Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the expected value of the random variable.

1) The accompanying table describes the probability distribution for the number of adults in a certain town (among 4 randomly selected adults) who have a college degree. 1) _____

x	P(x)
0	0.2401
1	0.4116
2	0.2646
3	0.0756
4	0.0081

A) 1.35 B) 1.20 C) 1.44 D) 1.10 E) 2.00

Create a probability model for the random variable.

2) You roll a pair of fair dice. If you get a sum greater than 10 you win \$60. If you get a double you win \$20. If you get a double and a sum greater than 10 you win \$80. Otherwise you win nothing. Create a probability model for the amount you win at this game. 2) _____

A)

Amount won	\$0	\$20	\$60	\$80
P(Amount won)	$\frac{28}{36}$	$\frac{5}{36}$	$\frac{2}{36}$	$\frac{1}{36}$

B)

Amount won	\$0	\$20	\$60
P(Amount won)	$\frac{27}{36}$	$\frac{6}{36}$	$\frac{3}{36}$

C)

Amount won	\$0	\$20	\$60	\$80
P(Amount won)	$\frac{27}{36}$	$\frac{6}{36}$	$\frac{2}{36}$	$\frac{1}{36}$

D)

Amount won	\$0	\$20	\$60	\$80
P(Amount won)	$\frac{26}{36}$	$\frac{6}{36}$	$\frac{3}{36}$	$\frac{1}{36}$

E)

Amount won	\$0	\$20	\$60	\$80
P(Amount won)	$\frac{27}{36}$	$\frac{5}{36}$	$\frac{3}{36}$	$\frac{1}{36}$

3) A carnival game offers a $80 cash prize for anyone who can break a balloon by throwing a dart at it. It costs $5 to play and you're willing to spend up to $20 trying to win. You estimate that you have a 8% chance of hitting the balloon on any throw. Create a probability model for the number of darts you will throw. Assume that throws are independent of each other. Round to four decimal places if necessary. 3) _____

A)

Number of Darts	1	2	3	4
P(Number of Darts)	0.08	0.0736	0.0677	0.0573

B)

Number of Darts	1	2	3	4
P(Number of Darts)	0.08	0.08	0.08	0.76

C)

Number of Darts	1	2	3	4	5
P(Number of Darts)	0.08	0.0736	0.0677	0.7787	0.0573

D)

Number of Darts	1	2	3	4
P(Number of Darts)	0.08	0.0736	0.0677	0.7787

E)

Number of Darts	1	2	3
P(Number of Darts)	0.08	0.0736	0.0677

Find the expected value of the random variable.

4) You roll a pair of dice. If you get a sum greater than 10 you win $50. If you get a double you win $25. If you get a double and a sum greater than 10 you win a $75. Otherwise you win nothing. You pay $5 to play. 4) _____
Find the expected amount you win at this game.

A) $8.33 B) $4.72 C) $5.42 D) $4.03 E) $3.33

5) A company bids on two contracts. It anticipates a profit of $70,000 if it gets the larger contract and a profit of $40,000 if it gets the smaller contract. It estimates that there's a 20% chance of winning the larger contract and a 60% chance of winning the smaller contract. Find the company's expected profit. Assume that the contracts will be awarded independently. 5) _____

A) $51,200 B) $38,000 C) $50,000 D) $112,800 E) $24,800

Find the standard deviation of the random variable. Round to two decimal places if necessary.

6)

x	100	200	300	400
P(X = x)	0.2	0.4	0.3	0.1

6) _____

A) 117.00 B) 108.00 C) 99.00 D) 90.00 E) 82.80

Find the standard deviation of the random variable.

7) A teacher grading statistics homeworks finds that none of the students has made more than three errors. 10% have made three errors, 29% have made two errors, and 35% have made one error. Find the standard deviation of the number of errors in students' statistics homeworks. 7) _____

A) 0.87 B) 0.81 C) 0.95 D) 0.98 E) 0.90

Find the expected value of the random variable.

8) You have arranged to go camping for two days in March. You believe that the probability that it will rain on the first day is 0.5. If it rains on the first day, the probability that it also rains on the second day is 0.5. If it doesn't rain on the first day, the probability that it rains on the second day is 0.3. 8) _____
Let the random variable X be the number of rainy days during your camping trip. Find the expected value of X.

A) $\mu = 1.05$ B) $\mu = 0.75$ C) $\mu = 0.65$ D) $\mu = 1$ E) $\mu = 0.9$

Determine whether a probability model based on Bernoulli trials can be used to investigate the situation. If not, explain.

9) We record the blood types (O, A, B, or AB) found in a group of 100 people. Assume that the people are unrelated to each other. 9) _____

A) Yes.

B) No, 400 is more than 10% of the population.

C) No. The chance of getting a particular blood group depends on the blood groups already recorded.

D) No. More than two outcomes are possible.

E) No.The chance of getting a particular blood group changes from one person to the next.

10) We draw a card from a deck 6 times (replacing the card after each draw) and get 3 kings. How likely is this? 10) _____

A) Yes.

B) No. More than two outcomes are possible.

C) No. The draws are not independent of each other.

D) No. 6 is more than 10% of 52

E) No. The chance of getting a king changes as cards are drawn.

11) A pool of possible jurors consists of 15 men and 18 women. A jury of 12 is picked at random from this group. What is the probability that the jury contains all women? 11) _____

A) Yes

B) Yes, assuming the possible jurors are unrelated

C) No. The chance of a woman changes depending on who has already been picked.

D) No. 15 is more than 10% of 18

E) No. There are more than two possible outcomes.

Find the indicated probability.

12) A basketball player has made 70% of his foul shots during the season. Assuming the shots are independent, find the probability that in tonight's game he misses for the first time on his 8th attempt? 12) _____

A) 0.0576 B) 0.0824 C) 0.3 D) 0.0247 E) 0.0173

13) A tennis player makes a successful first serve 90% of the time. Assume that each serve is independent of the others. If she serves 10 times, what is the probability that she misses for the first time on her second or fourth serve? 13) _____

A) 0.6 B) 0.1629 C) 0.1 D) 0.0066 E) 0.0101

14) Suppose that in a certain population 8% of people are color blind. A researcher selects people at random from this population. What's the probability that the first color blind person will be found among the first 4 people checked? 14) _____

A) 0.0623 B) 0.2836 C) 0.0573 D) 0.7787 E) 0.7164

15) Suppose that in a certain population 46% of people have type O blood. A researcher selects people at random from this population. What's the probability they won't find a person with type O blood among the first 8 people checked? 15) _____

A) 0.9928 B) 0.0072 C) 0.0020 D) 0.9980 E) 0.0062

Solve.

16) A laboratory worker finds that 2.2% of his blood samples tested positive for the HIV virus. How many blood samples should he expect to test before finding one which tests positive for the HIV virus? 16) _____

A) 97.8 B) 1.02 C) 0.978 D) 45.45 E) 2.2

17) A company finds that 71% of applicants for a job do not have the required qualifications. How many applications should they expect to read before finding a suitably qualified applicant? 17) _____

A) 71 B) 0.29 C) 1.41 D) 3.45 E) 0.71

Find the indicated probability.

18) A tennis player makes a successful first serve 55% of the time. If she serves 5 times, what is the probability that she gets all her first serves in? Assume that each serve is independent of the others. 18) _____

A) 0.0185 B) 0.0226 C) 0.9497 D) 0.0503 E) 0.2516

19) A multiple choice test has 7 questions each of which has 5 possible answers, only one of which is correct. If Judy, who forgot to study for the test, guesses on all questions, what is the probability that she will answer none of the questions correctly? 19) _____

A) 0.2097 B) 0.0000128 C) 0.0419 D) 0.1335 E) 0.9999872

20) Suppose that 11% of people are left handed. If 6 people are selected at random, what is the probability that exactly 2 of them are left handed? 20) _____

A) 0.0121 B) 0.0188 C) 0.0076 D) 0.2278 E) 0.1139

Find the probability of the outcome described.

21) A tennis player makes a successful first serve 59% of the time. If she serves 6 times, what is the probability that she gets no more than 3 first serves in? Assume that each serve is independent of the others. 21) _____

A) 0.1933 B) 0.4764 C) 0.2831 D) 0.5236 E) 0.8067

22) A company purchases shipments of machine components and uses this acceptance sampling plan: Randomly select and test 21 components and accept the whole batch if there are fewer than 3 defectives. If a particular shipment of thousands of components actually has a 3% rate of defects, what is the probability that this whole shipment will be accepted? 22) _____

A) 0.4485 B) 0.9760 C) 0.0240 D) 0.0208 E) 0.1060

23) An airline estimates that 93% of people booked on their flights actually show up. If the airline books 63 people on a flight for which the maximum number is 61, what is the probability that the number of people who show up will exceed the capacity of the plane? 23) _____

A) 0.0594 B) 0.0490 C) 0.0103 D) 0.9406 E) 0.1737

Solve the problem.

24) Police estimate that in one city 49% of drivers wear their seat belts. They set up a safety roadblock, stopping cars to check for seat belt use. If they stop 50 cars during the first hour, what is the mean of the number of drivers expected to be wearing their seat belts? 24) _____

A) 24.5 B) 3.53 C) 25.5 D) 25 E) 12.50

25) A laboratory worker finds that 2.6% of his blood samples test positive for the HIV virus. In a random sample of 70 blood tests, what is the mean number that test positive for the HIV virus? 25) _____

A) 1.77 B) 1.33 C) 18.2 D) 1.82 E) 68.18

26) A company manufactures batteries in batches of 14 and there is a 3% rate of defects. Find the standard deviation of the number of defects per batch. 26) _____

A) 0.291 B) 0.638 C) 0.648 D) 0.636 E) 0.615

27) Suppose that 2.9% of people are left handed. If 70 people are selected at random, what is the standard deviation of the number of right-handers in the group? 27) _____

A) 2.03 B) 1.40 C) 1.97113 D) 8.24 E) 1.42

Provide an appropriate response.

28) An archer is usually able to hit the bull's-eye 77% of the time. He buys a new bow hoping that it will improve his success rate. During the first month of practice with his new bow he hits the bull's-eye 318 times out of 400 shots. Is this evidence that with the new bow his success rate has improved? In other words, is this an unusual result for him? Explain. 28) _____

A) No; we would normally expect him to make 308 bull's-eyes with a standard deviation of 17.55. 318 is 0.6 standard deviations above the expected value. That's not an unusual result.

B) Yes; we would normally expect him to make 308 bull's-eyes with a standard deviation of 8.42. 318 is 1.2 standard deviations above the expected value. That's an unusual result.

C) Yes; we would normally expect him to make 308 bull's-eyes with a standard deviation of 70.84. 318 is 0.1 standard deviations above the expected value. That's an unusual result.

D) No; we would normally expect him to make 308 bull's-eyes with a standard deviation of 70.84. 318 is 0.1 standard deviations above the expected value. That's not an unusual result.

E) No; we would normally expect him to make 308 bull's-eyes with a standard deviation of 8.42. 318 is 1.2 standard deviations above the expected value. That's not an unusual result.

Answer Key
Testname: DISCRETE RANDOM VARIABLES

1) B
2) A
3) D
4) E
5) B
6) D
7) C
8) E
9) D
10) A
11) C
12) D
13) B
14) B
15) B
16) D
17) D
18) D
19) A
20) E
21) B
22) B
23) A
24) A
25) D
26) B
27) B
28) E