Test 4 Sample Questions

Solve the problem by applying the Fundamental Counting Principle with two groups of items.

1) An apartment complex offers apartments with four different options, designated by A through D. 1) _____

A = number of bedrooms (one through four)
B = number of bathrooms (one through three)
C = floor (first through fifth)
D = outdoor additions (balcony or no balcony)

How many apartment options are available?

A) 240 B) 16 C) 14 D) 120

2) A person can order a new car with a choice of 7 possible colors, with or without air conditioning, with or without heated seats, with or without anti–lock brakes, with or without power windows, and with or without a CD player. In how many different ways can a new car be ordered in terms of these options? 2) _____

A) 112 B) 448 C) 14 D) 224

Evaluate the factorial expression.

3) $\frac{7!}{5!}$ 3) _____

A) 7 B) 2! C) 42 D) $\frac{7}{5}$

Solve the problem.

4) In how many distinct ways can the letters in MANAGEMENT be arranged? 4) _____

A) 226,800 B) 22,680 C) 3,628,800 D) 453,600

Use the Fundamental Counting Principle to solve the problem.

5) You want to arrange 6 of your favorite CD's along a shelf. How many different ways can you arrange the CD's assuming that the order of the CD's makes a difference to you? 5) _____

A) 720 B) 120 C) 30 D) 36

Use the formula for $_nP_r$ to solve.

6) How many arrangements can be made using 2 letters of the word HYPERBOLAS if no letter is to be used more than once? 6) _____

A) 1,814,400 B) 90 C) 45 D) 3,628,800

7) A club elects a president, vice–president, and secretary–treasurer. How many sets of officers are possible if there are 9 members and any member can be elected to each position? No person can hold more than one office. 7) _____

A) 168 B) 3024 C) 252 D) 504

In the following exercises, does the problem involve permutations or combinations? Explain your answer. It is not necessary to solve the problem.

8) Five of a sample of 100 computers will be selected and tested. How many ways are there to make this selection? 8) _____

A) Combinations, because the order of the computers selected does not matter.

B) Permutations, because the order of the computers selected does matter.

Use the formula for ${}_nC_r$ to evaluate the expression.

9) ${}_{10}C_4$ 9) _____

A) 151,200 B) 210 C) 2520 D) 1440

10) $\dfrac{{}_{11}C_3}{{}_6C_4}$ 10) _____

A) $\dfrac{11}{2}$ B) 11 C) 443520 D) $\dfrac{11}{4}$

Use the empirical probability formula to solve the exercise. Express the answer as a fraction. Then express the probability as a decimal, rounded to the nearest thousandth, if necessary.

11) The table below represents a random sample of the number of deaths per 100 cases for a certain illness over time. If a person infected with this illness is randomly selected from all infected people, find the probability that the person lives 3–4 years after diagnosis. 11) _____

Years after Diagnosis	Number deaths
1-2	15
3-4	35
5-6	16
7-8	9
9-10	6
11-12	4
13-14	2
15+	13

A) $\dfrac{7}{120}$; 0.058 B) $\dfrac{35}{100}$; 0.35 C) $\dfrac{1}{35}$; 0.029 D) $\dfrac{35}{65}$; 0.538

Use the theoretical probability formula to solve the problem. Express the probability as a fraction reduced to lowest terms.

12) This problem deals with eye color, an inherited trait. For purposes of this problem, assume that only two eye colors are possible, brown and blue. We use b to represent a blue eye gene and B a brown eye gene. If any B genes are present, the person will have brown eyes. The table shows the four possibilities for the children of two Bb (brown–eyed) parents, where each parent has one of each eye color gene. 12) _____

		Second Parent	
		B	b
First Parent	B	BB	Bb
	b	Bb	bb

Find the probability that these parents give birth to a child who has blue eyes.

A) 0 B) $\frac{1}{2}$ C) $\frac{1}{4}$ D) 1

13) A die is rolled. The set of equally likely outcomes is {1, 2, 3, 4, 5, 6}. Find the probability of getting a 9. 13) _____

A) $\frac{9}{6}$ B) 0 C) 9 D) 1

Solve the problem.

14) A committee consisting of 6 people is to be selected from eight parents and four teachers. Find the probability of selecting three parents and three teachers. 14) _____

A) $\frac{10}{11}$ B) $\frac{2}{33}$ C) $\frac{8}{33}$ D) $\frac{100}{231}$

15) Amy, Jean, Keith, Tom, Susan, and Dave have all been invited to a birthday party. They arrive randomly and each person arrives at a different time. In how many ways can they arrive? In how many ways can Jean arrive first and Keith last? Find the probability that Jean will arrive first and Keith will arrive last. 15) _____

A) 720; 24; $\frac{1}{30}$ B) 120; 6; $\frac{1}{20}$ C) 720; 15; $\frac{1}{48}$ D) 120; 10; $\frac{1}{12}$

A single die is rolled twice. The set of 36 equally likely outcomes is {(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6),}.

16) Find the probability of getting a sum of 2 or 3. 16) _____

A) $\frac{1}{18}$ B) $\frac{1}{12}$ C) $\frac{1}{9}$ D) $\frac{1}{36}$

The chart shows the probability of a certain disease for men by age. Use the information to solve the problem. Express all probabilities as decimals, estimated to two decimal places.

Age	Probability of Disease X
20–24	less than 0.008
25–34	0.009
35–44	0.14
45–54	0.39
55–64	0.42
65–74	0.67
75+	0.79

17) What is the probability that a randomly selected man between the ages of 55 and 64 does not have this disease? 17) _____

A) 0.39 B) 0.58 C) 0.61 D) 0.42

Solve the problem.

18) The probability of a resident of a certain city being the victim of a serious crime at some point in his or her life is approximately $\frac{7}{25}$. What are the odds in favor of a resident of this city never being the victim of a serious crime during his or her lifetime? 18) _____

A) 100 to 28 B) 72 to 28 C) 28 to 72 D) 28 to 100

The following table shows the percentage of children in the U.S. whose parents ae college graduates in one –parent households and two–parent households. Use the information shown to solve the problem.

Percentage of U.S. Children Whose Parents are College Graduates
In One–Parent Households 9%
In Two–Parent Households 29%

19) What are the odds in favor of a child in a one–parent household having a parent who is a college graduate? What are the odds against a child in a one–parent household having a parent who is a college graduate? 19) _____

A) 91 to 9: 9 to 91 B) 9 to 100; 100 to 9
C) 91 to 100; 100 to 91 D) 9 to 91; 91 to 9

Solve the problem.

20) Numbered disks are placed in a box and one disk is selected at random. If there are 7 red disks numbered 1 through 7, and 4 yellow disks numbered 8 through 11, find the probability of selecting a disk numbered 3, given that a red disk is selected. 20) _____

A) $\frac{4}{11}$ B) $\frac{1}{11}$ C) $\frac{1}{7}$ D) $\frac{7}{11}$

Solve the problem that involves probabilities with events that are not mutually exclusive.

21) An ice chest contains 7 cans of apple juice, 9 cans of grape juice, 3 cans of orange juice, and 2 cans of pineapple juice. Suppose that you reach into the container and randomly select three cans in succession. Find the probability of selecting no grape juice. 21) _____

A) $\frac{144}{665}$ B) $\frac{6}{95}$ C) $\frac{22}{133}$ D) $\frac{440}{3087}$

Solve the problem involving probabilities with independent events.

22) A spinner is used for which it is equally probable that the pointer will land on any one of six regions. Three of the regions are colored red, two are colored green, and one is colored yellow. If the pointer is spun once, find the probability it will land on green and then yellow. 22) _____

A) $\frac{1}{9}$ B) $\frac{1}{3}$ C) $\frac{1}{6}$ D) $\frac{1}{18}$

A spinner has a pointer which can land on one of three regions labelled 1, 2, and 3 respectively.

23) Compute the expected value for the number on which the pointer lands if the probabilities for the three regions are $\frac{1}{2}$, $\frac{1}{5}$, and $\frac{3}{10}$ respectively. 23) _____

A) $\frac{21}{10}$ B) $\frac{9}{5}$ C) $\frac{27}{10}$ D) $\frac{13}{10}$

Solve the problem that involves computing expected values in a game of chance.

24) A game is played using one die. If the die is rolled and shows a 2, the player wins $8. If the die shows any number other than 2, the player wins nothing. If there is a charge of $1 to play the game, what is the game's expected value? 24) _____

A) $0.33 B) $7.00 C) –$1 D) -$0.33

Solve the problem.

25) A mining company is considering two sites on which to dig, described as follows: 25) _____

Site A: Profit if diamonds are found: $80 million.
Loss if no diamonds are found: $20 million.
Probability of finding diamonds: 0.2

Site B: Profit if diamonds are found $100 million.
Loss if no diamonds are found $16 million.
Probability of finding diamonds: 0.1

What is the expected profit for each site?

A) site A: $16 million; site B: -$4.4 million
B) site A: $16 million: site B: $10 million
C) site A: $0 million; site B: -$4.4 million
D) site A: $0 million; site B: $10 million