Empirical Rule

1. Given an approximately normal distribution with a mean of 159 and a standard deviation of 70.

a) What percent of values are within the interval (89, 299)? _____

b) What percent of values are within the interval (19, 159)? _____

c) What interval contains 99.7% of all values? _____

d) What percent of values are above 229? _____

e) What percent of values are outside the interval (19, 229)? _____

Question B

There were six different stat classes that were offered last semester; one student was randomly selected from each class with his/her final score and the class average and standard deviation.

Find the z-score for each student.

Joe got score of 83 when the class average was 71 with standard deviation of 6.5. _____

Moe got score of 88 when the class average was 76 with standard deviation of 7.5. _____

Nielo got score of 77 when the class average was 72 with standard deviation of 2.3. _____

April got score of 82 when the class average was 72 with standard deviation of 5.5. _____

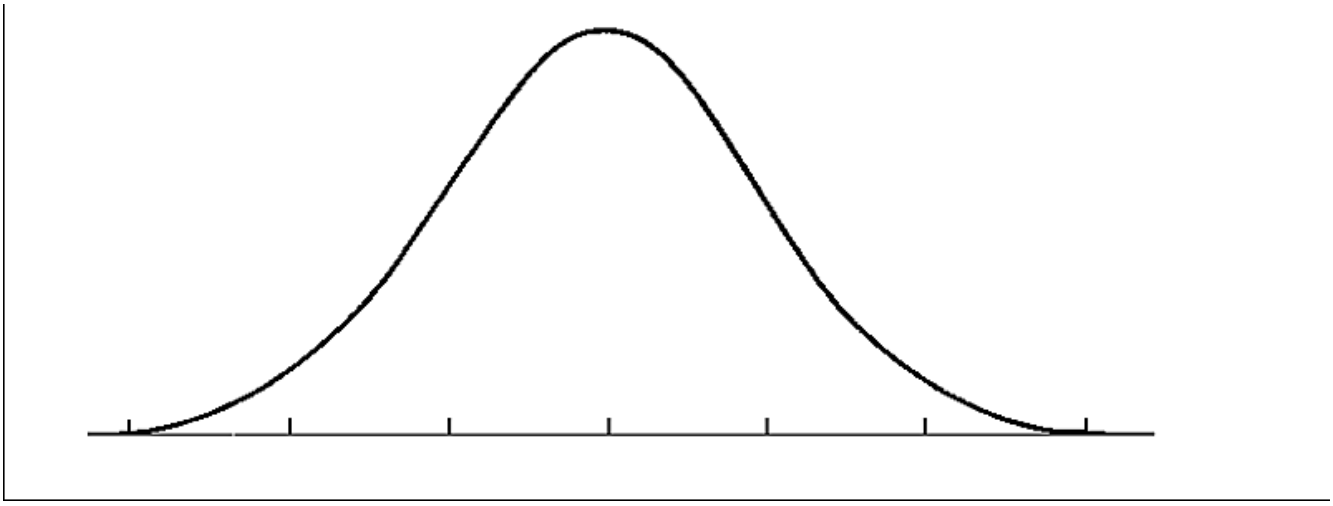
Max got score of 82 when the class average was 71 with standard deviation of 5. _____

Alex got score of 82 when the class average was 72 with standard deviation of 6. _____

Answer the following questions:

a) Who did relatively better in the class than the rest?
b) Who did relatively worse in the class than the rest?
c) Who got scores that can be considered unusual?

7. **500 freshmen at Schaumburg High School took an algebra test. The scores were distributed normally with a mean of 75 and a standard deviation of 7. Label the mean and three standard deviations from the mean.**



Answer the following questions based on the data:

a) What percentage of scores are between scores 61 and 82?

b) What percentage of scores are between scores 75 and 82?

c) What percentage of scores are between scores 61 and 89?

d) What percentage of scores is less than a score of 61?

e) What percentage of scores is greater than a score of 96?

f) Approximately how many algebra students scored between 61 and 89?

g) Approximately how many algebra students scored between 68 and 82?

h) Approximately how many algebra students scored between 61 and 75?

i) Approximately how many algebra students scored between 89 and 96?

j) Approximately how many algebra students scored higher than 89?

8. Here are the scores for a recent test in a Prob/Stat class.

90	90	95	100	80	80	75	80	70	60	95	100	100
100	75	80	90	90	90	70	70	80	85	90	90	85

Answer the following questions regarding this set of data.

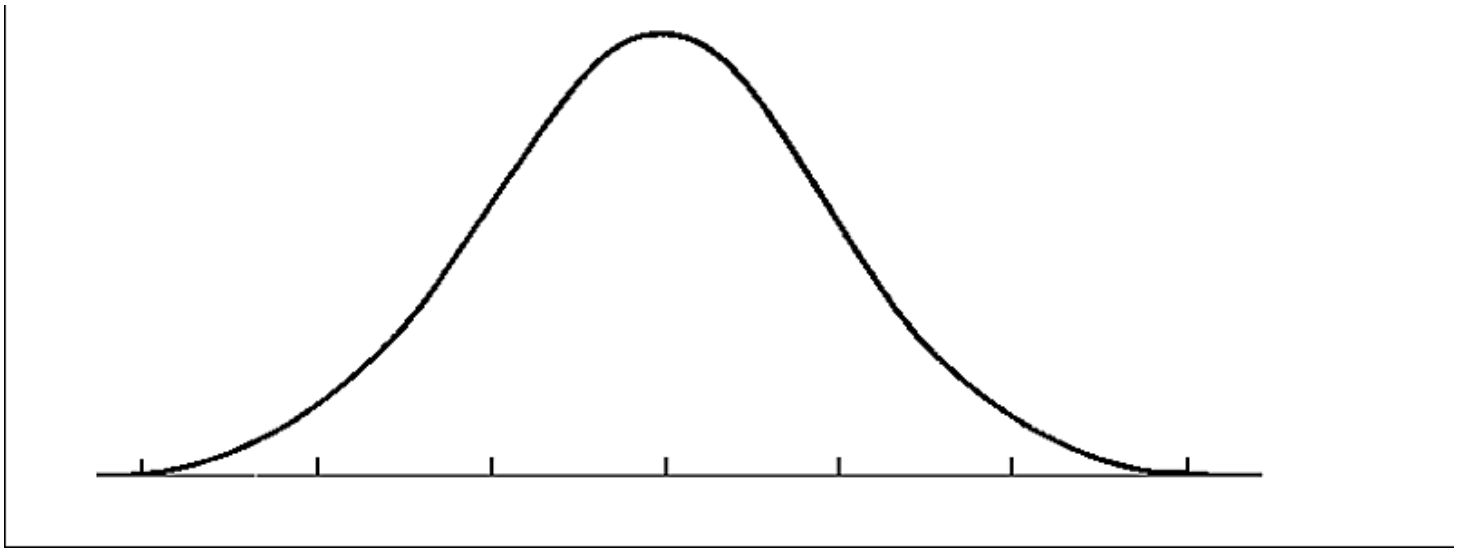
Median = _____ Mean = _____ Mode = _____

Standard Deviation = _____ Variance = _____

How many scores are within 1 standard deviation of the mean? _____

How many scores are within 2 standard deviations of the mean? _____

Hint: Drawing the curve will help answer the last two questions!!!



BP DATE:_____, Name_____

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

Provide an appropriate response.

1) Which of the following cannot be the probability of an event? 1) _____

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

2) If A, B, C, and D, are the only possible outcomes of an experiment, find the probability of D using the table below. 2) _____

Outcome	A	B	C	D
Probability	1/7	1/7	1/7	

A) 4/7 B) 3/7 C) 1/7 D) 1/4

3) The probability that event A will occur is $P(A) = \frac{\text{Number of successful outcomes}}{\text{Number of unsuccessful outcomes}}$ 3) _____

A) True B) False

4) The probability that event A will occur is $P(A) = \frac{\text{Number of successful outcomes}}{\text{Total number of all possible outcomes}}$ 4) _____

A) False B) True

5) In terms of probability, a(n) _____ is any process with uncertain results that can be repeated. 5) _____

A) Experiment B) Event C) Sample space D) Outcome

6) A(n) _____ of a probability experiment is the collection of all outcomes possible. 6) _____

A) Event set B) Prediction set C) Bernoulli space D) Sample space

7) True or False: An outcome is any collection of events from a probability experiment. 7) _____

A) False B) True

8) In a 1–pond bag of skittles the possible colors were red, green, yellow, orange, and purple. The probability of drawing a particular color from that bag is given below. Is this a probability model? Answer Yes or No. 8) _____

Color	Probability
Red	0.2299
Green	0.1908
Orange	0.2168
Yellow	0.1889
Purple	0.1816

A) Yes B) No

9) An unusual event is an event that has a 9) _____

A) Probability of 1 B) Low probability of occurrence

C) A negative probability D) Probability which exceeds 1

10) The table below represents a random sample of the number of deaths per 100 cases for a certain illness over time. If a person infected with this illness is randomly selected from all infected people, find the probability that the person lives 3–4 years after diagnosis. Express your answer as a simplified fraction and as a decimal. 10) _____

Years after Diagnosis	Number deaths
1–2	15
3–4	35
5–6	16
7–8	9
9–10	6
11–12	4
13–14	2
15+	13

A) $\frac{1}{35}$; 0.029 B) $\frac{35}{100}$; 0.35 C) $\frac{35}{65}$; 0.538 D) $\frac{7}{120}$; 0.058

11) A die is rolled. The set of equally likely outcomes is {1, 2, 3, 4, 5, 6}. Find the probability of getting a 2. 11) _____

A) 0 B) $\frac{1}{6}$ C) 2 D) $\frac{1}{3}$

12) A fair coin is tossed two times in succession. The set of equally likely outcomes is {HH, HT, TH, TT}. Find the probability of getting the same outcome on each toss. 12) _____

A) $\frac{3}{4}$ B) $\frac{1}{4}$ C) 1 D) $\frac{1}{2}$

13) A single die is rolled twice. The set of 36 equally likely outcomes is {(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)}. Find the probability of getting two numbers whose sum is greater than 10. 13) _____

A) $\frac{1}{18}$ B) 3 C) $\frac{5}{18}$ D) $\frac{1}{12}$

14) A single die is rolled twice. The set of 36 equally likely outcomes is {(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)}. Find the probability of getting two numbers whose sum is less than 13. 14) _____

A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) 1 D) 0

15) Three fair coins are tossed in the air and land on a table. The up side of each coin is noted. How many elements are there in the sample space? 15) _____

A) 4 B) 6 C) 8 D) 3

16) In a survey of college students, 880 said that they have cheated on an exam and 1721 said that they have not. If one college student is selected at random, find the probability that the student has cheated on an exam. 16) _____

A) $\frac{880}{2601}$ B) $\frac{2601}{880}$ C) $\frac{1721}{2601}$ D) $\frac{2601}{1721}$

Probability

1) If 25% of U.S. federal prison inmates are not U.S. citizens, find the probability that 2 randomly selected inmates will not be U.S. citizens.

2) If 2 cards are selected from a standard deck of cards. The first card is placed back in the deck before the second card is drawn. Find the following probabilities:

a) P(Heart and club)

b) P(Red card and 4 of spades)

c) P(Spade and Ace of hearts)

d) P(2 Aces)

e) P(Queen of hearts and King)

f) P(2 of the same card)

3) Find the same probabilities for problem #19 but this time, the card is not placed back in the deck before the 2^{nd} card is drawn.

d) P(Heart and club)

e) P(Red card and 4 of spades)

f) P(Spade and Ace of hearts)

d) P(2 Aces)

e) P(Queen of hearts and King)

f) P(2 of the same card)

Answers

Questions B.

Name	x	$\overline{x}$	**s**	$z=\frac{x-\overline{x}}{s}$
Joe	83	71	6.5	1.85
Moe	88	76	7.5	1.60
Nielo	77	72	2.3	2.17
April	82	72	5.5	1.82
Max	82	71	5	2.20
Alex	82	72	6	1.67

a)Max **b)** Moe **c)** Nielo and Max

Answer Key
Testname: UNTITLED1

1) B
2) A
3) B
4) B
5) A
6) D
7) B
8) A
9) B
10) B
11) B
12) D
13) D
14) C
15) C
16) A

9