Name_____

1) A 12-sided die can be made from a geometric solid called a dodecahedron. Assume that a fair dodecahedron is rolled.

The sample space is {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}.

Find P(Less than 4).

2) A poll was taken of 14,537 working adults aged 40-70 to determine their level of education. The participants were classified by sex and by level of education. The results were as follows.

Education Level	Male	Female	Total
High School or Less	3199	2729	5928
Bachelor's Degree	3872	3538	7410
Master's Degree	595	482	1077
Ph.D.	71	51	122
Total	7737	6800	14,537

A person is selected at random. Compute the probability that the person is female and has a bachelor's degree.

3) A penny and a nickel are tossed. Each is a fair coin, which means that heads and tails are equally likely.

i. Construct a sample space containing equally likely outcomes. Each outcome should specify the results for both coins.
ii . Find the probability that one coin comes up heads and the other comes up tails.

4) Let E be the event that a corn crop has an infestation of ear worms, and let B be the event that a corn crop has an infestation of corn borers.

Suppose that $P(E) = 0.24$, $P(B) = 0.17$, and $P(E \text{ and } B) = 0.1$. Find the probability that a corn crop has either an ear worm infestation, a corn borer infestation, or both.

5) In a recent semester at a local university, 490 students enrolled in both General Chemistry and Calculus I. Of these students, 66 received an A in general chemistry, 58 received an A in calculus, and 30 received an A in both general chemistry and calculus.

Find the probability that a randomly chosen student received an A in general chemistry or calculus or both.

6) On a recent Saturday, a total of 1087 people visited a local library. Of these people, 249 were under age 10, 479 were aged 10–18, 180 were aged 19–30, and the rest were more than 30 years old.

One person is sampled at random. What is the probability that the person is less than 19 years old?

7) Out of 920 items checked out of a public library, 397 were fiction books, 285 were non-fiction books, and 238 were videos (of any genre). What is the probability that a randomly-selected item was not a video?

8) A geneticist is studying two genes. Each gene can be either dominant or recessive. A sample of 100 individuals is categorized as follows.

	Gene 2 Dominant	Gene 2 Recessive
Gene 1 Dominant	14	26
Gene 1 Recessive	21	39

Given that gene 1 is dominant, what is the probability that gene 2 is dominant?

9) A lot of 1000 components contains 150 that are defective. Two components are drawn at random and tested. Let A be the event that the first component drawn is defective, and let B be the event that the second component drawn is defective.

Find $P(B$ and $A)$.

10) Charles has six songs on a playlist. Each song is by a different artist. The artists are Drake, Post Malone, BTS, Ed Sheeran, Taylor Swift, and Cardi B. He programs his player to play the songs in a random order, without repetition. What is the probability that the first song is by Drake and the second song is by Cardi B?

11) A study suggests that 14.7% of all four-digit personal identification numbers, or PIN codes, have a repeating-digits format such as 2525. Assuming this to be true, if the PIN codes of four people are selected at random, what is the probability that at least one of them will have repeating digits?

1) 1/4
2) 0.243
3) i. {HH, HT, TH, TT}
   ii. 1/2
4) 0.31
5) 0.192
6) 0.67
7) 0.741
8) 0.35
9) 0.0224
10) 0.0333
11) 0.4706