other the log normal distribution... Think about the radon data in Minnesota. Suppose we fit to it a Normal model with mean the mean of the radon data and standard deviation of the radon data. If we did that, which of the following would be true?

Correct Answer

- [ ] The probability of small values of radon would be underestimated
- [ ] The probability of high values of radon would be underestimated

The probability of low values of radon would be overestimated

You Answered — The normal would be a very good, almost perfect fit to the radon data

Question 10

1 / 1 pts

The random variable "Netflix subscriber status" can take two possible values: 1 if the person is a Netflix subscriber and 0 otherwise. Let's denote that random variable X. We are interested in $E\left(X^2\right)$. Find it. You may use LOTUS to answer this question.

Correct! — p

np

p^2

p(1-p)

Question 11

1 / 1 pts

This song is forgetting to sing about the (choose all that applied)

Correct! — the negative binomial pmf

Correct! — the geometric pmf

Correct! — Benford's law's pmf

- the Poisson pmf

Question 12

0.5 / 1 pts

Normal Probability Calculator

Describe distribution

Variable: X

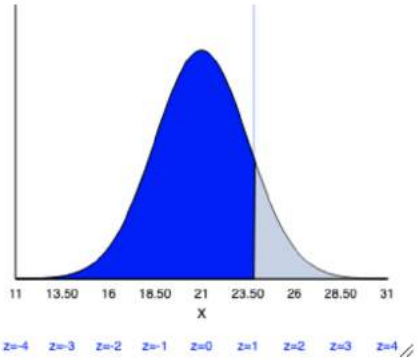
Mean: 21 SD: 2.5

Mean: 0 SD: 2

Scale to Fit

Check the box to activate a row.
Specify one value (and direction) to find the other two values.

		x	z	Probability
☑	<	23.816	1.126	0.8700
☐	<			



The image is showing what the Rossman-Chance applet produces when we enter information in it. According to the results, which of the following statements are correct?

Correct!

- ☑ 23.816 is the 87th percentile.
- ☐ 87 is the 23.816th percentile.

Correct Answer

- ☐ 1.126 is the 87th percentile of the standard normal random variable.
- ☐ 23.816 is 1.126 standard deviations below the mean.

Question 13

1 / 1 pts

Thanks to LOTUS we know that

Correct!

- ☑ The expectation operator is a linear operator
- ☐ The expectation operator is not a linear operator
- ☐ If we apply the definition of expectation of a function of a random variable X, say the expectation of g(X)=a+bX, we will discover that E(a+bX) = bX, where a, b are constants
- ☐ The variance of g(X) where $g(x) = a^2 X$ is equal to $a^2 Var(X)$

Unanswered

Question 14

Not yet graded / 1 pts

Two factories are used to produce the microchips sold by the Microchipsellers company. Factory A produces 60% of the microchips and its microchips have, on average, 2 defects per microchip. Factory B produces the remaining 40% of the microchips and its microchips have, on average, 1 defect per microchip.

If we buy a microchip sold by Microchipsellers, what is the probability that it has 1 error? Show work and provide a final answer.

Your Answer:

Question 15

1 / 1 pts

What is

$\sum_x \left[\left(x^2 + \mu_x^2 - 2x\mu_x\right) P(x)\right]$ equal to, according to the law of the unconscious statistician?

Correct!

- [x] σ_X^2

Correct!

- [x] $E(X^2) - \mu_X^2$
- [ ] $\mu_x + E(X^2)$

Correct!

- [x] $E\left[(X - \mu_X^2)\right]$

Unanswered

Question 16

Not yet graded / 1 pts

For each of the following types of random variables, provide the expected value of the following function:
$g(x) = 20 + 30X^2 - 5X$

(a) X ~ Binomial (n=20, p=0.3)

(b) X~ Poisson (λ=5)

(c) X~ Negative Binomial (p=0.2, r=5)

(d) X~ Exponential(λ=5)

(e) X~ Gaussian($\mu = 100$, σ=5)

Show work and make sure you separate the questions using (a), (b), (c), etc.

Your Answer:

Question 17

0.75 / 1 pts

Throughout the course we have been talking about models and cases of actual data that they fit well. Match the models and the data that we have seen.

You Answered

Covid-19 amount of cases

Normal density function

	Correct Answer	Benford's law probability mass function
Correct!	**Amount of radon per household**	log normal probability density
Correct!	**Birth data per hour in a hospital (thorughout 24 hours)**	Poisson probability mass fun
Correct!	**Number of deaths by horse kick per week**	Poisson probability mass fun

Other Incorrect Match Options:

- Normal density function
- Binomial probability mass function
- Exponential density function

Unanswered

Question 18

Not yet graded / 1 pts

Suppose we roll two fair six-sided dice, one red and one blue. Showing work, answer the following question. You may submit a file for this question with your hand-written or typed answer.

(a) Construct the probability mass function of the random variable

Y=(a-b),

where "a" is the value obtained with the red one and "b" the value obtained with the blue one.

(b) Calculate the probability that Y is less than or equal to 1.

Calculate the expected value and standard deviation of Y.

(c) Characterize the distribution of Y as skewed right, skewed left or symmetric.

Your Answer:

Unanswered

Question 19

Not yet graded / 1 pts

The length of time that it takes to process the grocery shopping at a checkout counter in a store with only one checkout counter is exponentially distributed with parameter $\lambda = \frac{1}{7}$. If someone arrives immediately ahead of you to the checkout counter, what is the probability that you will have to wait 3 minutes?

Your Answer:

Unanswered

Question 20

Not yet graded / 1 pts

Earlier in the quarter, you were asked to provide an answer to the taxicab problem involving a hit and run accident, where blue and green cab companies serve the city. Find the exercise in the earlier lectures, and, showing work, provide an answer here.

Your Answer:

Question 21

1 / 1 pts

If the probability that a randomly chosen person in the United States is poor is 12.3%, but the probability that a United States 16 year old person is poor is 16.8%, this is an indication that

Correct!

- (●) The events being poor and age of a person are not independent.
- ( ) The events being poor and age of a person are mutually exclusive
- ( ) The events being poor and age of a person are complement of each other
- ( ) The events being poor and age of a person are empty

Question 22

0.5 / 1 pts

Suppose that C and D are mutually exclusive events. Then the joint probability of C and D is equal to

Correct!

- [x] 0
- [ ] P(C)P(D)
- [ ] P(C) + P(D)

Correct Answer

- [ ] P(C|D)P(D)

Question 23

1 / 1 pts

The probability that a defective part is from factory A is 0.4, the probability that a defective part is from factory B is 0.5 and the probability that a defective part is from factory C is 0.3. The probabilities given here are

Correct!

- (●) conditional probabilities
- ( ) joint probabilities
- ( ) total or marginal probabilities
- ( ) enough to calculate the probability of defectives in factory A

Question 24

1 / 1 pts

Suppose we have two events C and D. If the events are not independent, which would be the correct way to calculate the joint probability of C and D?

Correct!
- [x] P(C)P(D|C)

Correct!
- [x] P(D)P(C|D)
- [ ] P(C)P(D)
- [ ] P(C)+P(D)

Question 25

1 / 1 pts

The probability that a defective part is from factory A is 0.4, the probability that a defective part is from factory B is 0.5 and the probability that a defective part is from factory C is 0.3. If you are given a defective part, observe that it is defective, and must decide where the part came from, what would you conclude if you use probabilistic decision making?

Correct!
- (•) Factory B
- ( ) Factory A
- ( ) Factory C
- ( ) We would not be able to tell

Unanswered

Question 26

Not yet graded / 1 pts

List three random variables, X, Y, T that apply to this scene and indicate whether they are discrete or continuous and what could be a possible model for them.

Your Answer:

Question 27

1 / 1 pts

When sampling 3 balls from an urn with 20 balls numbered 1 to 20, without replacement, which of the following is true?

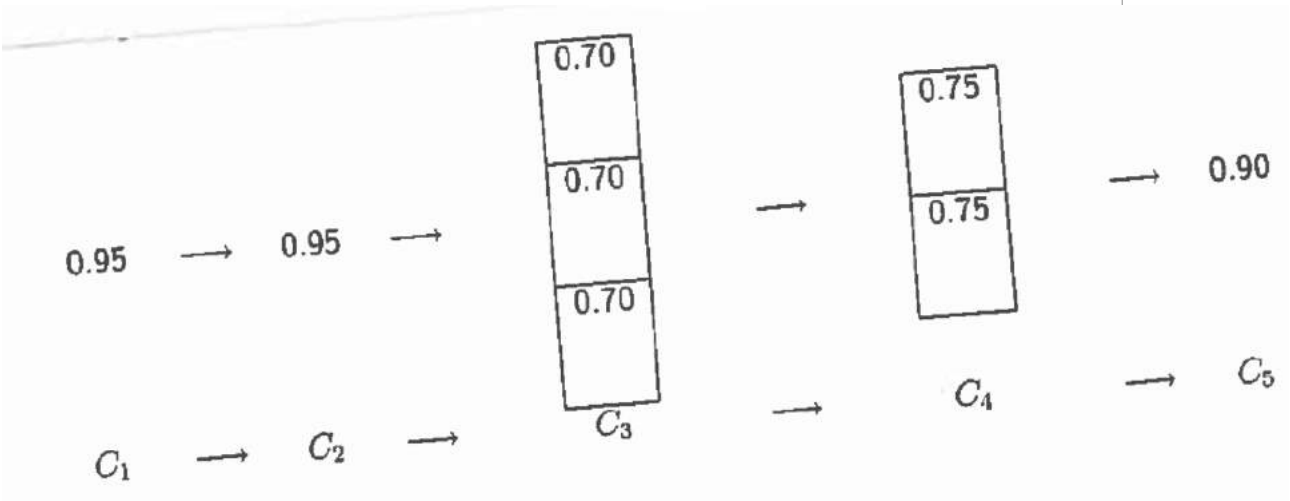
Correct!

- [x] the probability of getting the numbers 1, 2, 3, will be the same whether you use the number of corresponding sets in the numerator and denominator or you use the number of corresponding samples in the numerator and denominator.
- [ ] the probability of getting the numbers 1, 2, 3, will not be the same using the number of corresponding sets in the numerator and denominator as using the number of corresponding samples in the numerator and denominator.
- [ ] No answer text provided.
- [ ] No answer text provided.

Unanswered

Question 28

Not yet graded / 1 pts



This system has 8 components. The reliability of each component is given as indicated. We have, for convenience, split the system into 5 subcomponents that we label as C_1 *to* C_5 . Showing work calculate the reliability of the whole system.

Your Answer:

Here is a statement. For your exam to be graded, you must write your name in the space indicated and then write your hand-written signature. You may write the statement by hand and upload it, completed, or you can just complete it in a tablet with a pen and upload. You decide that. The statement must be complete and be exactly like the following. Upload the statement in a question that is just dedicated to upload it. If you do not see that question, make sure that you include the statement in one of the Midterm's essay questions after you answer the question. This statement must stay with the midterm. I will not accept pdf files sent by email. Thank you.

Statement:

I, _____**Write you full name, printed, where the bold letters are**____sign below to confirm that this exam reflects my work and only my work, that I have not consulted with anyone or anything except the class material posted in CCLE, the textbook, and Cognella active learning and that I have taken the time

specified in the instructions of very close to that time to complete the exam from the moment that I first flicked on the exam file until it was submitted. I also confirm that I have adhered to the UCLA Student Code of Conduct at **https://deanofstudents.ucla.edu/individual-student-code** (https://deanofstudents.ucla.edu/individual-student-code) and that I have not shared or will share this exam with anyone or anything. I also confirm that I have not spoken and will not speark to anyone about this exam, even if I submitted it, until after the submission deadline.

YOUR SIGNATURE (In English, and hand-written). Typed signatures not allowed. You must sign by hand, a real signature.

Notice that the signature must go at the end, and your full name typed at the top. Do not change this pattern. There is no creativity requested in this. This is an honesty statement, and has legal binding, and must be exactly as indicated.

Unanswered

Question 29

Not yet graded / 1 pts

Below, between the lines, you will find a statement. For your exam to be graded, you must write your name in the space indicated and then write your hand-written signature. You may write the statement by hand and upload it, completed, or you can just copy it complete it in a tablet with a pen and upload. You decide that. The statement must be complete and be exactly like the following. I will not accept pdf files sent by email. Thank you.

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YOUR SIGNATURE (In English, and hand-written). Typed signatures not allowed. You must sign by hand, a real signature.

Notice that the signature must go at the end, and your full name typed at the top. Do not change this pattern. There is no creativity requested in this. This is an honesty statement, and has legal binding, and must be exactly as indicated.

Your Answer:

Stat 100A(2) Essay questions where you had to show work. KEY. Copyright Juana Sanchez. Distribution outside Canvas course web page for Stat 100A(2) Fall 2021 prohibited.

Question Z generation (1 point) A Z generation student has 3000 songs in their playlist. 15% of these songs are classic rock. The student selects their songs at random. What is the probability that in the next 100 songs chosen, the number of classic rock songs is larger than 70? Show work and justify your answer.

Define random variable (0.1 points): X = number of classic rock songs in the sample

Check assumptions for Binomial (0.1 points): (i) Songs chosen at random, so each song choice is an independent trial. (ii) small sample relative to 3000 so p constant and p=0.15= "probability that a son is classic rock."

Conclusion (0.1): Can assume that X is Binomial(n=100, p=0.15)

Check conditions for normal approximation to binomial (0.1 points): (i) np= 100(0.15) = 15>10; (ii) 100(0.85) =85 > 10. Conditions hold, so can use the Normal approximation.

Calculate expected value and standard deviation for binomial (0.2 pts):

$$\mu_X = np = 15; \qquad \sigma_X = \sqrt{np(1-p)} = \sqrt{100(0.15)(0.85)} = 3.570714$$

Work set up for answer: P(X> 70) (0.2pts) = "approximately 0" (0.2 pts) by looking at the app for calculating normal probabilities posted in the course web site.

Question one die (1 pt). A friend tells me that a six-sided die that we are using for a game is fair.You roll the die 100 times and find 75 numbers that are even. Is the die fair or not?

Define random variable (0.1 points): X = number of even numbers in the roll of fair 6-sided

Check assumptions for Binomial (0.1 points): (i) Each roll (or trial) is an independent trial. (ii) rolling a die is like sampling with replacement, so p constant and p=0.5= "probability that a roll is an even number"

Conclusion (0.1): Can assume that X is Binomial(n=100, p=0.5)

Check conditions for normal approximation to binomial (0.1 points): (i) np= 100(0.5) = 50>10; (ii) 100(0.5) =50 > 10. Conditions hold, so can use the Normal approximation.

Calculate expected value and standard deviation for binomial (0.2 pts):

$$\mu_X = np = 50; \qquad \sigma_X = \sqrt{np(1-p)} = \sqrt{100(0.5)(0.5)} = 5$$

Work set up for answer: P(X> 75) (0.1pts) = "approximately 0" (0.1 pts) by looking at the app for calculating normal probabilities posted in the course web site. So we conclude: die is not fair (0.2pts)

Question types of r.v.(1 pt). For each of the following types of random variables, provide the expected value of the following function:

$$\boldsymbol{g(x) = 20 + 30X^2 - 5X}$$

(a) (0.2 pts, 0.1 for work, 0.1 for final number) X ~ Binomial (n=20, p=0.3)

$$E\big(g(X)\big) = 20 + 30E(\boldsymbol{X^2}) - 5E(X) = 20 + 30(np(1-p) + (np)^2) - 5np$$
$$= 20 + 30(4.2 + 36) - 5(6) = 1196$$

(b) (0.2pts, 0.1 for work, 0.1 for final number) X~ Poisson (λ=5)

$$E\big(g(X)\big) = 20 + 30E(\boldsymbol{X^2}) - 5E(X) = 20 + 30(\lambda + (\lambda)^2) - 5\lambda = 20 + 30(5 + 25) - 5(5)$$
$$= 895$$

(c) (0.2pts, 0.1 for work, 0.1 for final number) X~ Negative Binomial (p=0.2, r=5)

$$E\big(g(X)\big) = 20 + 30E(\boldsymbol{X^2}) - 5E(X) = 20 + 30\left(\frac{r(1-p)}{p^2} + \left(\frac{r}{p}\right)^2\right) - 5\frac{r}{p}$$
$$= 20 + 30(100 + 625) - 5(25) = 21645$$

(d) (0.2pts, 0.1 for work, 0.1 for final number) X~ Exponential(λ=5)

$$E\big(g(X)\big) = 20 + 30E(\boldsymbol{X^2}) - 5E(X) = 20 + 30\left(\frac{1}{\lambda^2} + \left(\frac{1}{\lambda}\right)^2\right) - 5\frac{1}{\lambda}$$
$$= 20 + 30(0.04 + 0.04) - 5(0.2) = 21.4$$

(e) (0.2pts, 0.1 for work, 0.1 for final number) X~ Gaussian(μ=100, σ=5)

$$E\big(g(X)\big) = 20 + 30E(\boldsymbol{X^2}) - 5E(X) = 20 + 30(\sigma^2 + (\mu)^2) - 5\mu$$
$$= 20 + 30(25 + 10000) - 5(100) = 300270$$

Question factories(1 pt). Two factories are used to produce the microchips sold by the Microchipsellers company. Factory A produces 60% of the microchips and its microchips have, on average, 2 defects per microchip. Factory B produces the remaining 40% of the microchips and its microchips have, on average, 1 defect per microchip.

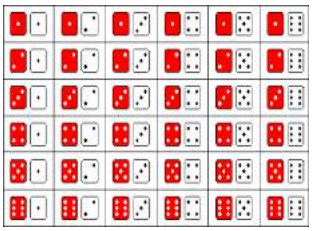
If we buy a microchip sold by Microchipsellers, what is the probability that it has 1 error? Show work and provide a final answer.

Defines random variable (0.2pts): Let Y="number of errors per microchip."

Justifies Poisson (0.2 pts):Assuming errors are independently and equally likely to happen in any of the microchips, we can assume that Y is Poisson distributed. However, there are two Poisson distributions, one for Factory A and one for factory B.

$$P(Y=1)(0.1pts) = P(Y=1|A)P(A) + P(Y=1|B)P(B)$$
$$= \left(\frac{2^1e^{-2}}{1!}\right)0.6 + \left(\frac{1^1e^{-1}}{1!}\right)0.4(work\ 0.4\ pts)$$
$$= 0.3095541(final\ answer\ 0.1pts)$$

Question two dice (two dice) (1pt) : Suppose we roll two fair six-sided dice, one red and one blue. Showing work, answer the following question. You may submit a file for this question with your hand-written or typed answer.

(a)  (0.6 pts for the pmf) Construct the probability mass function of the random variable

Y=(a-b),

where "a" is the value obtained with the red one and "b" the value obtained with the blue one.

5	4	3	2	1	0
4	3	2	1	0	-1
3	2	1	0	-1	-2
2	1	0	-1	-2	-3
1	0	-1	-2	-3	-4
0	-1	-2	-3	-4	-5

y=(a-b)	P(y)
-5	1/36
-4	2/36
-3	3/36
-2	4/36
-1	5/36
0	6/36
1	5/36
2	4/36
3	3/36
4	2/36
5	1/36

(b) (0.2 pts for mean and standard deviation) Calculate the probability that Y is less than or equal to 1. Calculate the expected value and standard deviation of Y.

$$P(Y \leq 1) = \frac{26}{36} = \frac{1}{36} + \frac{2}{36} + \frac{3}{36} + \frac{4}{36} + \frac{5}{36} + \frac{6}{36} + \frac{5}{36}$$

$$E(Y) = \sum_{y} yP(Y = y) = -5 \times \frac{1}{36} + \cdots \ldots \ldots + 5 \times \frac{1}{36} = 0$$

$$E(Y^2) = \sum_{y} y^2 P(Y = y) = 25 \times \frac{1}{36} + \cdots \ldots \ldots + 25 \times \frac{1}{36} = 5.83333$$

$$Var(Y) = E(Y^2) - [E(Y)]^2 = 5.83333$$

$$\sigma_Y = \sqrt{5.8333} = 2.415229$$

(b) Characterize the distribution of Y as skewed right, skewed left or symmetric.

It is symmetric. (0.2pts)

Question grocery. (1 pt) The length of time that it takes to process the grocery shopping at a checkout counter in a store with only one checkout counter is exponentially distributed with parameter λ=1/7. If someone arrives immediately ahead of you to the checkout counter, what is the probability that you will have to wait 3 minutes?

Let Y ="time it takes to process grocery shopping" (0.2pts defines r.v.)

You will have to wait 3 minutes if the processing of the grocery shopping of the person ahead of you takes 3 minutes or more

$P(Y \geq 3) = 1 - P(Y < 3) = 1 - (1 - e^{-3/7}) = 0.6514391$. (0.6, 0.2pts)

Note: Y is a continuous random variable. Consequently f(3) =0, because there is no area in a line. You can not calculate the probability of Y=3, but you can calculate the probability that Y is larger or equal to 3.

Question with image of train station. List three random variables, X, Y, T that apply to this scene and indicate whether they are discrete or continuous and what could be a possible model for them.

1/3 point for each. Examples will vary.

X= The daily number of people arriving at this station from wherever the train that is parked there originated from. This would be a Poisson random variable.

Y=The weight of the people arriving in the train that is now parked in the station. This is a continuous random variable and it could not be normal, because there could be children and adults, and therefore there will be more than one peak in the distribution (what we call a bimodal distribution). It could be a mixture of normal distributions.

T= The time it takes a passenger arriving in this train to go from the train to the top of the stairs. This would be a continuous random variable, exponential.

Question of system with components (1pt) : This system has 8 components. The reliability of each component is given as indicated. We have, for convenience, split the system into 5 subcomponents that we label as $C1$ *to* $C5$. Showing work calculate the reliability of the whole system.

Reliability= P(system works) (0.2pt)= $0.95 \times 0.95 \times (1 - 0.3^3) \times (1 - 0.25^2) \times 0.9$ $(0.6\,pt) = 0.7409243 (0.2pt)$

Question on taxicab hit and run. (1pt)

Let

Labeling events and identifying probabilities (0.2pt)

G=green cab; B=blue cab ; C =witness identified a cab as blue; C^c =witness identified the cab as green.

P(G) =0.85 ; P(B) = 0.15 ; P(C|B) = 0.8; P(L|G) = 0.8

Want (work: 0.1, 0.6, 0.1 pts)

$$P(B|C) = \frac{P(C|B)P(B)}{P(C|B)P(B) + P(C|G)P(G)} = \frac{0.8 \times 0.15}{0.8 \times 0.15 + 0.2 \times 0.85} = 0.4137931$$

So the cab is more likely to be green than blue.