Advanced Functions – Multiplying Probabilities WS Name: Key

I. A die is rolled three times. Find each probability. Express your answers as a percent.

1.) P (three 4's) $\frac{1}{6}\cdot\frac{1}{6}\cdot\frac{1}{6}=\frac{1}{216}=$ .46%

2.) P (no 4's) $\frac{5}{6}\cdot\frac{5}{6}\cdot\frac{5}{6}=\frac{125}{216}=$ 57.9%

3.) P (2 , then 3 , then 1) $\frac{1}{6}\cdot\frac{1}{6}\cdot\frac{1}{6}=\frac{1}{216}=$ .46%

4.) P (three different even numbers) $\frac{3}{6}\cdot\frac{2}{6}\cdot\frac{1}{6}=\frac{6}{216}=$ 2.8%

5.) P (any number, then 5 , then 3) $\frac{6}{6}\cdot\frac{1}{6}\cdot\frac{1}{6}=\frac{6}{216}=$ 2.8%

6.) P (even number, then odd number, then 1) $\frac{3}{6}\cdot\frac{3}{6}\cdot\frac{1}{6}=\frac{9}{216}=$ 4.2%

II. There are 3 nickels, 2 dimes, and 5 quarters in a purse. Three coins are selected in succession at random. Find the probability and express your answers as a percent. 10 coins total

7.) P (nickel, dime , quarter) ; no replacement $\frac{3}{10}\cdot\frac{2}{9}\cdot\frac{5}{8}=\frac{30}{720}=$ 4.2%

8.) P (nickel , dime , quarter) ; replacement $\frac{3}{10}\cdot\frac{2}{10}\cdot\frac{5}{10}=\frac{30}{1000}=$ 3%

9.) P (2 nickels , 1 quarter) ; no replacement $\frac{3}{10}\cdot\frac{2}{9}\cdot\frac{5}{8}=\frac{30}{720}=$ 4.2%

10.) P (3 dimes) ; replacement $\frac{3}{10}\cdot\frac{3}{10}\cdot\frac{3}{10}=\frac{27}{1000}=$ 2.7%

11.) P (3 dimes) ; no replacement 0% (only 2 dimes)

12.) P (2 quarters . 1 dime) ; no replacement $\frac{5}{10}\cdot\frac{4}{9}\cdot\frac{2}{8}=\frac{40}{720}=$ 5.6%

13.) P (2 dimes , 1 nickel) ; replacement $\frac{2}{10}\cdot\frac{2}{10}\cdot\frac{3}{10}=\frac{12}{1000}=$ 1.2%

14.) P (quarter , 2 pennies) ; no replacement $\frac{5}{10}\cdot\frac{0}{9}=$ 0% (no pennies)

III. Determine whether the events are independent or dependent. The find each probability. Express your answers as a percent.

15.) A mixed box of herbal teabags contains 2 lemon teabags, 3 orange-mango teabags, 3 chamomile teabags, and 1 apricot-ginger teabags. Kevin choices 2 teabags at random to bring two work with him. What is the probability that he first chooses lemon teabag and then a chamomile teabag? 9 bags total

D → $P(L,C)=\frac{2}{9}\cdot\frac{3}{8}=\frac{6}{72}=$ 8.3%

16.) Serena is creating a painting. She wants to use 2 more colors. She chooses randomly from 6 shades of red, 10 shades of green, 4 shades of yellow, 4 shades of purple, and 6 shades of blue. What is the probability that she chooses 2 shades of green? 30 shades total

D → $P(2\text{green})=\frac{10}{30}\cdot\frac{9}{29}=\frac{90}{870}=$ 10.3%

17.) Kershel's mother is shopping at a bakery. The owner offers Kershel a cookie from a jar containing 22 chocolate chip cookies, 18 sugar cookies, and 15 oatmeal cookies. Without looking, Kershel selects one, drops it back in, and then randomly selects another. What is the probability that neither selection was a chocolate chip cookie? 55 cookies total

I → $P(\text{neither choc. chip})=\frac{33}{55}\cdot\frac{33}{55}=\frac{1089}{3025}=$ 36%

18.) The Connor's are planning a 3-day vacation to the mountains. A long-range forecast reports that the probability of rain each day is 10%. Assuming that the daily probabilities of ran are independent, what is the probability that there is no rain on the first two days, but that it rains on the third day?

I → $P(\text{no ran, no ran, rain})=.90\times.90\times.10=$ 8.1%

19.) There are 3 miniature chocolate bars and 5 peanut butter cups in a candy dish. Judie chooses 2 of them at random. What is the probability that she chooses 2 miniature chocolate bars? 8 bars total

D → $P(2\text{ choc bars})=\frac{3}{8}\cdot\frac{2}{7}=\frac{6}{56}=$ 10.7%

20.) A bowl contains 7 red, 4 blue, and 6 yellow marbles. If 3 marbles are selected in succession, what is the probability of selecting blue, then yellow, then red, if replacement occurs each time? 17 marbles total

I → $P(B,Y,R)=\frac{4}{17}\cdot\frac{6}{17}\cdot\frac{7}{17}=\frac{168}{4913}=$ 3.4%

IV. Anita has a list of 20 jobs around the house to do, and plans to do 3 of them today. She assigns each job a number from 1 to 20, and sets her calculator to generate random numbers from 1 to 20, which can reoccur. Of the jobs, 3 are outside, and the rest are inside. Express your answer to 3 decimals if needed.

3/20 17/20

21.) Sketch a tree diagram showing all of the possibilities that the first three numbers generated correspond to inside jobs or outside jobs. Use it to find the probability that the first two numbers correspond to inside jobs, and the third to an outside job. $P(I,I,O)=\frac{17}{20}\cdot\frac{17}{20}\cdot\frac{3}{20}=\frac{867}{8000}=$ .108375 (10.8%)

22.) What is the probability that the number generated corresponds to an outside job three times in a row?

$P(O,O,O)=\frac{3}{20}\cdot\frac{3}{20}\cdot\frac{3}{20}=\frac{27}{8000}=$ .003375 (.34%)

Adv. Functions : Multiplying Prob. WS

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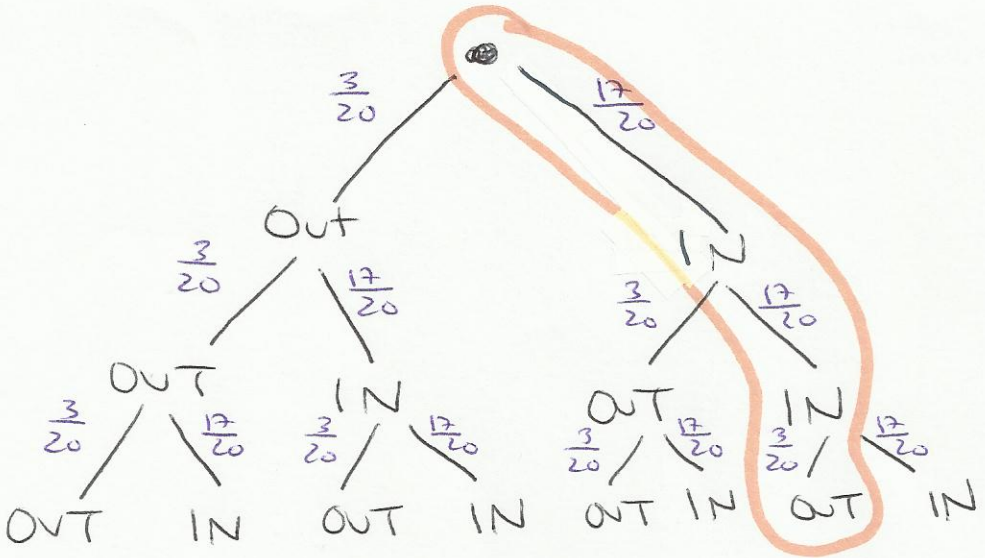

$$P(I, I, O) = \frac{17}{20} \cdot \frac{17}{20} \cdot \frac{3}{20} = \frac{867}{8000} = \boxed{.108375\ (10.8\%)}$$