

Name: Key
Date: _____ Hour: _____

Chapter 12 Review

Calculate the following.

1. ${}_{10}P_3$

720

2. ${}_{10}C_3$

120

3. ${}_{17}P_4$

57120

4. How many license plates of 4 digits followed by 2 letters are possible if $\#\#\#\# LL$

a. Repetition is allowed

$10^4 \cdot 26^2$

6,760,000

b. Repetition is not allowed

$10 \cdot 9 \cdot 8 \cdot 7 \cdot 26 \cdot 25$

3,276,000

5. A card is drawn randomly from a standard 52-card deck. Find the following:

a. $P(\text{a spade})$

$\frac{13}{52} = \frac{1}{4}$

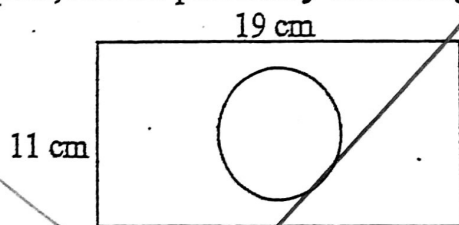
b. $P(\text{a red face card})$

$\frac{6}{52} = \frac{3}{26}$

c. $P(\text{a six})$

$\frac{4}{52} = \frac{1}{13}$

Optional)
6. A dart is thrown at the rectangular dartboard shown below. The radius of the circular region is 4 cm and the rectangle has the dimensions listed on the drawing. Assuming the dart will randomly hit anywhere on the board, find the probability of it hitting:

a. Anywhere *inside* the entire circular regionb. Anywhere *outside* the entire circular region

7. A weather forecaster is planning his report. There is a 60% probability that it will snow tomorrow or will hail, a 42% probability it will snow, and a 27% probability it will hail. What is the probability that it will snow and hail tomorrow?

$$.60 = .42 + .27 - x$$

$$.09 = \text{SNOW \& HAIL} \quad \text{or } 9\%$$

8. Are the events in question 7 mutually exclusive? Explain why or why not

$$\text{NO} \quad S \& H \neq 0$$

9. If $P(A) = 0.4$, $P(B) = 0.25$, and $P(A \text{ and } B) = 0.35$, find the probability of A or B.

$$P(A \text{ or } B) = .4 + .25 - .35$$

$$= .3$$

10. A card is drawn randomly from a standard 52-card deck. Find the following:

a. $P(\text{a club or a five})$

$$\frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$$

b. $P(\text{a three or an ace})$

$$\frac{4}{52} + \frac{4}{52} - \frac{8}{52} = \frac{2}{13}$$

In questions 11 and 12 cards are drawn randomly from a standard 52-card deck. Find the requested probabilities (a) with replacement and (b) without replacement.

11. $P(\text{two clubs})$

$$\text{a) } \frac{13}{52} \cdot \frac{13}{52} = .0625$$

$$\text{b) } \frac{13}{52} \cdot \frac{12}{51} = .059$$

12. $P(\text{a red face card, then an ace})$

$$\text{a) } \frac{6}{52} \cdot \frac{4}{52} = .0089$$

$$\text{b) } \frac{6}{52} \cdot \frac{4}{51} = .009$$

13. When two dice are rolled, there are 36 possible outcomes. If event A is obtaining a roll that adds up to seven, find $P(A')$.

$$1 - P(A) = 1 - \frac{6}{36} = \frac{36}{36} - \frac{6}{36} = \frac{30}{36} = \frac{5}{6}$$

14. A pizza shop has a choice of 15 different toppings that can be put on their pizzas. Suppose you can afford at most three toppings. How many different pizzas could you possibly order? (no double toppings)

$$3 \text{ or } 2 \text{ or } 1 \text{ or } 0$$

$${}_{15}C_3 + {}_{15}C_2 + {}_{15}C_1 + {}_{15}C_0 = 576$$

15. In a group of people, 35 of which are women and 25 which are men, how many different committees of any 6 people can be chosen?

$$60C_6 = 5,006,386,0$$

16. On vacation, you can visit up to 5 cities AND 4 attractions.

a) How many different trips are possible (order does not matter) to 3 cities and 4 attractions?

$$5C_3 \cdot 4C_4 = 10 \cdot 1 = 10$$

b) What if you just want to visit 6 of the 9 locations?

$$9C_6 = 84$$

c) What if you just want to visit at least 6 of the 9 locations?

$$9C_6 + 9C_7 + 9C_8 + 9C_9 = 130$$

A local TV station sponsored a contest with the following prizes.

| First Place | Second Place | Third Place | Fourth Place | Fifth Place |
|------------------|---------------------------------------|------------------------|-----------------|----------------|
| Trip to New York | Airplane ticket to any US destination | 100 CDs of your choice | Concert tickets | Dinner for two |

17. During the last week of the contest, the names of 20 finalists were drawn. How many ways can the prizes be awarded?

$$20P_5 = 1,860,480$$

18. There are 9 blue and 15 red marbles in a bag. If you draw one marble from the bag at random, what is the probability it is red?

$$\frac{15}{24} = \frac{5}{8}$$

19. Devin has a collection of 40 model vehicles which consists of 25 different cars and 15 different trucks. He randomly selects 8 to display on the shelf in his room. What is the probability that he selects 3 cars and 5 trucks?

$$25C_3 \cdot 15C_5 = 6,906,900$$

20. A card is drawn randomly from a standard 52-card deck. Find the probability of drawing the given card.

a) A card other than 10

$$\frac{48}{52} = \boxed{\frac{12}{13}}$$

b) The ace of hearts

$$\boxed{\frac{1}{52}}$$

c) A diamond

$$= \boxed{\frac{1}{4}}$$

21. The results of rolling a six-sided die 120 times are shown. Use the table to find the experimental probability of each event. Also find the theoretical probability. How do the probabilities compare?

| RESULTS FROM ROLLING A DIE 120 TIMES | | | | | | |
|--------------------------------------|----|----|----|----|----|----|
| Roll | 1 | 2 | 3 | 4 | 5 | 6 |
| Number of Occurrences | 15 | 18 | 20 | 17 | 24 | 26 |

a) P(rolling a 6)

$$\text{Experimental} = \frac{26}{120} = \frac{13}{60} = \boxed{.217}$$

$$\text{Theoretical} = \frac{1}{6} = \boxed{.167}$$

b) P(rolling a number > 2)

$$\text{Experimental} = \frac{87}{120} = \frac{29}{40} = \boxed{.725}$$

$$\text{Theoretical} = \frac{4}{6} = \frac{2}{3} = \boxed{.667}$$