

Probability Practice

Name: Key

Date: _____

1. A jar contains 12 red marbles, 16 blue marbles, and 18 white marbles.

$$\frac{12}{28} \quad 46$$

a. Three marbles are chosen from a jar without replacement. What is the probability that none are white?

R+B
12+16=28

$$\frac{28}{46} \cdot \frac{27}{45} \cdot \frac{26}{44} = \frac{19656}{91080} = \frac{273}{1265}$$

b. Four marbles are chosen from the jar with replacement. What is the probability they are all white?

$$\frac{18}{46} \cdot \frac{18}{46} \cdot \frac{18}{46} \cdot \frac{18}{46} = \frac{104976}{4477456} = \frac{26244}{1119364} = \frac{6561}{279861}$$

~~c. Three marbles are chosen from the jar without replacement. What is the probability that at least one is white?~~

$$\frac{18}{46} \cdot \frac{45}{45} \cdot \frac{44}{44}$$

2. Find the probability of drawing the given cards from a standard deck of 52 cards (a) with replacement and (b) without replacement.

a. a club, then a diamond

b. a jack then a 7

c. a 5, then a face card, then an ace

d. a king, then another king, then a third king

	Replacement	Without Replacement
a.	$\frac{13}{52} \cdot \frac{13}{52} = \frac{169}{2704} = \frac{1}{16}$	$\frac{13}{52} \cdot \frac{13}{51} = \frac{169}{2652} = \frac{13}{204}$
b.	$\frac{4}{52} \cdot \frac{4}{52} = \frac{16}{2704} = \frac{1}{169}$	$\frac{4}{52} \cdot \frac{4}{51} = \frac{16}{2652} = \frac{4}{663}$
c.	$\frac{4}{52} \cdot \frac{12}{52} \cdot \frac{4}{52} = \frac{192}{140608} = \frac{3}{2197}$	$\frac{4}{52} \cdot \frac{12}{51} \cdot \frac{4}{50} = \frac{192}{132600} = \frac{8}{5525}$
d.	$\frac{4}{52} \cdot \frac{4}{52} \cdot \frac{4}{52} = \frac{64}{140608} = \frac{1}{2197}$	$\frac{4}{52} \cdot \frac{3}{51} \cdot \frac{2}{50} = \frac{24}{132600} = \frac{2}{11050}$

3. A basketball player has attempted 24 shots and made 13. Find the experimental probability that the player will make the next shot that she attempts.

$$\frac{13}{24} = .54 = 54\%$$

4. A baseball player attempted to steal a base 70 times and was successful 47 times. Find the experimental probability that the player will be successful on his next attempt to steal a base.

$$\frac{47}{70} = .67 = 67\%$$

Classify each pair of events as *dependent* or *independent*.

4. A member of the junior class and a second member of the same class are randomly selected.

Dependent

5. A member of the junior class and a member of another class are randomly chosen.

Independent

6. An odd-numbered problem is assigned for homework, and an even-numbered problem is picked for a test.

Independent

7. The sum and the product of two rolls of a number cube

ie: 2

Dependent



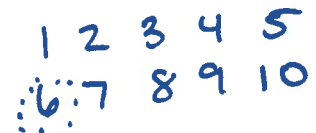
8. A natural number from 1 to 10 is randomly chosen.

- a. $P(\text{even or } 7)$

$$\frac{5}{10} + \frac{1}{10} = \frac{6}{10} = \frac{3}{5} \quad 60\%$$

- b. $P(\text{even or odd})$

$$\frac{5}{10} + \frac{5}{10} = 1 \quad 100\%$$



- c. $P(\text{multiple of 2 or multiple of 3})$

$$\frac{5}{10} + \frac{3}{10} - \frac{1}{10} = \frac{7}{10} \quad 70\%$$

- d. $P(\text{odd or less than 3})$

$$\frac{5}{10} + \frac{2}{10} - \frac{1}{10} = \frac{6}{10} = \frac{3}{5} \quad 60\%$$

9. A flavored-water company wants to know how many people prefer its new lemon-flavored water over two competitors' brands. The company hires you to survey 1000 random people and ask them to rank the three drinks in order of preference. After conducting the survey, you find that 35% prefer the lemon-flavored water over Competitor A, 38% prefer the lemon-flavored water over Competitor B, and 27% did not prefer the lemon-flavored water over either competitor's brand.

- a.) What is the probability that someone prefers the lemon-flavored water over both competitors' brands?

$$\frac{38 + 35}{100} = \frac{73}{100} \quad 73\%$$

- b.) What is the margin of error for this survey?

$$\pm \frac{1}{\sqrt{1000}} = \pm 3\%$$

- c.) What is the interval for people who did not prefer lemon-flavored water over either competitor's brands?

$$3\% - 27\% + 3\% \quad 24\% - 30\%$$

- d.) What are some events that could have happened to make this survey not accurate?

Not thirsty, doesn't like lemon, had a bad taste in their mouth to begin, etc.

- e.) Is this survey considered a bias sample? Why or Why not?

No because it says "Random".

10. What are the measures of Central Tendency?

Mean, median, mode

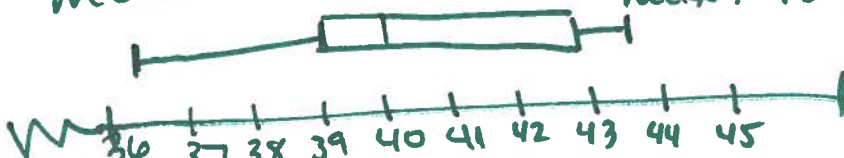
11. Find the mean, median, and mode for each set of data

	<u>Mean</u>	<u>Median</u>	<u>Mode</u>
a. 4, 6, 9, 12, 5 4, 5, 6, 9, 12	7.2	6	none
b. 7, 13, 4, 7 4, 7, 7, 13	5/25 7.75	7	7
c. 9, 9, 9, 9, 8	8.8	9	9
d. 300, 24, 40, 50, 60 24, 40, 50, 60, 300 ↑	94.8	50	none
f. 23, 23, 12, 12	17.5	17.5	12, 23

12. One of the events in the Winter Olympics is the Men's 500-meter Speed Skating. The times for this event are show to the right. Find the mean, median, and mode. Then create a box plot (box and whisker plot) using the data (using a graphing calculator or by hand).

mean: 40.6
 median: 40.15
 mode: 43.4
 min: 36.45
 Q₃: 43.1
 median: 40.15
 Q₁: 39.17
 max: 43.4

Year	Time	Year	Time
1928	43.4	1964	40.1
1932	43.4	1968	40.3
1936	43.4	1972	39.44
1948	43.1	1976	39.17
1952	43.2	1980	38.03
1956	40.2	1984	38.19
1960	40.2	1988	36.45



13. Write an example of an event that is mutually exclusive.

Answers Vary: Heart or Club

14. Explain how an outlier can affect data.

An outlier is a piece of data that is an exceptionally large or small than the rest of the data. The mode and median will not change much. The mean will have a significant change.