Question 1

0.25 points ✓ Sav

In the particular card game, 5 cards are drawn randomly from a deck of 52 cards and are not replaced. Let X be the number of red cards. The random variable X is:

- ○ A. Geometric
- ○ B. Poisson
- ◉ C. Binomial
- ○ D. Hypergeometric
- ○ E. Negative Binomial

Question 2

0.25 points ✓ Saved

In a community, 2% are infected with COVID-19. A doctor performs ideal PCR tests to detect COVID patients each day by randomly selecting persons from the community. Let X be the number of tests the doctor would have to perform until there are 5 positive patients. Assume independence. The random variable X is:

- ○ A. Binomial
- ◉ B. Negative Binomial
- ○ C. Poisson
- ○ D. Hypergeometric
- ○ E. Geometric

Question 3

Which of the following is false? Select ALL that apply.

- ☐ A. A binomial random variable is a sequence of Bernoulli random variables.
- ☑ B. The number of trials for a binomial random variable is fixed with success probability 1-*p*.
- ☐ C. Bernoulli trials are independent of one another and can only have two outcomes.
- ☑ D. The number of trials for a geometric random variable is fixed with success probability *p*.
- ☐ E. A Bernoulli random variable is a special case of the Binomial random variable when n = 1.

Question 4

0.5 points ✓ Sa

Which one statement is false?

- ○ A. The negative binomial distribution assumes a fixed number of successes but a random (or unknown) number of independent trials.
- ○ B. The hypergeometric distribution is applied to situations where there are two outcomes, but the assumption of independence of the binomial distribution is not satisfied.
- ◉ C. The binomial distribution is the limiting distribution of the Poisson distribution.
- ○ D. The geometric distribution is a decaying exponential probability distribution concerned with the number of independent trials until the first success occurs.

Question 5

Which of the following is true regarding a Binomial random variable? Select ALL that apply.

- [x] A. 1-*p* is the probability of failure and *p* is the probability of success.
- [x] B. There are *n* fixed independent Bernoulli trials.
- [x] C. The binomial random variable is the number of successes observed in *n* trials.
- [ ] D. *X* is the number of trials until the first success occurs.

Question 16

0.25 points

The computer repair desk at a tech store has 13 customers on average each hour. Let the random variable X be the number of customers. Assume independence. The random variable X is:

- ○ A. Bernoulli
- ● B. Poisson
- ○ C. Binomial
- ○ D. Geometric

Question 17

0.25 points

A computer crashes on average once every two months. Let the random variable X be the number of times the computer crashes. Assume independence. The random variable X is:

- ○ A. Binomial
- ○ B. Geometric
- ● C. Poisson
- ○ D. Bernoulli

Question 6

1 points Save Answer

According to the U.S. National Center for Health Statistics, there is a 98% chance that a 20 year old male will survive to the age of 30. Suppose we select 50 males from UTD who are at age 20. What is the probability that less than 47 of the selected males will survive to age 30? Round your answer to three decimal places.

$p = 0.98$; $n = 50$; $P(X<47) = P(X \leq 46)$ binom

$P(X \leq 46) = \text{binomcdf}(50, 0.98, 47) = \boxed{0.0178}$

Question 7

1 points | Save A

An internet search engine looks for a certain keyword in a sequence of independent web sites. It is believed that 20% of the sites contain this keyword. Suppose we select 30 websites randomly. What is the probability that less than 7 of these websites contain this keyword?

$p = 0.2$; $n = 30$; $P(X<7) = P(X \leq 6)$ binom

$P(X \leq 6) = \text{binomcdf}(30, 0.2, 6) = \boxed{0.607}$

Question 8

1 points | Save A

An internet search engine looks for a certain keyword in a sequence of independent web sites. It is believed that 20% of the sites contain this keyword. Suppose we select 30 websites randomly. What is the probability that exactly 7 of these websites contain this keyword?

$p = 0.2$; $n = 30$ $X = 7$ binom

$P(X=7) = \text{binompdf}(30, 0.2, 7) = \boxed{0.154}$

Question 9

0.5 points | Save Answ

A light bulb manufacturing factory finds 6 in every 60 light bulbs defective (or 10%). What is the probability that at most 6 bulbs will be tested before finding the first defective bulb? Assume independence. Round to three decimal places.

$p = 0.1$; at most 6 ; $P(X \leq 6)$ Geometric

$P(X \leq 6) = \text{geometcdf}(0.1, 6) = \boxed{0.469}$

Question 10 0.5 points Save An

A light bulb manufacturing factory finds 3 in every 60 light bulbs defective (or 5%). What is the probability that more than 6 bulbs will need to be tested before finding the first defective bulb? Assume independence. Round to three decimal places.

$p = 0.05$; $P(X > 6)$ Geomet

$P(X > 6) = 1 - P(X \leq 6) = \boxed{0.735}$

Question 11 0.25 points Save Answ

A light bulb manufacturing factory finds 3 in every 60 light bulbs defective (or 5%). How many lightbulbs should we expect to inspect before finding the first defective bulb?

$p = 0.05$ geomet

$\mu = \frac{1}{p} = \frac{1}{0.05} = \boxed{20}$

Question 12 0.25 points Save Answer

According to the U.S. National Center for Health Statistics, there is a 98% chance that a 20 year old male will survive to the age of 30. Suppose we select 50 males from UTD who are at age 20. How many of these students do we expect to live to the age of 30?

$p = 0.98$; $n = 50$ binom

$E(X) = np = 50 \times 0.98 = \boxed{49}$

Question 13 1 points Save Answer

Suppose power outages at UTD occur at a rate of two per month. What is the probability of more than 5 power outages in any three month period? Round your answer to three decimal places.

$P(X>5)$ poisson

$\lambda_0 = 2$ per month
$t = 3$ month $\Rightarrow \lambda = 2 \times 3 = 6$

$P(X>5) = 1 - P(X \le 5) = 1 - \text{poissoncdf}(6,5) = \boxed{0.554}$

Question 14 1 points Save Answer

Suppose power outages at UTD occur at a rate of two per month. What is the probability of at least 5 power outages in any three month period? Round your answer to three decimal places.

$\lambda_0 = 2$
$t = 3$ $\Rightarrow \lambda = 6$ $P(X \ge 5)$ poisson

$1 - P(X<5)$

$P(X \ge 5) = 1 - P(X \le 4) = 1 - \text{poissoncdf}(6,4) = \boxed{0.715}$

Question 15 1 points Save Answer

Suppose power outages at UTD occur at a rate of two per month. What is the probability of exactly 5 power outages in any three month period? Round your answer to three decimal places.

$\lambda = \lambda_0 t = 2(3) = 6$ $P(X=5)$ poisson

$P(X=5) = \text{poissonpdf}(6,5) = \boxed{0.161}$