

skip 18, 48, 55, 60  
FR #1b

Key

1 H65/H69  
5/11

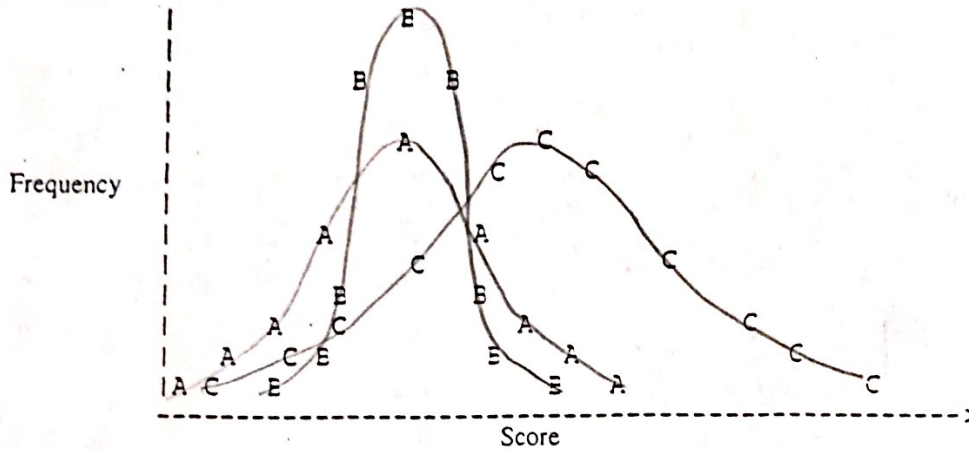
AP STATISTICS  
SEMESTER 1 EXAM Review

NAME \_\_\_\_\_

Choose one correct answer for each of the following.

Part 1: 1 point each

Questions 1-3 refer to the following figure:



Note: Connect the A points with a smooth curve to form distribution A, the B points with a smooth curve to form distribution B, and the C points with a smooth curve to form distribution C.

- C 1. In the figure, which distribution's mean differs from the mean of the other two distributions?  
(a) A (b) B (c) C (d) cannot be determined
- B 2. In the figure, which distribution has the smallest standard deviation?  
(a) A (b) B (c) C (d) cannot be determined
- A 3. In the figure, is it likely that the mean of distribution A corresponds closely with the mode of distribution B?  
(a) Yes (b) No (c) cannot be determined
- B 4. A large mass of data can best be summarized pictorially by means of:  
(a) the range  
(b) a histogram  
(c) the frequency table  
(d) the mean and standard deviation
- C 5. For a symmetric distribution, the mean and median are  
(a) the same (only if normal!)  
(b) always different  
(c) possibly the same, possibly different  
(d) insufficient information
- A 6. A distribution of 6 scores has a median of 21. If the highest score increases 3 points, the median will become  
(a) 21  
(b) 21.5  
(c) 24  
(d) cannot be determined without additional information  
(e) none of these

- d 7. If you are told a population has a mean of 25 and a variance of 0, what must you conclude?
- (a) someone has made a mistake
  - (b) there is only one element in the population
  - (c) there are no elements in the population
  - (d) all elements in the population are 25

- A 8. In a frequency distribution of 250 scores, the mean is reported as 78 and the median as 65. One would expect this distribution to be
- (a) skewed to the right (positively skewed)
  - (b) skewed to the left (negatively skewed)
  - (c) symmetrical, but not rectangular or normal
  - (d) normal
  - (e) rectangular

- A 9. A sample of 56 college students was asked to report the number of hours devoted to study during a typical week. The stem-and-leaf plot of the results is shown below.

STEM-AND-LEAF OF STUDY HOURS (n=56)

0	3
0	5 5 5 5 6 6 7 7 7 7 7 7 8 9 9 9
1	0 0 0 0 0 0 0 0 0 1 1 2 2 2 2 3 3 3 3 4 4 4 4 4
1	5 5 5 5 6 6 8
2	0
2	5 6
3	0 0
3	5
4	0

1|5 represents 15 study hours

Q1 = 8  
11  
Q3 = 15

- Which of the following best describes these data?
- (a) skewed distribution; mean greater than median
  - (b) skewed distribution; mean less than median
  - (c) symmetric distribution; mean greater than median
  - (d) symmetric distribution; mean less than median
  - (e) symmetric distribution with outliers on the high end

- d 10. Which of the following is not a measure of central tendency?
- (a) mean
  - (b) median
  - (c) mode
  - (d) standard deviation
  - (e) none of these

- a 11. The quantity  $\sum_{i=1}^n (x_i - \bar{x})$  is not used as a measure of dispersion because it is
- (a) always equal to zero
  - (b) always a positive value
  - (c) too difficult to work with
  - (d) always a negative value
- variance*

e 12. A random sample of size 10 was taken from a population. The sample has a variance of zero. Which of the following statements must be true?

- I. The population also has a variance of zero.
  - II. The sample mean is equal to the sample median.
  - III. The ten data points in the sample are equal in numerical value.
- (a) I only
  - (b) II only
  - (c) III only
  - (d) I and II
  - (e) II and III

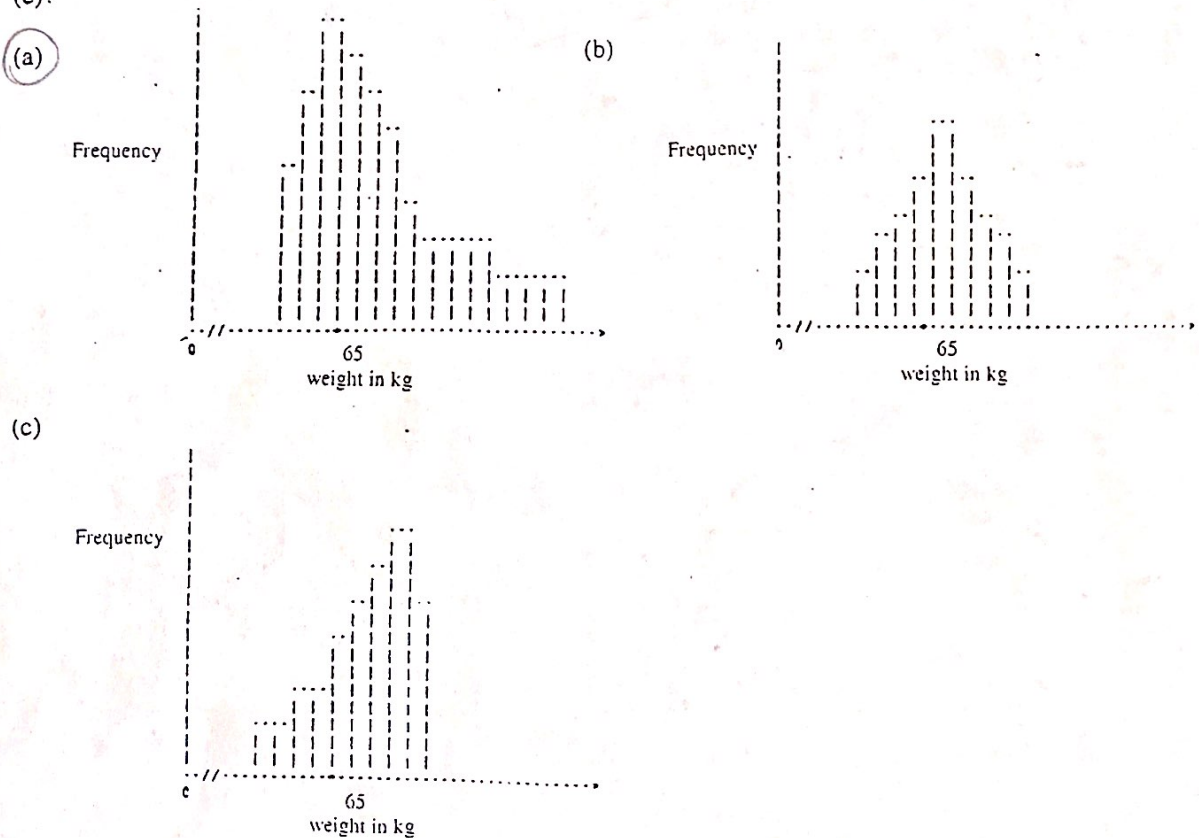
a 13. If a constant were to be added to a set of scores, the standard deviation would

- (a) remain the same
- (b) increase by the square root of that constant
- (c) increase by the square of that constant
- (d) increase by the magnitude of that constant
- (e) none of the above

c 14. Increasing the frequencies in the tails of a distribution will

- (a) reduce the standard deviation
- (b) not affect the standard deviation
- (c) increase the standard deviation — *fatter tails result in bigger stand. dev.*
- (d) not affect the standard deviation as long as the increases are balanced on each side of the mean
- (e) none if the above

a 15. The median weight for a group of men is 65 kg; the mean is 75 kg. Based on your knowledge of the mean and median would you expect the histogram for the group to look most like (a), (b), or (c)?



- B 16. Edith G. obtained a score of 65 on a statistics test, placing her at the 78<sup>th</sup> percentile. If five points were added to each score in the distribution, her new score would be at the
- (a) 83<sup>rd</sup> percentile
  - (b) 78<sup>th</sup> percentile
  - (c) 70<sup>th</sup> percentile
  - (d) none of the above
  - (e) impossible to answer without additional information

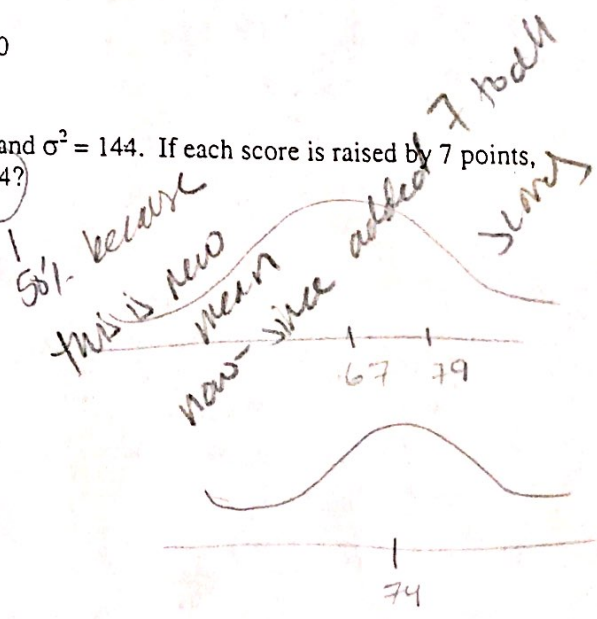
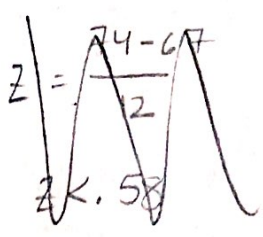
- B 17. A sample is
- (a) a number resulting from the manipulation of raw data according to specified rules
  - (b) a subset of a population
  - (c) a characteristic of a population which is measurable
  - (d) a complete set of individuals, objects, or measurements
  - (e) none of the above

- ~~X~~ 18. A probability function is a rule of correspondence or equation that:
- (a) finds the mean value of the random variable
  - (b) assigns values of  $x$  to the events of a probability experiment
  - (c) assigns probabilities to the various values of  $x$
  - (d) defines the variability in the experiment
  - (e) none of the above is correct

- C 19. On the same test, Mary and Pam scored at the 64<sup>th</sup> and 56<sup>th</sup> percentiles, respectively. Which of the following is a true statement?
- (a) Mary scored eight more points than Pam.
  - (b) Mary's score is 8% higher than Pam's.
  - (c) Eight percent of those who took the test scored between Pam and Mary.
  - (d) Thirty-six people scored higher than both Mary and Pam.
  - (e) None of the above is correct.

- C 20. A standard normal distribution has:
- (a) the mean equal to the variance
  - (b) mean equal 1 and variance equal 1
  - (c) mean equal 0 and variance equal 1
  - (d) mean equal 0 and standard deviation equal 0
  - (e) none of these

- C 21. Consider a normal distribution with  $\mu = 67$  and  $\sigma^2 = 144$ . If each score is raised by 7 points, what percentage of the new scores is less than 74?
- (a) 72%
  - (b) 88%
  - (c) 50%
  - (d) 52%
  - (e) none of these



a 25. Suppose we fit the least squares regression line to a set of data. What is true if the plot of the residuals show a curved pattern?

- (a) a straight line is not a good summary for the data
- (b) the correlation must be zero
- (c) the correlation must be positive
- (d) outliers must be present

a 26. A study of consumer behavior finds a positive correlation between sales of ice cream (X) and sales of beer (Y). What is a plausible explanation for the observed correlation?

- (a) Both X and Y are changing with the lurking variable outdoor temperature
- (b) Ice cream creates a thirst for beer
- (c) People generally have ice cream for dessert if they had beer with their meal
- (d) The positive correlation can only be the result of an arithmetic mistake.

b 27. The primary reason for using blocking when designing an experiment is to reduce

- (a) the sensitivity of the experiment
- (b) variation
- (c) the need for randomization
- (d) bias

*Blocking - divide group by Gender 1st  
then do random assignment*

b 28. A factor that is varied by an experimenter in order to assess its effect is known as a(n):

- (a) response variable
- (b) explanatory variable
- (c) control variable
- (d) none of the above

b 29. Characteristics of a population are called \_\_\_\_, while those of a sample are termed \_\_\_\_.

- (a) statistics; measures
- (b) parameters; statistics
- (c) statistics; variables
- (d) statistics; parameters
- (e) none of these

d 30. A population is:

- (a) a number or measurement collected as a result of observation
- (b) a subset of a population
- (c) a characteristic of a population which is measurable
- (d) a complete set of individuals, objects, or measurements having some common observable characteristics
- (e) none of these

b 31. An experiment is conducted to determine if the use of certain specified amounts of a drug will increase the IQ scores differentially for high and low anxious students in the fifth grade. In this experiment, IQ serves as \_\_ and the drug serves as \_\_\_\_.

- (a) explanatory variable, response variable
- (b) response variable, explanatory variable
- (c) moderator variable, control variable
- (d) control variable, moderator variable

C

32. Male students are assigned randomly to either a rote learning (memorization) treatment or to a discovery learning treatment. At the end of the experiment, students are tested for their ability to answer questions on an achievement test. The results indicate that fast learners in the discovery treatment do better than the slow learners in this treatment, but there is no difference in performance between the two types of learners in the rote treatment.

In this experiment, the achievement test serves as:

- (a) an explanatory variable
- (b) a moderator variable
- (c) a response variable
- (d) a control variable
- (e) an intervening variable

C

33. In a study on the effect of reinforcement on learning from programmed text, two experimental treatments are planned: reinforcement given after every frame of programmed text or reinforcement given after every three frames. Which one of the following control groups would serve best in this study?

- (a) A group which does not read the programmed text material.
- (b) A group which reads the programmed material in prose format.
- (c) A group which reads the programmed material but does not receive reinforcement.
- (d) A group which reads the programmed text material and reinforcement is given at random.

a

34. A coach in a large high school thinks that ballet training will improve the batting performance of his baseball team. He decides to have a randomly selected half of the team take six weeks of ballet training before the baseball season begins, while the other half does not take such training. He will then compare the season batting averages of group A (those with ballet training) and group B (those without ballet training) by comparing the mean of group A with the mean of group B.

An independent variable is:

- (a) ballet training
- (b) batting average
- (c) runs batted in
- (d) the size of the school
- (e) the grades the players make in the ballet school

d

35. Which of the following is a necessary condition for a sample to be a simple random sample?

- (a) The characteristics of the sample are the same as the characteristics of the population.
- (b) The choice of the method of selecting individuals from the population is governed entirely by chance.
- (c) Proportions of various groups selected are equal to corresponding proportions in the population.
- (d) Every possible sample of the desired size has an equal chance of being selected.
- (e) None of the above is necessary.

C

36. For a daytime house-to-house survey to study women's attitudes about their role in society, which one of the following errors would be most likely to occur?

- (a) reporting and processing errors
- (b) interviewer contamination
- (c) non-response bias
- (d) response bias
- (e) wording of question bias

B

37. Which of the following describes a "statistical inference"?

- (a) A true statement about a population made by measuring some sample of that population.
- (b) A conjecture about a population made by measuring some sample of that population
- (c) A true statement about a sample made by measuring some population.
- (d) A conjecture about a sample made by measuring some population
- (e) A true statement about a sample made by measuring the entire population.

C

38. The purpose of using a sample and calculating a mean is to

- (a) find the average for the sample
- (b) determine the dispersion of the sample
- (c) estimate the mean of the population
- (d) estimate sample size

a

39. The distribution of means of all possible samples of the same size ( $n$ ) drawn from a population will approximate the normal curve if

- (a) the  $n$  is large enough
- (b) the population is large
- (c) the population is symmetrical
- (d) the mean of each sample equals the mean of the population
- (e) none of the above is correct

e

40. The Central Limit Theorem tells us that:

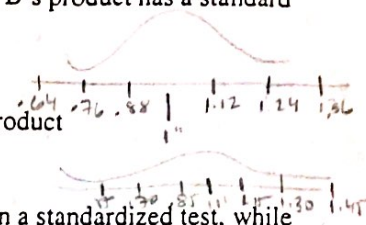
- (a) the shape of all sampling distributions of sample means are normally distributed
- (b) the mean of the distribution of sample means is less than the mean of the parent population
- (c) the standard deviation of the distribution of sample means is the same as the standard deviation of the population
- (d) all of the above are true
- (e) none of the above are true

b

- a 44. What is the difference between an observational study and an experiment?
- (a) In an observational study one observes individuals and measures variables of interest but does not attempt to influence the responses. In an experiment, one deliberately imposes some treatment on individuals in order to observe their responses. ✓
  - (b) In an observational study, great emphasis is placed on how observations are to be taken. In an experiment, great emphasis is on what is to be observed.
  - (c) In an observational study, all data are obtained by careful observation. In an experiment, all data are obtained by careful control.
  - (d) There is no difference. These are two names for the same thing.

- c 45. Which of the following is not important in the design of experiments?
- (a) control of confounding variables
  - (b) randomization in assigning subjects to different treatments
  - (c) use of a lurking variable to control the placebo effect?
  - (d) replication of the experiment using a sufficient number of subjects
  - (e) all of the above are important in the design of experiments.

- a 46. Two suppliers offer a machine part with the required 1" diameter. Samples indicate that supplier A's product has a standard deviation of 0.12 in. and supplier B's product has a standard deviation of 0.15 in. Which of the following statements is true?
- (a) A offers a more homogeneous product
  - (b) B offers a more homogenous product
  - (c) The standard deviation has no relationship to the quality of the product
  - (d) Only the mean is important in buying the machine part



- b 47. Ms. Sweetwater's Biology class had a standard deviation of 2.4 on a standardized test, while Ms. Quincy's Biology had a standard deviation of 1.2 on the same test. What can be said about these two classes?
- (a) Ms. Sweetwater's class is more homogeneous than Ms. Quincy's
  - (b) Ms. Quincy's class is less heterogeneous than Ms' Sweetwater's
  - (c) Ms. Quincy's class did less well on the test than Ms. Sweetwater's
  - (d) Ms. Sweetwater's class performed twice as well on the test as Ms. Quincy's

- ~~48~~ Mathematically speaking, casinos and life insurance companies make a profit because of
- (a) their understanding of sampling error and sources of bias.
  - (b) their use of well-designed, well-conducted surveys and experiments
  - (c) their use of simulation of probability distributions
  - (d) the central limit theorem
  - (e) the law of large numbers

? 49.

- d 50. If a given score is at the 30<sup>th</sup> percentile for reference group A and the 60<sup>th</sup> percentile for reference group B, which of the following is most likely true?
- (a) Individuals in reference group B generally performed better on the test than those in group A
  - (b) A person at the 15<sup>th</sup> percentile with group A will be at the 30<sup>th</sup> percentile with group B.
  - (c) A person at the 80<sup>th</sup> percentile with reference group B will be at the 50<sup>th</sup> percentile with group A.
  - (d) Individuals in reference group B generally scored lower on the test than those in reference group A.
  - (e) None of the above

score of 70 in grp A means most people scored really high  
 in grp B means majority of people scored lower than 70



b 51. In a sample of 12 numbers,  $\sum (x_i - \bar{x})^2$  is equal to 18. The standard deviation is

- (a) 1.636
- (b) 1.279
- (c) 1.225
- (d) 1.5

$$\sqrt{\frac{18}{11}}$$

e 52. What is the mean of the following sample:

X  
2  
3  
4

frequency of X

$$\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} = 6$$

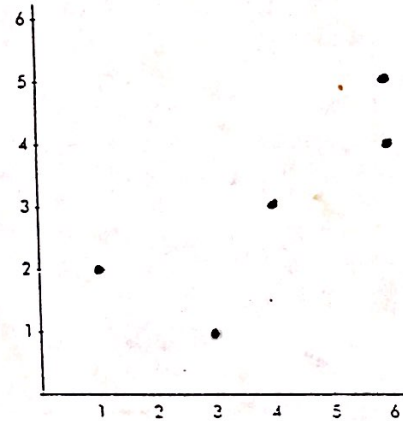
- (a) 3
- (b) 2
- (c) 20
- (d) 2.222
- (e) 3.333

$$\frac{2 \cdot 1 + 3 \cdot 2 + 4 \cdot 3}{6}$$

b 53. The least squares regression line for the scatterplot shown is  $\hat{y} = 0.61x + 0.56$ . What is the residual for the point (3, 1)?

- (a) -1.00
- (b) -1.39
- (c) -1.83
- (d) -2.39

actual - predicted  
 $1 - 2.39$



d 54. What is the least squares regression equation for the following set of data?

X	.31	.85	1.26	2.47	3.75
Y	.82	1.95	2.18	3.01	6.07

- (a)  $Y = .4057x + 1.389$
- (b)  $Y = .644x + 1.247$
- (c)  $Y = 1.247x + .644$
- (d)  $Y = 1.389x + .4057$

$$\hat{y} = .406 + 1.389x$$

~~X~~ 55. Two random samples of three observations each are taken from a population that is normally distributed with a mean of 100 and a standard deviation of 5. What is the probability that the sum of the two sample means is greater than 210?

- (a) .015
- (b) .298
- (c) .439
- (d) .007

$$> \frac{210 - 100}{5}$$

a 56. The following table is a cross-tabulation of age and reading speed of 100 pupils.

TABLE A: Age (to the nearest month)

	94-103	104-113	114-123	124-133	134-143	144-153	<i>total</i> f(y)
46-51		4	1				5
40-45	2	10	5				17
34-39	1	5	2				8
28-33	2	8	6	3	1	1	21
22-27		9	13	3			25
16-21	1	5	4	2	1	1	14
10-15		2	3	3	1	1	10
f(x)	6	43	34	11	3	3	100

In Table A, what proportion of those whose reading speed was more than 33 were aged between 104 and 113 months?

- (a) 19/30
- (b) 27/51
- (c) 19/43
- (d) 27/43
- (e) 19/100

*19 - reading speed over 33*  
 $\frac{19}{30}$  - all people reading speed more than 33

b

57. A sample of 1000 persons screened for a certain disease is distributed according to height and disease status resulting from the clinical exam as follows:

		DISEASE STATUS				
		None	Mild	Moderate	Severe	Totals
HEIGHT	Tall	122	78	139	61	400
	Medium	74	51	90	35	250
	Short	104	71	121	54	350
		300	200	350	150	1000

What would you estimate from the above table to be the probability of being medium or short in height and having moderate or severe disease status?

- (a) 300/500
- (b) 300/1000
- (c) 300/600
- (d) 800/1000

$\frac{300}{1000}$

b

58. A quiz has 6 multiple choice questions, each with four choices. If you guess at every question, what is the probability of getting exactly five questions correct?

- (a) .1162
- (b) .004
- (c) .735
- (d) .629

$6 \binom{1}{4}^5 \binom{3}{4}^1$

Success Failure

*binomial pdf (6, .25, 5)*

c 59. Forty-five percent of people in a population use Brand X toothpaste. A telephone survey is done, and 400 people are asked which brand of toothpaste they used most recently. The probability that more than one-half used Brand X most recently is

- (a) .48
- (b) .04
- (c) .02
- (d) .46

$1 - \text{binomialcdf}(400, .45, 200)$

60. In a certain large population, 40% of households have a total annual income of over \$70,000. A simple random sample is taken of four of these households. What is the probability that less than two of the households in the survey have an annual income of over \$70,000?

- (a) .6000
- (b) .5000
- (c) .4752
- (d) .6585

answer not listed should be .5248

d 61. Suppose that in a certain part of the world, in any 50-year period the probability of a major plague is .39, the probability of a major famine is .52, and the probability of both a plague and a famine is .15. What is the probability of a famine given that there is a plague?

- (a) .240
- (b) .288
- (c) .370
- (d) .385

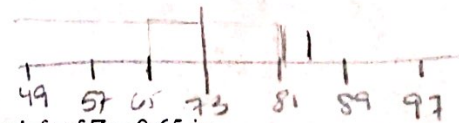
$P(F|P) = \frac{P(F \cap P)}{P(P)} = \frac{.15}{.39}$

b 62. One hundred students took a test on which the mean score was 73 with a variance of 64. A grade of A was given to all who scored 85 or better. Approximately how many A's were there, assuming scores were normally distributed? (Choose the closest.)

- (a) 42
- (b) 7
- (c) 58
- (d) 5
- (e) 22

stand dev = 8

$\frac{85-73}{8} = -1.5$  z table  
 $.0668$   
 $100(.0668) = 6.68$



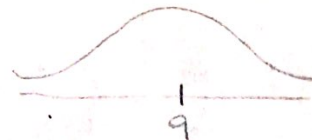
e 63. If Z is a standard normal variable, then the area to the left of Z = 0.65 is:

- (a) 0.35
- (b) 0.2242
- (c) 0.65
- (d) 0.2578
- (e) 0.7422

c 64. If the life of wild pheasants follows a normal distribution with a mean of 9 months and a standard deviation of 3, what percent of the population will be less than 11 months of age?

- (a) 34.13
- (b) 84.13
- (c) 74.86
- (d) 62.93

$\frac{11-9}{3} = .666$   
 $.7486$



a 65. If  $\bar{X}$  is the mean of a sample from a normal distribution with  $\mu = 10$ ,  $\sigma^2 = 25$ , and  $n = 9$ ,

then  $P(\bar{X} > 15)$  is:

- (a) .001350
- (b) .998650
- (c) .98778
- (d) .15866

$\sigma = 5$   
 $\text{normalcdf}(15, 1e99, 10, 5/\sqrt{9})$

c 66. Charlie's Z-score is 1.15 on a classroom examination. The mean score for the class is 50, and the standard deviation is 10. Charlie's raw score on the test is:

- (a) 11.15  
(b) 51.15  
(c) 61.50  
(d) 77.75

$$\bar{z} = \frac{X_i - 50}{10}$$

$$1.15 = \frac{X_i - 50}{10}$$

$$X_i = 61.50$$

a 67. Assume that the test scores of 600 students are normally distributed with a mean of 76 and a standard deviation of 8. The number of students scoring between 70 and 82 is:

- (a) 328  
(b) 164  
(c) 260  
(d) 136  
(e) 272

$$\frac{70-76}{8} < z < \frac{82-76}{8}$$

Normalcdf(70,82,76,8)

(.5467454411) (600)

$$-.75 < z < .75$$

b 68.  $P(Z \leq 1.65 \text{ or } Z > 3.0)$  is

- (a) 0.508  
(b) 0.9518  
(c) 0.9482  
(d) 0.0482  
(e) None of the above

$$1 - .9987 = .0013$$



d 69. A random sample of size 25 is taken from a population with mean 7 and variance 4. The sample mean is calculated to be 8. What value of the standard normal random variable (Z-score) corresponds to the sample mean?

- (a) 2.5  
(b) 1.25  
(c) -1.25  
(d) +2.5  
(e) none of the above

$$\mu = 7 \quad \bar{x} = 8 \quad sd = 2$$

$$z = \frac{8-7}{2/\sqrt{25}}$$

$$z = 2.5$$

c 70. The sampling distribution of means of random sample of size  $n$  drawn from some population will approach normality

- (a) only if the parent population is normally distributed and if  $n$  is large  
(b) only if the parent population is normally distributed regardless of the value of  $n$   
(c) if  $n$  is large regardless of the shape of the parent population distribution  
(d) regardless of the value of  $n$  and regardless of the shape of the parent population distribution.

b 71. Consider simple random sampling from a normal distribution with mean 18 and variance 36. For samples of size 9, the sampling distribution for the sample mean has mean and standard deviation equal to?

- (a) 2 and 12, respectively  
(b) 18 and 2, respectively  
(c) 18 and 4, respectively  
(d) 18 and 12, respectively  
(e) none of these

$$\mu_{\bar{x}} = \mu$$

$$\sigma = \frac{\sigma}{\sqrt{n}} = 2$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

a 72. If random sample of size 25 are drawn from a normal population for which  $\mu = 5$  and  $\sigma = 20$ , the probability that the mean of a random sample will be less than zero is:

- (a) .1056  
(b) .2119  
(c) .2881  
(d) .3944  
(e) .8944

$$\frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{\bar{x} - 5}{20/5} = \frac{\bar{x} - 5}{4}$$

$$z = \frac{0-5}{4} = -1.25$$

**Part 2: Free Response (9 points each)**

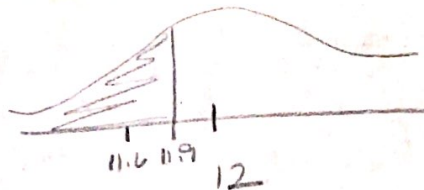
You must show all work and indicate the methods you use. You will be graded on the correctness of your methods and on the accuracy of your results and explanations.

1. A certain company is suspected of under-filling its cans of soft drink. The company advertises that its cans contain, on the average, 12 ounces of soda with a standard deviation of 0.4 ounces.

a) What is the probability that a single can of soft drink would contain 11.9 ounces or less? (You may assume that the distribution is approximately normally distributed.) Include a sketch of the distribution.

$$\mu = 12$$

$$\sigma = .4$$

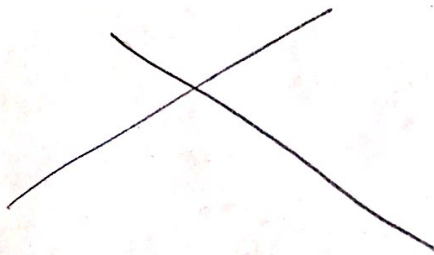


$$z = \frac{11.9 - 12}{.4} = -.25$$

Normalcdf(-1e99, 11.9, 12, .4)

$$P(X < 11.9) = .4013$$

b) Compute the probability that a random sample of 50 cans produces a sample mean fill of 11.9 ounces or less? Include a sketch of the distribution.



2. A quarterback completes 40% of his passes.

a. Explain how you could use a table of random numbers to simulate this quarterback attempting independent passes.

0,1,2,3 = completed passes

4,5,6,7,8,9 = incomplete passes

read table left to right

b. Using the random number table below, use your method to simulate 10 trials of throwing 5 passes. Circle the "successes." Based on your simulation, what is the approximate probability that he will complete three or more passes in the five attempts?

<sup>C</sup> 1 9 2 2 3	<sup>CC</sup> 9 5 0 3 4	<sup>C</sup> 0 5 7 5 6	<sup>C</sup> 2 8 7 1 3	<sup>C</sup> 9 6 4 0 9	<sup>CC</sup> 1 2 5 3 1
<sup>C</sup> 4 2 5 4 4	<sup>C</sup> 8 2 8 5 3	<sup>C</sup> 7 3 6 7 6	<sup>C</sup> 4 7 1 5 0	9 9 4 0 0	0 1 0 2 7
2 7 7 6 4	4 2 6 4 8	8 2 4 2 5	3 6 2 9 0	4 5 4 6 7	7 1 7 0 9
7 7 5 5 8	0 0 0 9 5	3 2 8 6 3	2 9 4 8 5	8 2 2 2 6	9 0 0 5 6
4 5 4 6 7	7 1 7 0 9	7 7 5 5 8	0 0 0 9 5	3 2 8 6 3	2 9 4 8 5
8 2 2 2 6	9 0 0 5 6	5 2 7 1 1	2 8 8 8 9	9 3 0 7 4	6 0 2 2 7

$\left(\frac{4}{5}\right) \frac{2}{5} \cdot \frac{1}{5} \left(\frac{3}{5}\right) \frac{1}{5} \left(\frac{4}{5}\right) \frac{1}{5} \frac{2}{5} \frac{1}{5} \frac{2}{5}$

Complete 3 or more =  $\frac{3}{10}$

3. Data show a trend in winning long jump distances for an international competition over the years 1972-92. With jumps recorded in inches and dates in years since 1900, a least squares regression line is fit to the data. The computer output and a graph of the residuals are as follows:

R squared = 92.1%

Variable	Coefficient	SE of Coeff	t-ratio	Prob
Constant	256.576 <i>a</i>	11.59	22.1	0.0001
Year	0.95893 <i>b</i>	0.141 <i>SEb</i>	6.81 <i>t</i>	0.0024 <i>pvalue</i>

a. Does a line appear to be an appropriate model? Explain

Yes  $r = .9597$

b. What is the slope of the least squares line? Give an interpretation of the slope.

$.95893$  each year distance increases  $.95893''$

c. What is the correlation?

$r = .9597$

d. What is the predicted winning distance for the 1980 competition?

$\hat{y} = 256.576 + .95893x$   $x=80$   $\hat{y} = 333.2904''$

e. What was the actual winning distance in 1980?

$8.54 \text{ m} = 336.220''$