Question **1**

Not yet answered

Marked out of 1.00

An online computer system is proposed. The manufacturer can give the information that the mean response time is 10 seconds. Estimate the probability that the response time will be more than 20 seconds.

Select one:

- a. More than 1/2
- b. Less than 1/2
- c. 1/3
- d. Less than 2

Question **2**

Not yet answered

Marked out of 1.00

Chapter 9, mini quiz question 2.

The distribution of income (in tens of thousands) of females in a small population can be modeled by a gamma distribution with mean 4 and standard deviation 8 dollars. A simulation is done, where each trial consists of drawing a random sample of 500 women from this population and computing the average salary of the women in this population. 1000 trials are done. Which of the following statements is true?

To answer this question, you must use the parameterization that we use in this class for the Gamma (there are different parameterizations out there in the internet, do not use those other ones). See the document posted at the bottom of the lectures folder on the Gamma. You also may want to review Dr. Sanchez's video on how to use the Rossman/Chance app on finding the distribution of the sample mean. See what we did there, which was a simulation similar to the one in this question.

Select one:

a. The distribution of the sample obtained in one trial should be close to normal

b. If we plotted the distribution of the sample obtained in each of the 1000 trials, we would have 1000 distributions that look like the normal.

c. The mean of the 500 random variables in each sample is close to 2000.

d. The distribution of the 1000 averages is exactly gamma.

e. The distribution of the 1000 averages is close to normal.

Question **3**

Not yet answered

Marked out of 1.00

Blood pressure in a population of very at risk people has expected value of 195 and a standard deviation of 20. Suppose you take a random sample of 100 of these people. There would be a 68% chance that the average blood pressure would be between

Select one:

a. 155 to 235

b. 193 to 197

c. 175 to 215

d. 191 to 199

e. 200 to 230

Question **4**

Not yet answered

Marked out of 1.00

An airline knows that over the long run, 90% of passengers who reserve seats show up for their flight. On a particular flight with 300 seats, the airline accepts 324 reservations. Assuming that passengers show up independently of each other, what is the chance that the flight will be overbooked?

Select one:

- a. 0.91
- b. 0.455
- c. 0.05297
- d. 0.1

Question **5**

Not yet answered

Marked out of 1.00

The service times for customers coming through a checkout counter in a retail store are independent random variables, with a mean of 1.5 minutes and a variance of 1.0 minute. Approximate the probability that 100 customers can be serviced in less than 2 hours of total service time.

Select one:

a. 0.4987

b. 0.5

c. 0.0013

d. 0.23

Question **6**

Not yet answered

Marked out of 1.00

The amount of money college students spend each semester on textbooks is normally distributed with an expected value of $195 and a standard deviation of $20. Suppose you take a random sample of 100 college students from this population. There would be a 68% chance that the average amount spent on textbooks is between

Select one:

- a. 155 to 235
- b. 191 to 199
- c. 193 to 197
- d. 175 to 215
- e. 235 to 155

Question **7**

Not yet answered

Marked out of 1.00

Chapter 9, mini quiz 7

The median age of residents of the United States is 31 years. If a survey of 100 randomly selected United States residents is taken, find the approximate probability that at least 60 of them will be under 31 years of age.

Select one:

- a. 0.02
- b. 0.5
- c. 0.471
- d. 5

Question **8**

Not yet answered

Marked out of 1.00

Chebychev's and Markov's theorems give

Select one:

a. exact probabilities that a random variable is in an interval in the real line

b. a bound for the probability that a random variable is in an interval in the real line

c. expected value of a random variable

d. the variance of a random variable

Question **9**

Not yet answered

Marked out of 1.00

Let random variables X, Y have the joint density function

$$f(x,y) = 6y, \quad 0 \le y \le x \le 1$$

For this example, it is true that

Select one or more:

- [ ] a. $E(E(Y|X)) = E(Y)$
- [ ] b. $Var(E(Y|X)) < Var(Y)$
- [ ] c. X and Y are independent
- [ ] d. The marginal density function of X is exponential

Question **10**

Not yet answered

Marked out of 1.00

Which of the following statements is not true according to the Central Limit Theorem?

- a. (a) The mean of a distribution of sample means is equal to the population mean divided by the square root of the sample size.
- b. The larger the sample size, the more the distribution of the sample means resembles the shape of the original distribution of one single random variable
- c. The mean of the distribution of sample means for samples of size n=15 will be the same as the mean of the distribution for samples of size n=100
- d. The larger the sample size, the more the distribution of sample means will resemble a normal distribution.
- e. An increase in n will produce a distribution of sample means with smaller standard deviation

Question **11**

Not yet answered

Marked out of 1.00

The length of a phone call, X, in minutes, is a random variable that can be modeled by an exponential distribution with expected value 10 in minutes.

Match the probability models that must be used to find the probabilities

$f(x) = 0.1e^{-0.1x}$ Choose...

$N(\mu = 10, \sigma^2 = 1)$ Choose...

$Gamma(\lambda = 0.1, \alpha = 3)$ Choose...

Question **12**

Not yet answered

Marked out of 1.00

Waiting times at a service counter in a pharmacy are exponentially distributed, with expected value 10 minutes. If 100 customers come to the service counter in a day,

The expected average waiting time of all customers is Choose...

The standard deviation of the average waiting time of 100 customers is Choose...

The probability that the waiting time of 100 customers is less than 7 minutes is Choose...

Question **13**

Not yet answered

Marked out of 1.00

We are interested in random variable X, the number of miles run per week by an individual training for the LA marathon. Consider n individuals, training for the LA marathon and let

$$X_1, X_2, \ldots, X_n$$

denote their number of miles run per week by each of those n individuals. If these random variables are independent and identically distributed, which of the following statements is NOT true?

Select one:

a. The larger the n, the more the distribution of

$$\frac{\sum_{i=1}^{n} X_i}{n}$$

resembles the distribution of any of the

$$X_i$$

.

b. The expected value of

$$\frac{\sum_{i=1}^{n} X_i}{n}$$

will be the same whether n is 100 or n is 5.

c. The larger n is, the more the distribution of

$$\frac{\sum_{i=1}^{n} X_i}{n}$$

will resemble a Gaussian distribution.

d. An increase in n will decrease the standard deviation of

$$\frac{\sum_{i=1}^{n} X_i}{n}$$

Question **14**

Not yet answered

Marked out of 1.00

As genetic theory shows, there is very close to an even chance that both children in a two-child family will be of the same sex. Here are two possibilities.

(i) 15 couples have two children each. In 10 or more of these families, it will turn out that both children are of the same sex.

(ii) 30 couples have two children each. In 20 or more of these families, it will turn out that both children are of the same sex.

According to the laws of probability, which of (i) and (ii) is more likely to be observed?

Select one:

a. (i) is more likely to be observed than (ii).

b. (ii) is more likely to be observed than (i).

Question **15**

Not yet answered

Marked out of 1.00

Let

$$X_1, X_2, \ldots . X_n$$

be a set of i.i.d random variables, where

$$f(x_i) = \frac{1}{\theta}, \quad 0 < x < \theta$$

Let

$$\bar{X} = \frac{\sum_{i=1}^{n} x_i}{n}$$

And let's define

$$Q = \sigma^2_{\bar{X}} + [E(\bar{X}) - \theta]^2$$

The Q equals

Select one:

a. $\frac{(3n+1)\theta^2}{12n}$

b. $3n\theta^2$

c. $\theta/2$

d. $3n\theta/12$