EXTRA CREDIT
Math 160

Name_____

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

Provide an appropriate response.

1) For the stem–and–leaf plot below, what are the maximum and minimum entries?   1) _____

```
1 | 0 8
1 | 6 6 6 7 8 9
2 | 0 1 1 2 3 4 4 5 6 6
2 | 7 7 7 8 8 9 9 9
3 | 0 1 1 2 3 4 4 5 5
3 | 6 6 6 7 8 8 9 9
4 | 1 7
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    A) max: 47; min: 10   B) max: 38; min: 7

    C) max: 41; min: 10   D) max: 47; min: 18

Construct a frequency distribution for the data using five classes. Describe the shape of the distribution.

2) The data set: ages of dishwashers (in years) in 20 randomly selected households   2) _____

    12 6 4 9 11 1 7 8 9 8

    9 13 5 15 7 6 8 8 2 1

    A) skewed to the left   B) skewed to the right

    C) bell shaped   D) uniform

Solve the problem.

3) Which of the following assignments of probabilities to the sample points A, B, and C is valid if A, B, and C are the only sample points in the experiment?   3) _____

    A) $P(A) = 0, P(B) = \frac{1}{12}, P(C) = \frac{11}{12}$ B) $P(A) = \frac{1}{5}, P(B) = \frac{1}{10}, P(C) = \frac{1}{2}$

    C) $P(A) = \frac{1}{7}, P(B) = \frac{1}{7}, P(C) = \frac{1}{7}$ D) $P(A) = -\frac{1}{4}, P(B) = \frac{1}{2}, P(C) = \frac{3}{4}$

Provide an appropriate response.

4) Each year advertisers spend billions of dollars purchasing commercial time on network sports television. In the first 6 months of 1988, advertisers spent $1.1 billion. A recent article listed the top 10 leading spenders (in millions of dollars):

4) _____

Company A $73.1   Company F $25.2
Company B   62.2   Company G   24.3
Company C   57.5   Company H   21.4
Company D   55.5   Company I   23.4
Company E   30.6   Company J   20.3

Calculate the mean amount spent.
A) 410.47 million dollars
B) 20.26 million dollars
C) 39.35 million dollars
D) 52.80 million dollars

5) Suppose a basketball player is an excellent free throw shooter and makes 90% of his free throws (i.e., he has a 90% chance of making a single free throw). Assume that free throw shots are independent of one another. Suppose this player gets to shoot three free throws. Find the probability that he misses all three consecutive free throws.

5) _____

A) 0.999   B) 0.271   C) 0.001   D) 0.729

6) Which of the following cannot be the probability of an event?

6) _____

A) 0   B) 0.001   C) –32   D) $\dfrac{\sqrt{5}}{3}$

7) A human gene carries a certain disease from the mother to the child with a probability rate of 42%. That is, there is a 42% chance that the child becomes infected with the disease. Suppose a female carrier of the gene has three children. Assume that the infections of the three children are independent of one another. Find the probability that at least one of the children get the disease from their mother.

7) _____

A) 0.195   B) 0.805   C) 0.424   D) 0.141

8) The table lists the drinking habits of a group of college students. If a student is chosen at random, find the probability of getting someone who is a man or a non–drinker. Round your answer to three decimal places.

8) _____

Sex	Non–drinker	Regular Drinker	Heavy Drinker	Total
Man	135	45	5	185
Woman	187	21	13	221
Total	322	66	18	406

A) 0.942   B) 0.837   C) 0.947   D) 0.916

9) Each year advertisers spend billions of dollars purchasing commercial time on network sports television. In the first 6 months of 1988, advertisers spent $1.1 billion. A recent article listed the top 10 leading spenders (in millions of dollars):

    9) _____

Company A $70.9   Company F $26.3
Company B   60.9   Company G   24
Company C   56.8   Company H   21.9
Company D   54.9   Company I   22.1
Company E   29   Company J   20.3

Calculate the median.
A) 50.60 million dollars   B) 38.71 million dollars
C) 5.26 million dollars   D) 27.65 million dollars

10) A small computing center has found that the number of jobs submitted per day to its computers has a distribution that is approximately bell shaped, with a mean of 74 jobs and a standard deviation of 5. Where do we expect most (approximately 95%) of the distribution to fall?

    10) _____

A) between 64 and 89 jobs per day   B) between 69 and 79 jobs per day
C) between 59 and 89 jobs per day   D) between 64 and 84 jobs per day

11) The February utility bills (in dollars) for ten residents of a large city are listed below. Find the mode amount.

    11) _____

  71 67 67 72 76 72 73 68 72 72
A) $76   B) $72   C) $67   D) $73

12) A machine has four components, A, B, C, and D, set up in such a manner that all four parts must work for the machine to work properly. Assume the probability of one part working does not depend on the functionality of any of the other parts. Also assume that the probabilities of the individual parts working are $P(A) = P(B) = 0.99$, $P(C) = 0.92$, and $P(D) = 0.9$. Find the probability that the machine works properly.

    12) _____

A) 0.8115   B) 0.8197   C) 0.1885   D) 0.9017

13) The chart shows the probability of a certain disease for men by age. What is the probability that a randomly selected man between the ages of 55 and 64 does not have this disease?

    13) _____

Age	Probability of Disease X
20–24	less than 0.008
25–34	0.009
35–44	0.14
45–54	0.39
55–64	0.42
65–74	0.67
75+	0.79

A) 0.61   B) 0.42   C) 0.39   D) 0.58

14) The costs (in dollars) of 10 college math textbooks are listed below. Find the sample standard deviation.

    14) _____

  70 72 71 70 69 73 69 68 70 71
A) $5.00   B) $2.23   C) $1.49   D) $70.30

15) On a recent day during the flu season, the Midtown Medical Clinic saw many patients. Patients   15) _____
had their temperatures (in °F) taken. The distribution of temperatures is given below.
Determine the mean temperature of a sample of 100 patients.

Temperatures	Frequency
95.6 – 96.49	1
96.5 – 97.39	3
97.4 – 98.29	19
98.3 – 99.19	28
99.2 – 100.09	35
100.1 – 100.99	12
101.0 – 101.89	2

     A) 98.75°F   B) 99.08°F   C) 98.63°F   D) 99.52°F

Assume that you plan to use a significance level of $\alpha = 0.05$ to test the claim that $p_1 = p_2$. Use the given sample sizes and numbers of successes to find the z test statistic for the hypothesis test.

16) A random sampling of sixty pitchers from the National League and fifty–two pitchers from the   16) _____
American League showed that 19 National and 11 American League pitchers had E.R.A's below
3.5.
     A) $z = 1.629$ B) $z = 1.253$ C) $z = 191.183$ D) $z = 15.457$

Provide an appropriate response. Express your answer as a simplified fraction unless otherwise noted.

17) The managers of a corporation were surveyed to determine the background that leads to a   17) _____
successful manager. Each manager was rated as being either a good, fair, or poor manager by
his/her boss. The manager's educational background was also noted. The data appear below.
Given that a manager is a good manager, what is the probability that this manager has some
college background?

Educational Background

Manager Rating	H. S. Degree	Some College	College Degree	Master's or Ph.D.	Totals
Good	5	7	26	1	39
Fair	1	15	41	30	87
Poor	2	3	9	20	34
Totals	8	25	76	51	160

     A) $\dfrac{2}{3}$ B) $\dfrac{7}{39}$ C) $\dfrac{7}{160}$ D) $\dfrac{7}{25}$

Provide an appropriate response.

18) Construct a 95% confidence interval for the population mean, μ. Assume the population has a   18) _____
normal distribution. A sample of 20 part–time workers had mean annual earnings of $3120 with
a standard deviation of $677.
     A) ($2135, $2567)   B) ($2657, $2891)   C) ($2803, $3437)   D) ($1324, $1567)

19) You wish to test the claim that $\mu \neq 36$ at a level of significance of $\alpha = 0.05$ and are given sample   19) _____
statistics $n = 35$, $\overline{x} = 35.1$, and $\sigma = 2.7$. Compute the value of the test statistic. Round your answer
to two decimal places.
     A) –1.83   B) –2.86   C) –1.97   D) –3.12

20) The produce manager at a farmer's market was interested in determining how many oranges a person buys when they buy oranges. He asked the cashiers over a weekend to count how many oranges a person bought when they bought oranges and record this number for analysis at a later time. The data is given below in the table. The random variable x represents the number of oranges purchased and P(x) represents the probability that a customer will buy x apples. Determine the mean number of oranges purchased by a customer.

x	1	2	3	4	5	6	7	8	9	10
$P(x)$	0.05	0.19	0.20	0.25	0.12	0.10	0	0.08	0	0.01

   A) 3 B) 4 C) 5.50 D) 3.97

21) The owner of a farmer's market was interested in determining how many oranges a person buys when they buy oranges. He asked the cashiers over a weekend to count how many oranges a person bought when they bought oranges and record this number for analysis at a later time. The data is given below in the table. The random variable x represents the number of oranges purchased and P(x) represents the probability that a customer will buy x oranges. Determine the variance of the number of oranges purchased by a customer.

x	1	2	3	4	5	6	7	8	9	10
$P(x)$	0.05	0.19	0.20	0.25	0.12	0.10	0	0.08	0	0.01

   A) 1.95 B) 3.57 C) 0.56 D) 3.97

22) A local eat–in pizza restaurant wants to investigate the possibility of starting to deliver pizzas. The owner of the store has determined that home delivery will be successful if the average time spent on the deliveries does not exceed 35 minutes. The owner has randomly selected 20 customers and has delivered pizzas to their homes in order to test if the mean delivery time actually exceeds 35 minutes. Suppose the P–value for the test was found to be 0.0295. State the correct conclusion.

   A) At $\alpha = 0.03$, we fail to reject H_0.   B) At $\alpha = 0.05$, we fail to reject H_0.

   C) At $\alpha = 0.025$, we fail to reject H_0.   D) At $\alpha = 0.02$, we reject H_0.

23) In a recent survey, 66% of the community favored building a health center in their neighborhood. If 14 citizens are chosen, find the probability that exactly 9 of them favor the building of the health center.

   A) 0.643 B) 0.015 C) 0.216 D) 0.660

24) Many people think that a national lobby's successful fight against gun control legislation is reflecting the will of a minority of Americans. A random sample of 4000 citizens yielded 2250 who are in favor of gun control legislation. Estimate the true proportion of all Americans who are in favor of gun control legislation using a 90% confidence interval.

   A) 0.5625 ± 0.4048 B) 0.4375 ± 0.0129
   C) 0.5625 ± 0.0129 D) 0.4375 ± 0.4048

25) A senator wishes to estimate the proportion of United States voters who favor abolishing the Electoral College. How large a sample is needed in order to be 95% confident that the sample proportion will not differ from the true proportion by more than 2%?

   A) 4802 B) 25 C) 2401 D) 1692

26) Find the standardized test statistic t for a sample with n = 25, $\bar{x}$ = 32, s = 3, and α = 0.005 if
H$_1$: μ > 31. Round your answer to three decimal places.

    A) 1.239   B) 1.997   C) 1.452   D) 1.667

26) _____

27) Assume that blood pressure readings are normally distributed with a mean of 123 and a
standard deviation of 9.6. If 144 people are randomly selected, find the probability that their
mean blood pressure will be less than 125.

    A) 0.9998   B) 0.9938   C) 0.0062   D) 0.8615

27) _____

28) Suppose a brewery has a filling machine that fills 12 ounce bottles of beer. It is known that the
amount of beer poured by this filling machine follows a normal distribution with a mean of
12.48 ounces and a standard deviation of 0.04 ounce. Find the probability that the bottle
contains between 12.38 and 12.44 ounces.

    A) 0.1525   B) 0.8475   C) 0.8351   D) 0.1649

28) _____

29) Many people think that a national lobby's successful fight against gun control legislation is
reflecting the will of a minority of Americans. A random sample of 4000 citizens yielded 2250
who are in favor of gun control legislation. Estimate the true proportion of all Americans who
are in favor of gun control legislation using a 95% confidence interval.

    A) 0.4375 ± 0.0154   B) 0.4375 ± 0.4823
    C) 0.5625 ± 0.0154   D) 0.5625 ± 0.4823

29) _____

30) If X_1, X_2, X_3, ..., X_N are the N observations of a variable from a population, then the population
mean is symbolized by

    A) X   B) Σ C) μ D) $\tilde{X}$

30) _____

31) A physics exam consists of 9 multiple–choice questions and 6 open–ended problems in which all
work must be shown. If an examinee must answer 7 of the multiple–choice questions and 3 of
the open–ended problems, in how many ways can the questions and problems be chosen?

    A) 720   B) 261,273,600   C) 21,772,800   D) 1134

31) _____

32) The length of time it takes college students to find a parking spot in the library parking lot
follows a normal distribution with a mean of 4.5 minutes and a standard deviation of 1 minute.
Find the cut–off time which 75.8% of the college students exceed when trying to find a parking
spot in the library parking lot.

    A) 5.2 min   B) 5.3 min   C) 5.0 min   D) 4.8 min

32) _____

33) If the probability of a newborn kitten being female is 0.5, find the probability that in 100 births,
55 or more will be female. Use the normal distribution to approximate the binomial distribution.

    A) 0.1841   B) 0.0606   C) 0.8159   D) 0.7967

33) _____

**Determine whether the hypothesis test involves a sampling distribution of means that is a normal distribution,
Student t distribution, or neither.**

34) Claim: μ = 120. Sample data: n = 11, $\bar{x}$ = 100, s = 15.2. The sample data appear to come from a
normally distributed population with unknown μ and σ.

    A) Student t   B) Neither   C) Normal

34) _____

Find the P-value for the indicated hypothesis test.

35) Find the P-value for a test of the claim that less than 50% of the people following a particular diet will experience increased energy. Of 100 randomly selected subjects who followed the diet, 47 noticed an increase in their energy level.

    A) 0.5486   B) 0.7257   C) 0.2743   D) 0.2257

35) _____

Provide an appropriate response.

36) Find the standardized test statistic to test the hypothesis that $\mu_1 > \mu_2$. Two samples are randomly selected from each population. The sample statistics are given below. Use $\alpha = 0.05$.

    $n_1 = 100$ $n_2 = 125$

    $\overline{x}_1 = 480$ $\overline{x}_2 = 465$

    $s_1 = 45$ $s_2 = 25$

    A) 2.98   B) 0.91   C) 1.86   D) 2.81

36) _____

37) When performing a hypothesis test upon two dependent samples, the variable of interest is
    A) the absolute value of the differences that exist between the matched-pair data.
    B) the differences that exist between the matched-pair data.
    C) all of the combined data.
    D) the data that is the same in both samples.

37) _____

38) A quiz consists of 10 multiple choice questions, each with five possible answers, one of which is correct. To pass the quiz a student must get 60% or better on the quiz. If a student randomly guesses, what is the probability that the student will pass the quiz?
    A) 0.060   B) 0.205   C) 0.377   D) 0.006

38) _____

39) A committee consisting of 6 people is to be selected from eight parents and four teachers. Find the probability of selecting three parents and three teachers.

    A) $\dfrac{2}{33}$ B) $\dfrac{100}{231}$ C) $\dfrac{10}{11}$ D) $\dfrac{8}{33}$

39) _____

40) A physical fitness association is including the mile run in its secondary-school fitness test. The time for this event for boys in secondary school is known to possess a normal distribution with a mean of 440 seconds and a standard deviation of 60 seconds. Find the probability that a randomly selected boy in secondary school can run the mile in less than 302 seconds.
    A) 0.0107   B) 0.4893   C) 0.5107   D) 0.9893

40) _____

41) Given $H_0: \mu = 25$, $H_1: \mu \neq 25$, and $P = 0.028$. Do you reject or fail to reject H_0 at the 0.01 level of significance?
    A) reject H_0
    B) fail to reject H_0
    C) not sufficient information to decide

41) _____

Find the critical value or values of χ^2 based on the given information.

42) $H_1: \sigma \neq 9.3$

    $n = 28$

    $\alpha = 0.05$

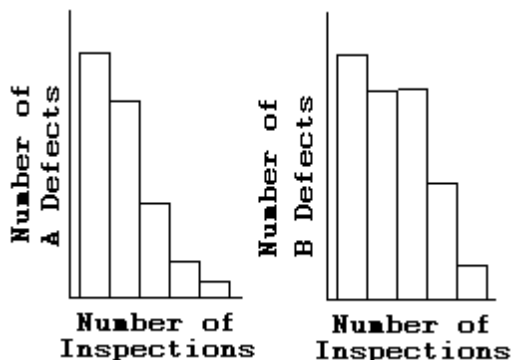   A) 16.151, 40.113   B) 14.573, 43.194

      C) –14.573, 14.573   D) –40.113, 40.113

42) _____

Use the histograms shown to answer the question.

43)

    Is either histogram symmetric?

      A) The first is symmetric, but the second is not symmetric.

      B) Neither is symmetric.

      C) The second is symmetric, but the first is not symmetric.

      D) Both are symmetric.

43) _____

Provide an appropriate response.

44) The prizes that can be won in a sweepstakes are listed below together with the chances of winning each one: \$3800 (1 chance in 8600); \$1700 (1 chance in 5400); \$700 (1 chance in 4600); \$200 (1 chance in 2600). Find the expected value of the amount won for one entry if the cost of entering is 55 cents.

      A) \$200   B) \$0.91   C) \$0.44   D) \$0.47

44) _____

Use the given data to find the equation of the regression line. Round the final values to three significant digits, if necessary.

45) Managers rate employees according to job performance and attitude. The results for several randomly selected employees are given below.

Performance	59	63	65	69	58	77	76	69	70	64
Attitude	72	67	78	82	75	87	92	83	87	78

      A) $\hat{y} = 92.3 - 0.669x$ B) $\hat{y} = 2.81 + 1.35x$

      C) $\hat{y} = 11.7 + 1.02x$ D) $\hat{y} = -47.3 + 2.02x$

45) _____

Use the given data to find the best predicted value of the response variable.

46) Based on the data from six students, the regression equation relating number of hours of preparation (x) and test score (y) is $\hat{y} = 67.3 + 1.07x$. The same data yield $r = 0.224$ and $\bar{y} = 75.2$. What is the best predicted test score for a student who spent 4 hours preparing for the test?

      A) 59.7   B) 71.6   C) 75.2   D) 78.1

46) _____

Assume that you plan to use a significance level of $\alpha = 0.05$ to test the claim that $p_1 = p_2$. Use the given sample sizes and numbers of successes to find the P–value for the hypothesis test.

47) $n_1 = 100$ $n_2 = 140$

     $x_1 = 41$ $x_2 = 35$

       A) 0.0512   B) 0.0021   C) 0.4211   D) 0.0086

47) _____

Assume that you want to test the claim that the paired sample data come from a population for which the mean difference is $\mu_d = 0$. Compute the value of the t test statistic. Round intermediate calculations to four decimal places as needed and final answers to three decimal places as needed.

48) A farmer has decided to use a new additive to grow his crops. He divided his farm into 10 plots and kept records of the corn yield (in bushels) before and after using the additive. The results are shown below.

Plot:	1	2	3	4	5	6	7	8	9	10
Before	9	9	8	7	6	8	5	9	10	11
After	10	9	9	8	7	10	6	10	10	12

You wish to test the following hypothesis at the 1 percent level of significance.

$H_0: \mu_d = 0$ against $H_1: \mu_d \neq 0$.

What is the value of the appropriate test statistic?

       A) 5.014   B) 1.584   C) 2.536   D) 2.033

48) _____

Find the probability (as a decimal rounded to four decimal places).

49) A bag contains 6 cherry, 3 orange, and 2 lemon candies. You reach in and take 3 pieces of candy at random. What is the probability that you have at least 2 cherry candies?

       A) 0.4909   B) 0.3362   C) 0.5758   D) 0.1515

49) _____