Name Key
Date ___/___/_____

Illowsky – Chapt. 3
Larson – Chapt. 3

**Please show all work neatly and orderly to recieve credit.**

**Provide an appropriate response.**

1) The data in the table represent the number of consumer complaints against major U.S. airlines. If one complaint from the table is randomly selected, find the probability that it was filed against Northwest Airlines.

| Airline | Number of Complaints |
|---|---|
| United | 1172 |
| Northwest | 765 |
| Continental | 563 |

$\frac{765}{2500} = .306$

2) Identify the sample space of the probability experiment: rolling a single 12-sided die with sides numbered 1-12

Sample space: $\{1, 2, 3, \ldots 10, 11, 12\}$

**Use the fundamental counting principle to solve the problem.**

3) A shirt company has 4 designs each of which can be made with short or long sleeves. There are 5 color patterns available. How many different shirts are available from this company?

$4 \cdot 2 \cdot 5 = 40$

**Provide an appropriate response.**

4) Classify the statement as an example of classical probability, empirical probability, or subjective probability. In California's Pick Three lottery, a person selects a 3-digit number. The probability of winning California's Pick Three lottery is $\frac{1}{1000}$.

Classical

5) Which of the following cannot be a probability and briefly state why it cannot be a probability?

A) 85% B) 0.0002 C) 1 D) $\frac{4}{3}$

All probability are between 0-1, inclusive.

6) A group of students were asked if they carry a credit card. The responses are listed in the table.

| Class | Credit Card Carrier | Not a Credit Card Carrier | Total |
|---|---|---|---|
| Freshman | 11 | 49 | 60 |
| Sophomore | 6 | 34 | 40 |
| Total | 17 | 83 | 100 |

If a student is selected at random, find the probability that he or she owns a credit card given that the student is a sophomore. Round your answer to three decimal places.

$\frac{6}{40} = .150$

7) Find the probability of getting four consecutive aces when four cards are drawn without replacement from a standard deck of 52 playing cards.

$\frac{4}{52} \cdot \frac{3}{51} \cdot \frac{2}{50} \cdot \frac{1}{49} = .00000369$

8) The table lists the smoking habits of a group of college students.

| Sex | Non-smoker | Regular Smoker | Heavy Smoker | Total |
|---|---|---|---|---|
| Man | 135 | 36 | 5 | 176 |
| Woman | 187 | 21 | 15 | 223 |
| Total | 322 | 57 | 20 | 399 |

$P(R \text{ or } H) = \frac{57}{399} + \frac{20}{399} = \frac{77}{399} = .193$

If a student is chosen at random, find the probability of getting someone who is a regular or heavy smoker. Round your answer to three decimal places.

**Perform the indicated calculation.**

9) ${}_9C_3$ $\frac{9!}{6!3!} = \frac{3 \cdot 4 \cdot 7 \cdot 8 \cdot 9}{6 \cdot 2 \cdot 1} = 84$

**Provide an appropriate response.**

10) Decide if the events A and B are mutually exclusive or not mutually exclusive. A die is rolled.
A: The result is an odd number.
B: The result is an even number.

Mutually exclusive.

11) A tourist in Ireland wants to visit six different cities. How many different routes are possible?

$6! = 720$

12) How many ways can two Republicans, one Democrat, and one Independent be chosen from nine Republicans, five Democrats, and two Independents to fill four positions on city council?

${}_9C_2 \cdot {}_5C_1 \cdot {}_2C_1 = 360$

13) How many different permutations of the letters in the word PROBABILITY are there?

$\frac{11!}{2!2!} = 9,979,200$

14) In California, each automobile license plate consists of a single digit followed by three letters, followed by three digits. How many distinct license plates can be formed if there are no restrictions on the digits or letters?

$10 \cdot 26 \cdot 26 \cdot 26 \cdot 10 \cdot 10 \cdot 10 = 175,760,000$

15) A delivery route must include stops at five cities. If the route is randomly selected, find the probability that the cities will be arranged in alphabetical order. Round your answer to five decimal places.

$5! = 120$

$\Rightarrow \frac{1}{120} = .008$