Name _____ Per _____

Statistics Introduction to Probability Worksheet #1 (10 pts.)

I. Vocabulary Use the **Word bank:** At random, complement, decimals, experimental, instance, Percents, reduce, subset, trials, variable

1.) An Event is any _____ (part) of a sample space.

2.) To pick an item _____ from a set is to pick in such a way that all items are equally likely to be chosen.

3.) Odds are not fractions, but they do _____ like fractions.

4.) _____ probability is based on data collected in the real world.

5.) A probability experiment is a kind of statistical study that consists of repeated _____.

6.) A random _____ is a rule that assigns a number to each outcome in a sample space. The set of all outcomes that have been assigned the same number is called a/an _____.

7.) The set of all outcomes in a sample space that are **not** in an Event is called the _____ of that Event.

8.) Probabilities can be expressed as fractions, _____ or _____.

II. Formula matching – Assume all outcomes are equally likely.

9.) Experimental $P(E)$: _____

A.) $\dfrac{|E|}{|\Omega|}$

10.) Theoretical $P(E)$: _____

B.) $0 \le P(E) \le 1$

11.) Range Rule: _____

C.) $\dfrac{n_E}{n}$

12.) Sum Rule: _____

D.) $P(E') = 1 - P(E)$

13.) Complement Rule: _____

E.) $\sum P(x) = 1$

III. Applications

14.) A kettle contains three gold coins, five silver coins and ten bronze coins. A coin is selected from this basket at random. What is the probability that it is a gold coin? _____

  A.) 1/5   **B.)** 1/3   **C.)** 5/6   **D.)** 1/6

15.) A kettle contains three gold coins, five silver coins and ten bronze coins. A coin is selected from this basket at random. What are the **odds against** it being a gold coin? _____

  A.) $5:1$ **B.)** $1:5$ **C.)** $6:1$ **D.)** $1:6$

16.) Consider a trial that consists of flipping a fair coin three times. Each time, it lands either heads up or tails up. How many outcomes are in the sample space of this trial? _____

  A.) 3   **B.)** 6   **C.)** 8   **D.)** 9

17.) Consider a trial that consists of flipping a fair coin three times. Let $x =$ the number of heads that appear in an outcome of this trial. Fill in the table to the right, representing the probabilities as **decimals**.

x	$P(x)$
Σ	

18.) The probability that there will be snow on Christmas is 30%. What are the **odds in favor** of snow on Christmas? _____

  A.) $7:3$ **B.)** $3:7$ **C.)** $10:3$ **D.)** $3:10$

19.) A pair of fair, six-sided dice is rolled and the numbers that appear are recorded. What is the probability that the **sum** of these numbers is greater than or equal to five? _____ [Hint: Make a set of axes diagram.]

  A.) $1/6$ **B.)** $5/6$ **C.)** $1/3$ **D.)** $2/3$

20.) The odds against a random ticket winning a fundraising lotto are $20:1$. What is the **probability** that your ticket wins the lotto? _____

  A.) 5.0%   **B.)** 4.8%   **C.)** 95.0%   **D.)** 95.2%

21.) A trial consists of selecting five cards (without replacement) from a standard deck of 52 cards. What is the size of the sample space for this trial? _____

  A.) $2.22 \cdot 10^{36}$ **B.)** 311,875,200   **C.)** 260   **D.)** 380,204,032

22.) Six **<u>digits</u>** are selected at random. What is the probability that the digits selected were all nines? _____

  A.) $1/10$ **B.)** $1/100$ **C.)** $1/1,000$ **D.)** $1/1,000,000$

23.) Which of the following events is **least likely** to occur? _____

  A.) Rolling a fair die 600,000 times and seeing a "1" 200,000 times

  B.) Rolling a fair die 600,000 times and seeing a "1" 100,000 times

  C.) Rolling a fair die 6 times and seeing a "1" twice.

  D.) Rolling a fair die 6 times and seeing a "1" once.

24.) Chauncey flipped a coin 1,200 times and it came up tails 629 times. He therefore concludes that $P(tails) = 0.524$. What type of probability did Chauncey use in coming up with this conclusion? _____

  A.) Theoretical   **B.)** Experimental   **C.)** Subjective   **D.)** Rounding

25.) Consider the **box-and-whiskers plot** shown to the right. What is the probability that a randomly selected data point from the set that generated this plot will be between 50 and 100? _____
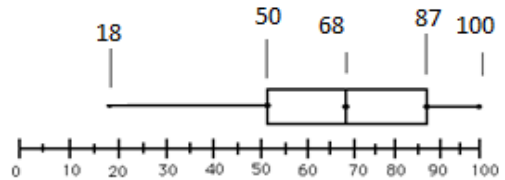
  A.) 15%   **B.)** 25%   **C.)** 50%   **D.)** 75%

26.) Consider the bar chart shown to the right. If a person is chosen at random from the field of study in which the survey that generated this chart was held, estimate the probability that this person will have **basketball** as his or her favorite sport: _____
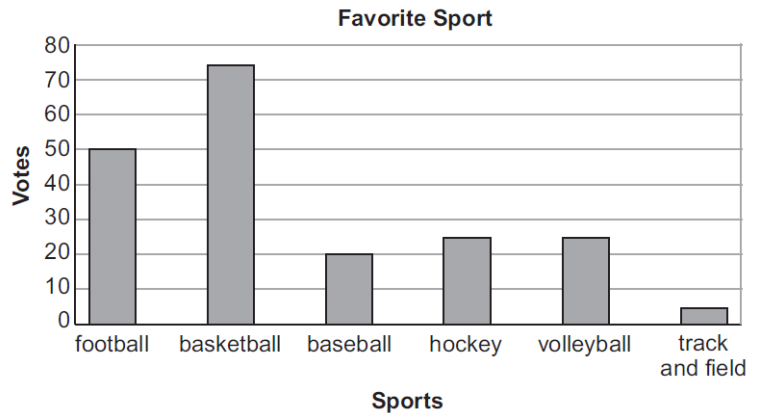
  A.) 37.5%   **B.)** 75%

  C.) 16.7%   **D.)** 50%

27.) Which of the following sample spaces is **NOT** random? _____

  A.) A fair coin is flipped.   Ω = {heads, tails}

  B.) You buy a lottery ticket.   Ω = {you win the jackpot, you do not win the jackpot}

  C.) Two evenly-matched opponents play a game of poker.   Ω={player A wins, player B wins}

  D.) A family has two children.   Ω = { (boy, boy); (boy, girl); (girl, boy); (girl, girl)}

28.) A trial consists of selecting two cards at random from the choices shown to the right. List all of the possible outcomes if you put the first card back before picking the second one: _____

_____.

29.) A trial consists of selecting two cards at random from the set in the previous problem. List all of the possible outcomes if you <u>don't</u> put the first card back before picking the second one: _____

_____.

30.) A trial consists of selecting two cards at random from the set shown in question #28. What is the probability that this outcome consists of picking an odd card, and then an even card, if you put the first card back before picking the second one? Express your answer as a fraction:

$$P(odd_1 \ and \ even_2) = \underline{\hspace{2cm}}$$

31.) A trial consists of selecting two cards at random from the set shown in question #28. What is the probability that this outcome consists of picking an odd card, and then an even card, if you **<u>don't</u>** put the first card back before picking the second one? Express your answer as a fraction:

$$P(odd_1 \ and \ even_2) = \underline{\hspace{2cm}}$$

32.) In a high school homeroom, there are 30 students. 23 are taking a math class and 15 are taking a science class. 12 are taking both a math and a science class. If you pick a student from this class at random, what is the probability that this student is taking a math class **OR** a science class? _____

   A.) 90%   **B.)** 60%   **C.)** 86.7%   **D.)** 66.7%

33.) In a certain town, there is a 20% chance of rain on any given day. What is the probability that in the next week (7 days) there is **NO** rain in this town? _____

   A.) 14.13%   **B.)** 2.86%   **C.)** 79.03%   **D.)** 20.97%

34.) A 12-sided die is used in some board games. The faces of this die are numbered 1 to 12. Suppose you roll this die once. What is the probability that the number that appears is prime **or** greater than 9? _____
[Note: 1 is not considered to be a prime number.]

   A.) 1/2   **B.)** 1/3   **C.)** 7/12   **D.)** 2/3

Introduction to Probability Worksheet #1 Answer Key

1.) subset

2.) at random

3.) reduce

4.) Experimental

5.) trials

6.) variable; instance (in that order)

7.) complement

8.) decimals; Percents (in either order)

9.) C

10.) A

11.) B

12.) E

13.) D

14.) D

15.) A

16.) C

17.)

x	$P(x)$
0	0.125
1	0.375
2	0.375
3	0.125
$\sum$	1 (check)

18.) B

19.) B

20.) B

21.) B

22.) D

23.) A

24.) B

25.) D

26.) A

27.) B

28.) $\{(3,3); (3,4); (3,5); (4,3); (4,4);$

$(4,5); (5,3); (5,4); (5,5)\}$

29.) $\{(3,4); (3,5); (4,3); (4,5); (5,3); (5,4)\}$

30.) 2/9

31.) 1/3

32.) C

33.) D

34.) C