Review 2

Find the indicated probability.

1) A class consists of 46 women and 81 men. If a student is randomly selected, what is the probability that the student is a woman?

A) $\frac{1}{127}$ B) $\frac{46}{81}$ C) $\frac{81}{127}$ D) $\frac{46}{127}$

Estimate the probability of the event.

2) The data set represents the income levels of the members of a country club. Estimate the probability that a randomly selected member earns at least $90,000. Round your answers to the nearest tenth.

104,000 118,000 84,000 125,000 87,000 104,000 90,000 78,000 139,000 174,000 81,000 97,000 132,000 87,000 118,000 111,000 90,000 146,000 75,000 111,000

A) 0.4 B) 0.8 C) 0.6 D) 0.7

Find the indicated probability.

3) If a person is randomly selected, find the probability that his or her birthday is not in May. Ignore leap years.

A) $\frac{334}{365}$ B) $\frac{11}{12}$ C) $\frac{31}{365}$ D) $\frac{31}{334}$

4) If you pick a card at random from a well shuffled deck, what is the probability that you get a face card or a spade?

A) $\frac{25}{52}$ B) $\frac{11}{26}$ C) $\frac{9}{26}$ D) $\frac{1}{22}$

5) A manufacturing process has a 70% yield, meaning that 70% of the products are acceptable and 30% are defective. If three of the products are randomly selected, find the probability that all of them are acceptable.

A) 0.429 B) 0.027 C) 0.343 D) 2.1

6) A study conducted at a certain college shows that 53% of the school's graduates find a job in their chosen field within a year after graduation. Find the probability that among 7 randomly selected graduates, at least one finds a job in his or her chosen field within a year of graduating.

A) 0.143 B) 0.988 C) 0.995 D) 0.530

Solve the problem.

7) There are 8 members on a board of directors. If they must form a subcommittee of 5 members, how many different subcommittees are possible?

A) 6720 B) 120 C) 32,768 D) 56

8) There are 7 members on a board of directors. If they must elect a chairperson, a secretary, and a treasurer, how many different slates of candidates are possible?

A) 210 B) 343 C) 35 D) 5040

Find the indicated probability.

9) A test consists of 10 true/false questions. To pass the test a student must answer at least 7 questions correctly. If a student guesses on each question, what is the probability that the student will pass the test?

A) 0.172 B) 0.945 C) 0.117 D) 0.055

Solve the problem.

10) According to a college survey, 22% of all students work full time. Find the standard deviation for the number of students who work full time in samples of size 16.

A) 1.66 B) 2.75 C) 3.52 D) 1.88

Find the mean, μ, for the binomial distribution which has the stated values of n and p. Round answer to the nearest tenth.

11) n = 20; p = 3/5

A) $\mu = 12.0$ B) $\mu = 11.5$ C) $\mu = 12.7$ D) $\mu = 12.3$

Use the Poisson Distribution to find the indicated probability.

12) The Columbia Power Company experiences power failures with a mean of $\mu = 0.210$ per day. Find the probability that there are exactly two power failures in a particular day.

A) 0.027 B) 0.018 C) 0.036 D) 0.085

Answer Key
Testname: REVIEW 2

1) D
2) D
3) A
4) B
5) C
6) C
7) D
8) A
9) A
10) A
11) A
12) B

Solutions

Problem 1

The total number of students is 46 + 81 = 127. From them 46 are women. Thus the probability that a randomly selected student is a woman is 46/127. The correct answer is "D".

Problem 2

From the 20 members of the club 14 earn at least 90,000. Therefore the estimated probability is 14/20 =0.7. The correct answer is "D".

Problem 3

The probability that a randomly selected person has her/his birthday in May is 31/365. Therefore the probability that the person's birthday is not in May is 1 – 31/365 = 334/365. The correct answer is "A".

Problem 4

Let F **be the event that the chosen card is a face card and let** S **be the event that the chosen card is a spade. Then**

$$p(F)=\frac{12}{52},\quad p(S)=\frac{13}{52},\ \text{and}\ p(F\cap S)=\frac{3}{52}.$$

Applying the formula (page 153)

$$p(F\cup S)=p(F)+p(S)-p(F\cap S)$$

we see that

$$p(F\cup S)=\frac{12}{52}+\frac{13}{52}-\frac{3}{52}=\frac{22}{52}=\frac{11}{26}.$$

The correct answer is "B".

Problem 5

Let A_1, A_2, **and** A_3 **be events that among three randomly selected products the first, the second, and the third, respectively, are acceptable. We can reasonably assume that the events** A_1, A_2, **and** A_3 **are independent (see the rule at the bottom of page 163) and therefore (page 162)**

$$p(A_1\cap A_2\cap A_3)=p(A_1)\,p(A_2)\,p(A_3)=0.7^3=.343$$

The correct answer is "C".

Problem 6

Let E **be the event that among 7 randomly selected graduates, at least one finds a job in his or her chosen field within a year of graduating. Then the complementary event** E' **is the event that none of these graduates will find a job. The probability that a randomly selected graduate will not find a job is** $1 - 0.53 = 0.47$**. Same reasoning as in Problem 5 shows that**

$$p(E')=0.47^7\approx 0.005.$$

Therefore

$$p(E)=1-p(E')\approx 0.995$$

The correct answer is "C".

Problem 7

In this problem 5 objects are chosen from 8. The order of chosen objects does not matter and therefore the number of choices is the number of combinations $_8C_5$**. Using the formula** $_nC_m = {}_nC_{n-m}$ **we see that**

$$_8C_5 = {}_8C_3 = \frac{8\bullet 7\bullet 6}{3!} = 56.$$

The correct answer is "D".

Problem 8

In this problem 3 objects are selected from 7. The order of selected objects matters whence the answer is given by the number of permutations $_7P_3 = 7\bullet 6\bullet 5 = 210.$ **The correct answer is "A".**

Problem 9

This is a problem on binomial probabilities. The probability of success (correct answer) p **is 0.5; respectively the probability of failure is also 0.5. The number of experiments** n **is 10. We are interested in probability that the number of successes is at least 7**

$$P(x \geq 7) = P(x = 7) + P(x = 8) + P(x = 9) + P(x = 10) =$$

$$= {}_{10}C_7\left(\frac{1}{2}\right)^7\left(\frac{1}{2}\right)^3 + {}_{10}C_8\left(\frac{1}{2}\right)^8\left(\frac{1}{2}\right)^2 + {}_{10}C_9\left(\frac{1}{2}\right)^9\left(\frac{1}{2}\right)^1 +$$

$${}_{10}C_{10}\left(\frac{1}{2}\right)^{10}\left(\frac{1}{2}\right)^0 = \frac{120+45+10+1}{1024} = \frac{176}{1024} = \frac{11}{64} \approx 0.172$$

The correct answer is "A".

Problem 10

We apply the formula $\sigma = \sqrt{np(1-p)} = \sqrt{16\bullet 0.22\bullet 0.78} \approx 1.66$**. The correct answer is "A"**

Problem 11

We apply the formula $\mu = np = 20\bullet\frac{3}{5} = 12.$ **The correct answer is "A".**

Problem 12

Applying formula 5 – 9 (Page 230)

$$P(x) = \frac{\mu^x e^{-\mu}}{x!}$$

We see that in our case

$$P = \frac{0.210^2 \bullet e^{-0.210}}{2} \approx 0.16$$

The correct answer is “B”.
Remark. The difference of my answer (0.16) from the answer in “B” (0.18) happened because I used a better approximation to e, $e \approx 2.718281828$.