

UNIT - PROBABILITY REVIEW

1. There are three choices of jellybeans - grape, cherry and orange. If the probability of getting a grape is $\frac{3}{10}$ and the probability of getting cherry is $\frac{1}{5}$, what is the probability of getting orange?

$$\frac{3}{10} + \frac{2}{10} = \frac{5}{10} \quad \frac{10}{10} - \frac{5}{10} = \frac{5}{10} = .5 = 50\%, \text{ or } \frac{1}{2} \quad \square$$

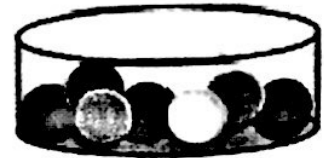
2. The container below contains 2 gray, 1 white, and 6 black marbles. Without looking, if Eric chooses a marble from the container, will the probability be closer to 0 or to 1 that Eric will select a white marble? A gray marble? A black marble? A blue marble? Justify each of your predictions and qualify each as impossible, unlikely, equally likely, likely, or definite.

WHITE: $\frac{1}{9}$ 0 unlikely

GRAY: $\frac{2}{9}$ 0 unlikely

BLACK: $\frac{6}{9}$ 1 likely

BLUE: $\frac{0}{9}$ 0 impossible



3. Suppose we toss a coin 50 times and have 27 heads and 23 tails. We define a head as a success.

The relative frequency of heads is: $\frac{27}{50} = 54\%$

The theoretical frequency of heads is (in ratio and percent form):

$$\frac{25}{50} = .5 = 50\%$$

Rel. Freq.
 $\frac{\text{occurrence (\#)}}{\text{total possible outcomes}}$

4. You are given a bag that contains 4 green marbles, 6 red marbles, and 10 blue marbles. Use this bag to answer the questions below.

What would be the theoretical probability of drawing a red marble? How many red marbles would you expect if you if you conducted the experiment 500 times?

$$\frac{6}{20} = \frac{3}{10} = .3 = 30\% \quad \frac{3 \times 50}{10} = \frac{x}{500} \quad x = 150$$

What would be the theoretical probability of drawing a green or blue marble? How many red marbles would you expect if you if you conducted the experiment 500 times?

Green: $\frac{4}{20} = \frac{1}{5} = .25 = 25\%$
 Blue: $\frac{10}{20} = \frac{1}{2} = .5 = 50\%$ 150

Jason uses your bag and makes 50 draws with the following results. How does the experimental probability of drawing a red marble compare to the theoretical probability of drawing red?

Jason's results:

Red	Green	Blue
25	15	10

E.P. $\frac{25}{50} = \frac{1}{2} = .5 = 50\%$
 T.P. $\frac{6}{20} = \frac{3}{10} = .3 = 30\%$

E.P. is higher than the T.P.
 $50\% > 30\%$

5. A bag contains 100 marbles, some red and some purple. Suppose a student, without looking, chooses a marble out of the bag, records the color, and then places that marble back in the bag. The student has recorded 9 red marbles and 11 purple marbles. Using these results, predict the number of red marbles in the bag.

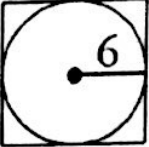
$$\frac{9}{20} = .45 = 45\% \quad 100 \times .45 = 45 \text{ red marbles}$$

6. If Mary chooses a point in the square, what is the probability that it is not in the circle?

$\square A = lw$
 $A = 12 \cdot 12$
 $A = 144$

$\circ A = \pi r^2$
 $A = \pi 6^2$
 $A = 36\pi$
 $A = 113.04$ (area of \circ)

$\frac{144 - 113.04}{144} = \frac{30.96}{144} = .215 = 21.5\%$



7. Jason is tossing a fair coin. He tosses the coin ten times and it lands on heads eight times. How does the experimental probability of getting heads compare to the theoretical probability?

$E.P. = \frac{8}{10} = .8 = 80\%$
 $T.P. = \frac{5}{10} = .5 = 50\%$

$E.P. \text{ is greater than } T.P.$
 $80\% > 50\%$

8. A bag contains 5 marbles. There is one red marble, two blue marbles and two purple marbles. Use this bag to answer the following questions.

Create an area model to show possible outcomes from two draws if the marble is replaced each time.

2nd pick

	R	B	B	P	P
R	RR	RB	RB	RP	RP
B	BR	BB	BB	BP	BP
B	BR	BB	BB	BP	BP
P	PR	PB	PB	PP	PP
P	PR	PB	PB	PP	PP

Using your model, what is the probability of drawing two purple marbles?

$$\frac{4}{25} = .16 = 16\%$$

Can you find the probability of getting two purple marbles another way without using the model?

$$\frac{2}{5} \cdot \frac{2}{5} = \frac{4}{25} = .16 = 16\%$$

What is the probability of drawing a blue and then a purple marble without replacement?

$$\frac{2}{5} \cdot \frac{2}{4} = \frac{4}{20} = \frac{2}{10} = .2 = 20\%$$

What is the probability of drawing two blue marbles with replacement?

$$\frac{2}{5} \cdot \frac{2}{5} = \frac{4}{25} = .16 = 16\%$$

What is the probability of drawing two red marbles without replacement?

$$\frac{1}{5} \cdot \frac{0}{4} = \frac{0}{20} = 0 = 0\%$$

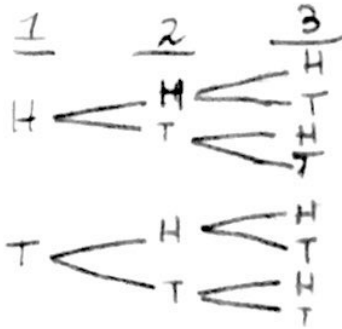
What is the probability of drawing a red, blue and then purple marble with replacement?

$$\frac{1}{5} \cdot \frac{2}{5} \cdot \frac{2}{5} = \frac{4}{125} = .032 = 3.2\%$$

What is the probability of drawing a red, blue, blue then purple marble without replacement?

$$\frac{1}{5} \cdot \frac{2}{4} \cdot \frac{1}{3} \cdot \frac{2}{4} = \frac{1}{30} = .033 = 3.3\%$$

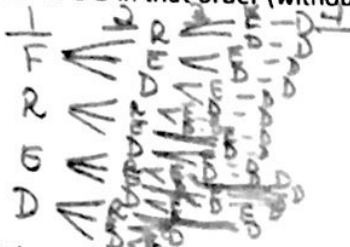
9. A fair coin will be tossed three times. What is the probability that two heads and one tail in any order will result?



Outcomes		
H	H	H
H	H	T
H	T	H
H	T	T
T	H	H
T	H	T
T	T	H
T	T	T

$$\frac{3}{8} = .375 = 37.5\%$$

10. If each of the letters F-R-E-D is written on a tile and drawn at random from a bag, what is the probability of drawing the letters F-R-E-D in that order (without replacement)?



$$\frac{1}{4} \cdot \frac{1}{3} \cdot \frac{1}{2} \cdot \frac{1}{1} = \frac{1}{24} = .042 = 4.2\%$$

11. Find the probability of flipping a coin and getting heads then drawing a card from a 52 card deck and getting a red card.

$$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4} = .25 = 25\%$$

12. Find the probability of getting a face card when drawing at random from a deck of cards.

$$\frac{16}{52} = .308 = 30.8\%$$

13. Find the probability of drawing a "10" from a deck of cards.

$$\frac{4}{26} = .154 = 15.4\%$$

14. Find the probability of rolling a number greater than two on a fair number cube.

$$\frac{4}{6} = .667 = 66.7\%$$

15. Find the probability of rolling an odd number on a fair number cube.

$$\frac{1}{2} = .5 = 50\%$$

UNIT 6 REVIEW SHEET

16. A spinner labeled one through four is spun 20 times. It lands on two 5 times. How does the theoretical probability compare to the experimental probability?

T.P. = $\frac{1}{4} = .25 = 25\%$
 (of landing on 2)

E.P. = $\frac{5}{20} = \frac{1}{4} = .25 = 25\%$
 (of landing on 2)

- A. theoretical and experimental probability are equal
- B. theoretical probability is less than the experimental probability.
- C. theoretical probability is greater than the experimental probability
- D. it cannot be determined from the data that is given

17. Andrew went to a sandwich shop for lunch. He was given the choices below. If he chooses one sandwich, one side, and a drink. How many different combinations can he choose from?

SANDWICH	SIDES	DRINK
Ham	Chips	Juice
Cheese	Potato Salad	Soda
Turkey		Water
Egg Salad		

$4 \cdot 2 \cdot 3 = 24$

18. Jamie's piggy bank contains 14 quarters, 11 dimes, 5 nickels, and 20 pennies. Jamie shakes out one coin at a time from his bank and does not replace it. What is the probability that he will shake out a nickel followed by a penny?

A. about 1%

B. about 4%

C. about 8%

D. about 10%

Nickel: $\frac{5}{50} = \frac{1}{10}$ Penny: $\frac{20}{49}$

$\frac{1}{10} \cdot \frac{20}{49} = \frac{2}{49} = .041 = 4.1\%$

19. Mrs. Summers cut up the letters in the word Missouri (M I S S O U R I) and placed them in a bag. Suppose you do not replace the first letter before drawing the second. What is the probability of drawing an M and then drawing an I?

$\frac{1}{8} \cdot \frac{1}{7} = \frac{1}{56} = .018 = 1.8\%$

20. A bag contains 4 blue and 6 red marbles. You will draw a marble, and then draw a second and third marble without replacing any marbles. Find the experimental probability of drawing 3 blue marbles.

$\frac{4}{10} \cdot \frac{3}{9} \cdot \frac{2}{8} = \frac{2}{5} \cdot \frac{1}{3} \cdot \frac{1}{4} = \frac{1}{30} = .033 = 3.3\%$

21. Bill flipped a coin four times. The first three times it landed on heads. What is the probability that on the fourth time it will land on heads?

T.P. = $\frac{1}{2} = .5 = 50\%$

E.P. = $\frac{3}{3} = 1 = 100\%$