Read these directions carefully. You may pick any one problem to omit by writing OMIT in the answer blank. If you do not do so, or omit more than one, then all problems will be graded. Relax and use your time wisely.

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

Find the indicated probability.

1) The table below describes the smoking habits of a group of asthma sufferers. 1) A

	Nonsmoker	Occasional smoker	Regular smoker	Heavy smoker	Total
Men	396	43	85	42	566
Women	344	48	60	39	491
Total	740	91	145	81	1057

If one of the 1057 people is randomly selected, find the probability that the person is a man or a heavy smoker.

$(566+39)/1057$

A) 0.572 B) 0.519 C) 0.612 D) 0.533

2) A bag contains 7 red marbles, 4 blue marbles, and 1 green marble. Find P(not blue). 2) A

A) $\frac{2}{3}$ B) $\frac{1}{3}$ C) 8 D) $\frac{3}{2}$

$\frac{7+1}{7+4+1} = \frac{8}{12}$

Is Event B dependent or independent of Event A?

3) A: You cook your chicken improperly. 3) B

B: You get salmonella poisoning.

A) Independent B) Dependent

If A happens, B is more likely.

Find the indicated probability.

4) Find the probability of correctly answering the first 4 questions on a multiple choice test if random guesses are made and each question has 6 possible answers. 4) D

A) $\frac{1}{4096}$ B) $\frac{3}{2}$ C) $\frac{2}{3}$ D) $\frac{1}{1296}$

$\left(\frac{1}{6}\right)^4$

5) A IRS auditor randomly selects 3 tax returns from 47 returns of which 6 contain errors. What is the probability that she selects none of those containing errors? Round to four decimal places. 5) A

A) 0.6574 B) 0.0021 C) 0.0012 D) 0.6638

$\frac{41}{47} \cdot \frac{40}{46} \cdot \frac{39}{45} = 0.657416$

Provide a written description of the complement of the given event.

6) When 100 engines are shipped, all of them are free of defects. 6) A

A) At least one of the engines is defective. B) At most one of the engines is defective.

C) All of the engines are defective. D) None of the engines are defective.

Not (all are free of defects) is at least one has a defect

Find the indicated probability. Round to the nearest thousandth.

7) A sample of 4 different calculators is randomly selected from a group containing 19 that are defective and 36 that have no defects. What is the probability that at least one of the calculators is defective? 7) B

A) 0.173 B) 0.827 C) 0.190 D) 0.816

$P(\text{at least one def}) = 1 - P(\text{none of 4 defective}) = 1 - \left(\frac{36}{55}\right)\left(\frac{35}{54}\right)\left(\frac{34}{53}\right)\left(\frac{33}{52}\right)$

Find the indicated probability. Express your answer as a simplified fraction unless otherwise noted.

8) The following table contains data from a study of two airlines which fly to Small Town, USA. 8) A

	Number of flights which were on time	Number of flights which were late
Podunk Airlines	33	6
Upstate Airlines	43	5

If one of the 87 flights is randomly selected, find the probability that the flight selected arrived on time given that it was an Upstate Airlines flight.

A) $\frac{43}{48}$ $\frac{43}{43+5}$ B) $\frac{43}{87}$

C) $\frac{11}{76}$ D) None of the above is correct.

9) The table below describes the smoking habits of a group of asthma sufferers. 9) D

	Nonsmoker	Light smoker	Heavy smoker	Total
Men	397	83	62	542
Women	320	73	79	472
Total	717	156	141	1014

$\frac{73}{156}$

If one of the 1014 subjects is randomly selected, find the probability that the person chosen is a woman given that the person is a light smoker. Round to the nearest thousandth.

A) 0.254 B) 0.072 C) 0.155 D) 0.468

Evaluate the expression.

10) ${}_5P_4$ 10) B

A) 24 B) 120 C) 1 D) 5

11) ${}_9C_4$ 11) D

A) 2 B) 120 C) 756 D) 126

Solve the problem.

12) How many ways can an IRS auditor select 4 of 8 tax returns for an audit? 12) B

A) 1680 B) 70 C) 24 D) 4096

${}_8C_4$

13) How many ways can 6 people be chosen and arranged in a straight line if there are 8 people to choose from? 13) B

A) 40,320 B) 20,160 C) 48 D) 720

${}_8P_6$

Identify the given random variable as being discrete or continuous.

14) The exact height of a randomly selected student 14) A

A) Continuous B) Discrete

Find the mean of the given probability distribution.

15) 15) C

x	P(x)
0	0.05
1	0.06
2	0.26
3	0.33
4	0.30

1-Var Stats L_1, L_2

A) $\mu = 2.82$ B) $\mu = 2.72$ C) $\mu = 2.77$ D) $\mu = 2.67$

Provide an appropriate response. Round to the nearest hundredth.

16) Find the standard deviation for the given probability distribution. 16) A

x	P(x)
0	0.07
1	0.34
2	0.25
3	0.20
4	0.14

1-Var Stats L_1, L_2

A) $\sigma = 1.17$ B) $\sigma = 1.38$ C) $\sigma = 1.20$ D) $\sigma = 2.32$

Assume that a researcher randomly selects 14 newborn babies and counts the number of girls selected, x. The probabilities corresponding to the 14 possible values of x are summarized in the given table. Answer the question using the table.

Probabilities of Girls

x(girls)	P(x)	x(girls)	P(x)	x(girls)	P(x)
0	0.000	5	0.122	10	0.061
1	0.001	6	0.183	11	0.022
2	0.006	7	0.209	12	0.006
3	0.022	8	0.183	13	0.001
4	0.061	9	0.122	14	0.000

Add these up, or better

$1 - (0.000 + 0.001) = 0.999$

17) Find the probability of selecting 2 or more girls. so 2, 3, 4, ... girls 17) A

A) 0.999 B) 0.001 C) 0.994 D) 0.006

Determine whether the given procedure results in a binomial distribution. If not, state the reason why.

18) Choosing 5 people (without replacement) from a group of 65 people, of which 15 are women, keeping track of the number of men chosen. 18) B

A) Procedure results in a binomial distribution.

B) Not binomial: the trials are not independent.

C) Not binomial: there are more than two outcomes for each trial.

D) Not binomial: there are too many trials.

Makes the trials dependent! $\left(\frac{5}{65} \approx 8\%\right)$

Assume that a procedure yields a binomial distribution with a trial repeated n times. Use the binomial probability formula to find the probability of x successes given the probability p of success on a single trial. Round to three decimal places.

19) n = 30, x = 12, p = 0.20 binompdf (30, 0.20, 12) 19) B

A) 0.003 (B) 0.006 C) 0.108 D) 0.014

Find the indicated probability.

20) In a survey of 300 college graduates, 53% reported that they entered a profession closely related to their college major. If 6 of those survey subjects are randomly selected without replacement for a follow-up survey, what is the probability that 3 of them entered a profession closely related to their college major? 20) A

6/300 = 2%. Can treat as binomial

A) 0.309 B) 0.149 C) 0.691 D) 0.206

binompdf (6, .53, 3)

Use the given values of n and p to find the minimum usual value $\mu - 2\sigma$ and the maximum usual value $\mu + 2\sigma$. Round your answer to the nearest hundredth unless otherwise noted.

21) n = 268, $p = \frac{1}{2}$ $\mu = np = 134$ $\sigma = \sqrt{np(1-p)} = 8.1854$ 21) B

A) Minimum: 125.81; maximum: 142.19 (B) Minimum: 117.63; maximum: 150.37

C) Minimum: 150.37; maximum: 117.63 D) Minimum: 122.42; maximum: 145.58

so $\mu - 2\sigma = 117.629$.

Solve the problem.

22) On a multiple choice test with 6 questions, each question has four possible answers, one of which is correct. For students who guess at all answers, find the mean for the number of correct answers. 22) D

A) 3 B) 2 C) 4.5 D) 1.5

$\mu = np = 6 \cdot \frac{1}{4} = 1.5$

23) A company manufactures batteries in batches of 8 and there is a 3% rate of defects. Find the standard deviation for the number of defects per batch. 23) D

A) 0.2 B) 23.3 C) 0.1 D) 0.5

$\sqrt{np(1-p)} = \sqrt{8(.03)(.97)} = 0.482$

Use the Poisson Distribution to find the indicated probability.

24) A naturalist leads whale watch trips every morning in March. The number of whales seen has a Poisson distribution with a mean of 2.5. Find the probability that on a randomly selected trip, the number of whales seen is 3. 24) A

A) 0.2138 B) 0.3634 C) 0.4275 D) 0.6413

poissonpdf (2.5, 3)

Find the indicated Poisson mean.

25) Data for 5 schools were combined for a 20-year period, and the 100 school-years included a total of 80 balloon thefts. Suppose the Poisson distribution will be used to find the a probability of exactly x balloon thefts. Find the mean of the appropriate Poisson distribution (the mean number of balloon thefts per school-year). Round your answer to the nearest hundredth. 25) A

A) 0.8 B) 1.25 C) 16 D) 4

Mean thefts per school-year $= \frac{80}{100} = 0.8$