

Worksheet -- Probability Test Review

Key  
Fall 2017

1. For a particular car model, a car dealer offers 6 versions of the model, 18 body colors, and 7 upholstery colors. How many different possibilities are available for that model?

$$6 \cdot 18 \cdot 7 = 756$$

2. There are five routes from Albany to Briscoe, six from Briscoe to Chadwick, and three from Chadwick to Dover. How many different routes are there from Albany to Dover via Briscoe to Chadwick?  $5 \cdot 6 \cdot 3 = 90$

3. There are 5 frozen juice bars and 8 frozen yogurt bars in the freezer. Dana reaches in and grabs 2 without looking. Find the probability of each selection:

a.  $P(2 \text{ juice bars}) = P(\text{juice and juice}) = \frac{5}{13} \cdot \frac{4}{12} = \frac{5}{39} \approx .128$

b.  $P(1 \text{ of each kind of bar}) = P(\text{juice and yogurt}) = \frac{5}{13} \cdot \frac{8}{12} = \frac{10}{39} \approx .256$

4. Robert's bank contains 6 pennies, 5 nickels, and 8 dimes. His parents tell him that he can spend the first three coins that he can shake out of the bank. Find the probability of each selection:

a.  $P(1 \text{ dime, 1 nickel, and 1 penny}) = \frac{8}{19} \cdot \frac{5}{18} \cdot \frac{6}{17} = \frac{40}{969} \approx .041$

b.  $P(2 \text{ dimes, 1 quarter}) = \frac{8}{19} \cdot \frac{7}{18} \cdot \frac{0}{17} = 0$

5. A multiple choice test contains five questions. There are four possible answers for each question. In how many ways can a student answer the questions on the test if every question is answered?  $4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 = 1024$

6. There are 3 nickels, 2 dimes, and 5 quarters in a jar. Find the probability of randomly selecting 1 nickel, 1 dime, and 1 quarter in that order with replacement.

$$\frac{3}{10} \cdot \frac{2}{10} \cdot \frac{5}{10} = \frac{3}{100} \approx .03$$

7. A red, a green and a yellow die are tossed. What is the probability that none of the three dice shows a 4?  $\frac{5}{6} \cdot \frac{5}{6} \cdot \frac{5}{6} = \frac{125}{216} \approx .579$

8. From a standard deck of 52 cards, 2 cards are selected. What is the probability of selecting 2 black cards, with replacement?  $\frac{26}{52} \cdot \frac{26}{52} = \frac{1}{4} = .25$

9. Two dice are tossed. Find the probability of getting a 3 and any other number.

$$\frac{1}{6} \cdot \frac{5}{6} = \frac{5}{36} \approx .139$$

10. A bag contains 41 dyed eggs: 14 yellow, 10 green, and 17 red. What is the probability of selecting a green or a red egg?  $\frac{10}{41} + \frac{17}{41} = \frac{27}{41} \approx .659$

11. A card is drawn from a deck of cards. What is the probability of having drawn a black card or an ace?  $\frac{26}{52} + \frac{4}{52} - \frac{2}{52} = \frac{7}{13} \approx .538$

12. Two cards are drawn from a standard deck of cards. What is the probability of having drawn 2 spades or 2 face cards?  $P(\text{spade} \& \text{spade}) + P(\text{face and face}) - P(\text{spade} \& \text{face})$

$$\frac{13}{52} \cdot \frac{12}{51} + \frac{12}{52} \cdot \frac{11}{51} - \frac{3}{52} \cdot \frac{2}{51} = \frac{47}{442} \approx .106$$

13. 4 yellow and 9 blue marbles are in a bag. Three are selected at random without replacement. What is the probability that all three are yellow or all three are blue?

$$\frac{4}{13} \cdot \frac{3}{12} \cdot \frac{2}{11} + \frac{9}{13} \cdot \frac{8}{12} \cdot \frac{7}{11} = \frac{4}{13} \cdot .308$$

14. 3 green, 4 yellow and 9 blue marbles are in a bag. One marble is selected randomly. What are the odds for selecting a blue marble? What are the odds against selecting a green marble?

$$9:7 \quad 13:3$$

15. An army is conducting an experiment as to the time required to assemble a new rifle consisting of eight parts that could be assembled in any order. If the army is interested in the least time-consuming method of assembly, then how many different assemblies would it need to test?

$${}_8P_8 = 40,320$$

16. The probability that your friends like chocolate ice cream is 70%. The probability that your friends like chocolate and strawberry ice cream is 35%. Find the probability that your friends like strawberry ice cream given that they like chocolate ice cream too.

$$p(\text{strawberry} | \text{chocolate}) = \frac{p(\text{chocolate})}{p(\text{chocolate})} = \frac{.35}{.70} = \frac{1}{2} = .5$$

17. Eight friends are attending the Powell Fan Club meeting. Henry buys eight subs at Harris Teeter, selecting each one randomly from a display. The probability that a sandwich is suitable for vegetarians is independently 0.3 for each sandwich. Find the probability that of the 8 sandwiches, the number suitable for vegetarians is

a. exactly 2  $\text{binompdf}(8, .3, 2) = .296$

b. 2 or fewer  $\text{binomcdf}(8, .3, 2) = .552$

c. more than 3  $1 - \text{binomcdf}(8, .3, 3) = .194$

18. For problem #17, how many of the 8 sandwiches would you expect to be suitable for vegetarians?

$$8(.3) = 2.4$$

19. A representative from the National Football League's Marketing Division randomly selects people on a random street in Kansas City, Kansas until he finds a person who attended the last home football game. Let  $p$ , the probability that he succeeds in finding such a person, equal 0.20. And, let  $X$  denote the number of people he selects until he finds his first success.

- a. What is the probability that the marketing representative must select 4 people before he finds one who attended the last home football game?

- b. What is the probability that the marketing representative must select more than 6 people before he finds one who attended the last home football game?

- c. How many people should we expect (that is, what is the average number) the marketing representative needs to select before he finds one who attended the last home football game?

a.  $\text{geometpdf}(.20, 4) = .102$

b.  $1 - \text{geometcdf}(.20, 6) = .262$

c.  $\frac{1}{.2} = 5$