

Review - PROBABILITY

1. Lynn and Dawn tossed a coin 30 times and got heads 20 times. What is the experimental probability of tossing heads using Lynn and Dawn's results?

$$\frac{20}{30} = \frac{2}{3}$$

2. What is the sum of the theoretical probability of an event and its complement? |

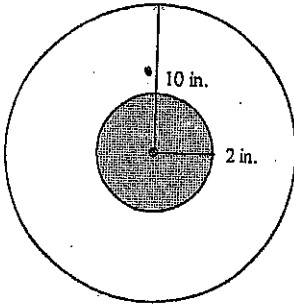
3. A spinner is numbered from 1 through 10 with each number equally likely to occur. What is the probability of obtaining a number less than 4 or greater than 8 in a single spin?

$$\frac{3}{10} + \frac{2}{10} = \frac{5}{10} = \frac{1}{2}$$

4. A bag contains 7 red marbles, 6 white marbles, and 4 blue marbles. If one marble is picked from the bag, find $P(\text{red or blue})$.

$$\frac{7}{17} + \frac{4}{17} = \frac{11}{17}$$

5. If a dart hits the target at random, what is the probability that it will land in the shaded region?



Drawing not to scale

$$\frac{2^2 \pi}{10^2 \pi} = \frac{4}{100} = \frac{1}{25}$$

For problems 6-7, suppose Q and R are independent events. Find $P(Q \text{ and } R)$.

6. $P(Q) = 0.77, P(R) = 0.73$ $.77 \times .73 = .5621$

7. $P(Q) = \frac{4}{15}, P(R) = \frac{8}{13}$ $\frac{4}{15} \cdot \frac{8}{13} = \frac{32}{195}$

8. Two urns contain white balls and yellow balls. The first urn contains 5 white balls and 2 yellow balls and the second urn contains 5 white balls and 8 yellow balls. A ball is drawn at random from each urn. What is the probability that both balls are white?

$$\frac{5}{7} \cdot \frac{5}{13} = \frac{25}{91}$$

For problem 9, suppose S and T are mutually exclusive events. Find $P(S \text{ or } T)$.

9. $P(S) = \frac{3}{4}, P(T) = \frac{2}{11}$ $\frac{3}{4} + \frac{2}{11}$

$$\frac{33}{44} + \frac{8}{44} = \frac{41}{44}$$

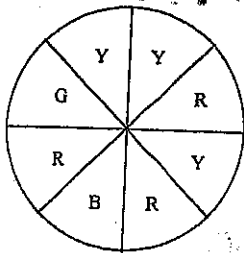
10. Use the frequency table. Find the probability that a person goes to the movies at least 5 times a month. Round to the nearest thousandth.

Trips to the Movies

Number of Movies	Number of Moviegoers
More than 7 movies per month	80
5-7 movies per month	134
2-4 movies per month	213
Less than 2 movies per month	247
Total	674

$$\frac{214}{674} = \frac{107}{337} = .318$$

11. The dartboard has 8 sections of equal area. The letters represent the colors red (R), yellow (Y), blue (B), and green (G). Use a table to show the probability distribution for a dart that hits the board at a random location.



EVENT	Y	R	B	G
FREQ	3	3	1	1
Prob.	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

12. The table shows the results of a survey of students in two math classes. Round answers to the nearest thousandth.

Did You Watch More Than One Hour of TV Last Night?

	Yes	No
3rd period class	9	9
6th period class	7	5

- a. Find $P(\text{not watching more than one hour of TV} \mid 3^{\text{rd}} \text{ period class})$
 b. Find $P(\text{not watching more than one hour of TV or } 3^{\text{rd}} \text{ period class})$
 c. Find $P(\text{watching more than one hour of TV} \mid 6^{\text{th}} \text{ period class})$
 d. Find $P(\text{watching more than one hour of TV and } 6^{\text{th}} \text{ period class})$

$$\frac{9}{18} = \frac{1}{2}$$

$$\frac{4}{30} + \frac{9}{30} - \frac{9}{30} = \frac{23}{30}$$

$$\frac{7}{12}$$

13. The table shows the results of a survey of college students. Round answers to the nearest thousandth.

First Class of the Day for College Students

	Male	Female
Humanities	95	85
Science	85	60
Other	50	100

- a. Find $P(\text{Humanities and Female})$
 b. Find $P(\text{Science or Male})$
 c. Find $P(\text{Humanities} \mid \text{Male})$
 d. Find $P(\text{Other} \mid \text{Female})$

$$a). \frac{85}{475} = \frac{17}{95}$$

$$b). \frac{145}{475} + \frac{230}{475} - \frac{85}{475} = \frac{290}{475}$$

$$c). \frac{95}{230} = \frac{19}{46}$$

$$d). \frac{100}{200} = \frac{1}{2}$$

17

22

14. Each person in a group of students was identified by year and asked when he or she preferred taking classes: in the morning, afternoon, or evening. The results are shown in the table. Find the probability that the student preferred morning classes given he or she is a Senior. Round to the nearest thousandth.

When Do You Prefer to Take Classes?

	Freshman	Sophomore	Junior	Senior
Morning	13	15	20	11
Afternoon	15	5	17	16
Evening	11	7	3	14

$$\frac{11}{41}$$

15. The probability that a city bus is ready for service when needed is 83%. The probability that a city bus is ready for service and has a working radio is 70%. Find the probability that a bus chosen at random has a working radio given that it is ready for service. Round to the nearest tenth of a percent.

$$\frac{.7}{.83} = .84 \text{ or } 84\%$$

16. In how many different orders can you line up 5 cards on a shelf?

$$5! = 120$$

In problems 17-20, evaluate the expression.

17. $7! = 5040$

18. ${}^6C_3 = 20$

19. ${}^9P_7 = 181,440$

20. $\frac{{}^6P_4}{{}^3P_2} = \frac{360}{6} = 60$

21. There are 11 students participating in a spelling bee. In how many ways can the students who go first, second, third, and fourth in the bee be chosen?

$${}_{11}P_4 = 7920$$

22. In how many ways can 5 singers be selected from 10 who came to an audition?

$${}_{10}C_5 = 252$$

23. There are 9 people on the ballot for regional judges. Voters can vote for any 4. Voters can choose to vote for 0, 1, 2, 3 or 4 judges. In how many different ways can a person vote?

$${}^9C_4 + {}^9C_3 + {}^9C_2 + {}^9C_1 + {}^9C_0 = 256$$

In problem 24, expand the binomial using Pascal's Triangle.

24. $(s - 5v)^5$

$$s^5 - 25s^4v + 250s^3v^2 - 1250s^2v^3 + 3125sv^4 - 3125v^5$$

In problem 25, expand the binomial using Binomial Theorem.

25. $(2x + y)^6$

$$64x^6 + 192x^5y + 240x^4y^2 + 160x^3y^3 + 60x^2y^4 + 12xy^5 + y^6$$

In problem 26, find the 5th term using the Binomial Theorem.

26. $(3a - b)^{12}$

$${}^{12}C_4 \cdot (3a)^8 \cdot (-b)^4 = 495 \cdot 6561a^8 \cdot b^4 = 3247695a^8b^4$$

27. 6% of the circuit boards assembled at a certain production plant are defective. If five circuit boards are chosen at random, what is the probability that exactly two are defective?

18
24

Algebra II, Probability Review

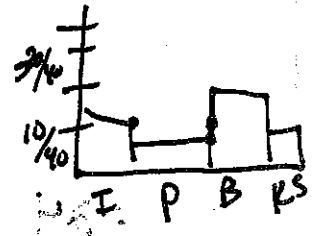
Name _____

* For more practice, see last page of review worksheet for suggested pages in book.

1) A reptile store has 11 iguanas, 6 pythons, 15 boas, and 8 king snakes.

a) Organize this data in a frequency table and graph the probability distribution for the reptiles in the store.

	I	P	B	KS
F	11	6	15	8
Prob.	$\frac{11}{40}$	$\frac{6}{40}$	$\frac{15}{40}$	$\frac{8}{40}$



b) Find the probability that one reptile chosen at random is a python.

$$\frac{6}{40} = \frac{3}{20}$$

Use the results of the survey below to find each conditional probability.

How many radios do you have in your home?

	0 radios	1 radio	2 radios	3+ radios
Male respondents	1	5	16	10
Female respondents	1	9	13	12

2) $P(\text{male} | 2 \text{ radios})$

$$\frac{16}{29}$$

3) $P(2 \text{ radios} | \text{male})$

$$\frac{16}{32} = \frac{1}{2}$$

4) $P(0 \text{ radios} | \text{female})$

$$\frac{1}{35}$$

5) $P(0 \text{ or } 1 \text{ radio} | \text{male})$

$$\frac{6}{32} = \frac{3}{16}$$

Multiple Choice.

6) Which of these is equal to 0.32 according to the tree diagram?

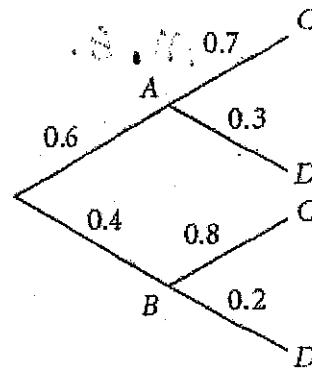
A. $P(C \text{ and } B) = (.4)(.8) = .32$

B. $P(C | B) = \frac{.32}{.4} = .8 = 80\%$

C. $P(B | C) = \frac{.32}{.8} = .4 = 40\%$

D. $P(A \text{ and } C)$

$$.6 \times .7 = .42$$



Suppose you select a number at random from the sample space $\{-3, -2, -1, 0, 1, 2, 3, 4\}$. Find each probability.

7) $P(\text{the number is positive})$

$$\frac{4}{8} = \frac{1}{2}$$

8) $P(\text{the number is even})$

$$\frac{3}{8}$$

9) $P(\text{the number is less than } 2)$

$$\frac{5}{8}$$

10) $P(\text{the number is a multiple of } 3)$

$$\frac{2}{8} = \frac{1}{4}$$

A jar contains four blue marbles and two red marbles. Suppose you choose a marble at random, and do not replace it. Then you choose a second marble. Find the probability of each event.

11) You select a red marble and then a blue marble.

$$\frac{2}{6} \cdot \frac{4}{5} = \frac{8}{30} = \frac{4}{15}$$

12) You select a red marble and then a red marble.

$$\frac{2}{6} \cdot \frac{1}{5} = \frac{2}{30} = \frac{1}{15}$$

Evaluate each expression.

13) $4! = 24$

14) $\frac{8!}{6!2!} = 28$

15) ${}_6C_3 = 20$

16) ${}_7P_2 = 7 \cdot 6 = 42$

Indicate whether each situation involves combination or permutation. Then solve.

17) You must complete the following chores: take out the trash, wash the dishes, vacuum the carpet, clean your room, make your bed, feed the fish. In how many different ways can you do the chores?

$${}_6P_6 = 720$$

18) A jar of candy contains 8 different candies. Your teacher allows you to choose 3 candies from the jar. In how many different ways can you choose them?

$${}_8C_3 = \frac{8!}{3!(5!)} = 56$$

Integers from 1 to 100 are randomly selected. State whether the events are mutually exclusively.

19) Even integers and multiples of 3
N.M.E

20) Integers less than 40 and integers greater than 50
M.E.

21) Odd integers and multiples of 4
M.E.

22) Integers less than 50 and integers greater than 40
N.M.E.

Classify each pair of events as dependent or independent.

23) A member of the junior class and a second member of the same class are randomly selected.
Dependent

24) A member of the junior class and a member of another class are randomly chosen.
Independent

25) The sum and the product of two rolls of a number cube.
Independent

EXTRA PRACTICE - Look at the Chapter Review in the book on pages:

Pg. 49 Section 1.6

Pg. 355 Section 6.7

Pg. 529 Section 9.7

Pg. 687 - 689 Sections 12.1 - 12.2

(ALL the Answers can be checked since they are in the back of the book!)