MATH 2050 **NAME**_____
QUIZ 3

Use a pencil. Be neat. Show all pertinent work. Use at least 3 decimal places for answers that require decimal points.

1. What value would be needed to complete the following probability distribution?

x	0	1	2	3	4
$f(x)$	$1/6$	$1/12$	$1/3$	$1/4$	???

answer:_____

2. What is the mean of the following probability distribution?

x	0	1	2	3	4
$f(x)$	0.1	0.1	0.4	0.3	0.1

answer:_____

3. What is the standard deviation (accurate to 3 decimal places) of the following probability distribution?

x	0	1	2	3	4
$f(x)$	0.1	0.1	0.4	0.3	0.1

answer:_____

4. A student randomly guesses at 10 multiple-choice questions. Each question has 4 possible choices. What is the probability that the student gets exactly 4 correct?

(a) .0039 (b) .0007 (c) .1460 (d) .0625 (e) .9085

5. A student randomly guesses at 10 multiple-choice questions. Each question has 4 possible choices. What is the mean number of questions the student answers correctly?

answer:_____

6. A student randomly guesses at 10 multiple-choice questions. Each question has 4 possible choices. What is the standard deviation of the number of questions the student answers correctly?

answer:_____

7. Suppose the birth weights of newborn babies at City General Hospital have a normal distribution with mean 7.2 lb and standard deviation 1.2 lb. What is the probability that a randomly selected baby weighs between 7.0 and 7.5 lb?

answer:_____

8. Suppose the birth weights of newborn babies at City General Hospital have a normal distribution with mean 7.2 lb and standard deviation 1.2 lb. Find the 95th percentile of the birth weight distribution.

(a) 1.645 (b) 9.17 (c) 10.30 (d) 9.55 (e) 1.96

9. A student randomly guesses at 10 multiple-choice questions. Each question has 5 possible choices. Let X represent the number of questions the student gets correct.
Find the probability that the student passes the test, i.e., find $P(X \geq 6)$.

answer:_____

10. You pay x dollars to play the following game. A card is randomly dealt from a deck of cards. If the card is an ace the "house" pays you \$40. If the card is a face card, the house pays you \$15. If the card value is 2 through 10, the house pays you \$5. How much should you pay to play in order to make the game "fair"?

answer:_____

11. Suppose the birth weights of newborn babies at City General Hospital have a normal distribution with mean 7.2 lb and standard deviation 1.2 lb. Let $\overline{X}$ denote the sample mean weight for a random sample of 30 newborn baby weights. Use the central limit theorem to approximate the probability $P(7.0 \leq \overline{X} \leq 7.5)$.

answer:_____

12. Suppose the random variable X has a binomial distribution with parameters $n = 400$ and $p = .685$. Use the normal distribution to approximate the probability $P(X \leq 260)$. Do not forget to use a continuity correction.

answer:_____

13. Prior to observing the sample, the sample mean $\bar{X}$ is a random variable.

True False

14. The central limit theorem can apply to a sample mean obtained from a population with a skewed distribution.

True False

15. When a random sample (of size 2 or more) is taken from a population (represented by random variable X) with mean μ and standard deviation σ, the standard deviation of $\bar{X}$ is less than σ.

True False

16. The sample mean $\bar{X}$ is a biased estimator of the population mean μ.

True False

17. A discrete random variable always has a finite support (range).

True False

18. If X is a continuous random variable with probability density function given by

$$f(x) = 2e^{-2x} \text{ for } x \geq 0 \text{ and } f(x) = 0 \text{ for } x < 0,$$

then $E(X) = \int_0^\infty 2e^{-2x}dx$.

True False

19. If X is a continuous random variable with probability density function given by

$$f(x) = 2e^{-2x} \text{ for } x \geq 0,$$

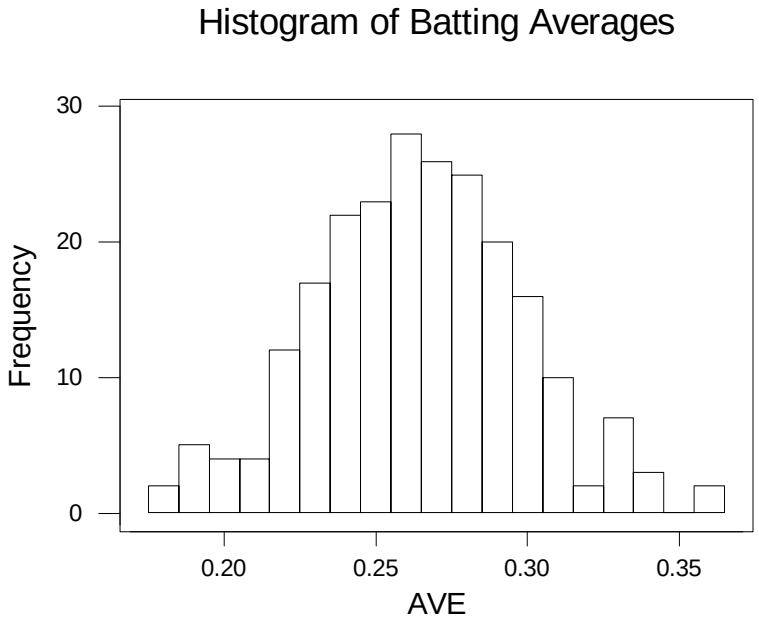
then $P(1 \leq X \leq 4) = \int_1^4 2e^{-2x}dx$

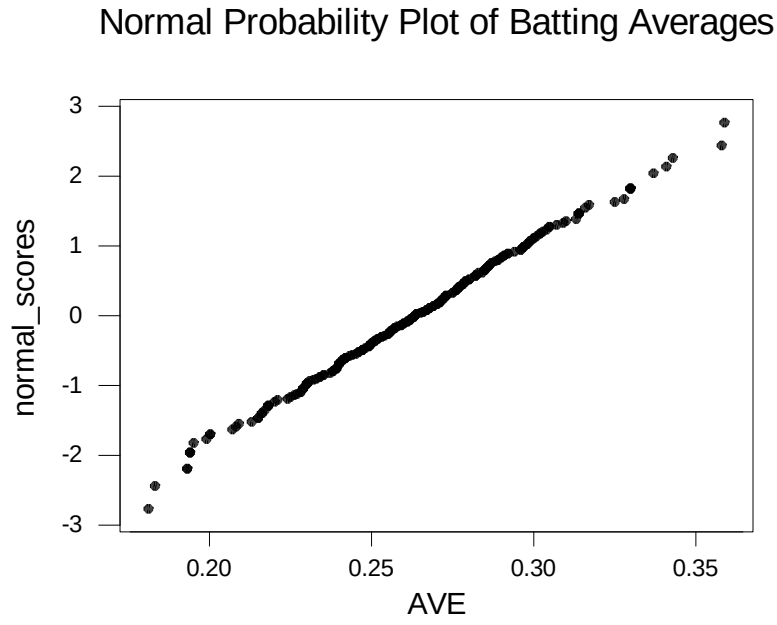
True False

20. If X is a random variable with mean 76 and standard deviation 4, then Chebyshev's inequality gives us $P(68 \leq X \leq 88) \geq 8/9$.

True False

21. Below are descriptive statistics for a data set that consists of 228 batting averages of baseball players from the National League in 2003. The mean is .26351, the standard deviation is .03401, the minimum is .181, Q1 is .24000, the median is .26300, Q3 is .28500, and the maximum is .35900. Some graphs are below.





Give at least 4 reasons why the data appears approximately normal.