AP Stats
Practice Questions - Chap 10 Name ______________________________ Pd ______

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

Provide an appropriate response.

1) Criticize the following simulation: A student uses a random number from 1 to 13 to simulate the value of a card drawn at random from a standard deck of playing cards. 1) ________

A) The simulation will not model the real situation. In reality, there are less "face" cards than cards with numbers.
B) The simulation will not model the real situation. The simulation should use random numbers from 1 to 12.
C) The simulation might not model the real situation. The deck may not be shuffled, in which case the real situation may not be random.
D) The simulation should model the real situation.
E) The simulation will not model the real situation. The simulation must also account for the card's suit.

2) When drawing five cards randomly from a deck, which is more likely, a royal flush or a full house? A royal flush is the five highest cards of a single suit. A full house is three of one denomination and two of another. How could you simulate 5–card hands? Once you have picked one card, you cannot pick that same card again. Describe how you will simulate a component and its outcomes. 2) ________

A) The component is picking a single card. An outcome is the denomination of the card. You could use the digits 01–52 for the 52 different cards, ignoring 00 and 53–99, or you could use a single digit 1, 2, 3, or 4 for the suit and then 01–13 for the denomination (ignoring 1, 5–9 for suits, and 00, 14–99 for denominations).
B) The component is picking a single card. An outcome is the suit of the card. You could use the digits 01–52 for the 52 different cards, ignoring 00 and 53–99, or you could use a single digit 1, 2, 3, or 4 for the suit and then 01–13 for the denomination (ignoring 1, 5–9 for suits, and 00, 14–99 for denominations).
C) The component is picking five cards. An outcome is the denomination of the cards. You could use the digits 01–52 for the 52 different cards, ignoring 00 and 53–99, or you could use a single digit 1, 2, 3, or 4 for the suit and then 01–13 for the denomination (ignoring 1, 5–9 for suits, and 00, 14–99 for denominations).
D) The component is picking five cards. An outcome is the suit and denomination of the cards. You could use the digits 01–52 for the 52 different cards, ignoring 00 and 53–99, or you could use a single digit 1, 2, 3, or 4 for the suit and then 01–13 for the denomination (ignoring 1, 5–9 for suits, and 00, 14–99 for denominations).
E) The component is picking a single card. An outcome is the suit and denomination of the card. You could use the digits 01–52 for the 52 different cards, ignoring 00 and 53–99, or you could use a single digit 1, 2, 3, or 4 for the suit and then 01–13 for the denomination (ignoring 1, 5–9 for suits, and 00, 14–99 for denominations).

3) A tax referendum for property tax funding for a bond issue to build a new school is on the ballot in the next election. A member of the referendum committee is confident that the question will have about 52% of the votes cast in the school district. But, you're worried that only 1,000 voters will show up at the polls since this is an off–year election. How often will the referendum question lose? To find out, you set up a simulation. Describe how you will simulate a component and its outcomes. 3) ________

A) The component is ten voters voting. An outcome is a vote yes or no for the referendum. Use two random digits, giving 00–52 a yes vote and 53–99 a no vote.
B) The component is one hundred voters voting. An out come is a vote yes or no for the referendum. Use one random digit, giving 0–5 a yes vote and 6–9 a no vote.
C) The component is one voter voting. An outcome is a vote yes or no for the referendum. Use three random digits, giving 000–520 a yes vote and 521–999 a no vote.
D) The component is one voter voting. An out come is a vote yes for the referendum. Use three random digits, giving 000–599 a yes vote and 600–999 a no vote.
E) The component is one voter voting. An out come is a vote no for the referendum. Use three random digits, giving 000–520 a yes vote and 521–999 a no vote.

4) You take a surprise quiz in your astronomy class with 12 multiple–choice questions. You estimated that you would have about a 30% chance of getting any individual question correct. What are your chances of getting them all right? Your simulation should use at least 20 runs. 4) ________

A) 2.1074359 B) 3.6 C) 1728 D) 0.00000053 E) 36

5) Five men and three women are waiting to be interviewed for jobs. If they are all selected in random order, find the probability that all the women will be interviewed first. Your simulation should use at least 10 runs. 5) ________

A) $\frac{1}{56}$ B) $\frac{1}{60}$ C) $\frac{9}{20}$ D) $\frac{3}{56}$ E) $\frac{6}{56}$

6) A surprise quiz was given yesterday in your biology class with 9 multiple choice questions. A classmate who took it claimed to have guessed on every question, but got them all correct. Each question had 5 possible answers. Should you believe him? Explain, basing your argument on a simulation involving at least 10 runs. 6) ________

A) It is hard to tell. The simulation would need to have more than 10 runs.
B) No, the possibility of that happening is very small, about 0.00000051.
C) Yes, it is likely.
D) No, the possibility of that happening is very small, about 1.55184557.
E) Yes, it is possible.

Solve the problem.

7) In order to illustrate the basic economic and psychological dynamics involved in purchasing life insurance, one can create a very simple game with a sack, one black marble, and three white marbles. In this game, the four marbles are placed in the sack, and the player must pay a "premium" of $5 for each draw he makes from the sack. The previously–drawn marbles are not returned to the sack. So, if he keeps playing, the player is guaranteed to win the $12 award eventually (but at what cost?!). Use a simulation to predict the average cost to win the $12 assuming the player continues playing until he gets the black marble. Use 30 simulation runs, letting a random number give the number of draws to obtain the black marble on a particular run. 7) ________

A) About $5.00
B) About $15.50
C) About $17.00
D) About $20.50
E) About $12.50