

HOMWORK 2, ACTS 4306

For each problem, you need to choose a correct answer among 5 given answers. Note that during exam you have 60 minutes to solve 10 problems, so keeping track of time is useful. Another remark: you need to solve correctly (about) 7 problems to get a "pass" so try, during your first run, choose problems that you can solve quickly (for less than 6 minutes) and skip those that will take more than 6 minutes.

1. A survey of 100 households revealed that they all have at least one type of insurance (termite and/or flood) with 60% having termite insurance and 80% having flood insurance. What is the probability that a household chosen at random from the surveyed ones has termite but not flood insurance?

[A] 0.1 [B] $1/8$ [C] $1/5$ [D] 0.5 [E] $6/8$

2. A survey of 100 patients who indicated that they like at least one of the two hospitals A and B, revealed that: 80 patients liked hospital A; 60 patients liked Hospital B. What is the probability that a patient, chosen at random from a group of patients who liked hospital B, did not like hospital A?

[A] 0.1 [B] 0.2 [C] $1/3$ [D] $1/2$ [E] $3/4$

3. Among a large group of patients, recovering from an injury, it is found that 22% visit both therapist and chiropractor, and 12% visit neither of these. The probability that a patient visits a chiropractor exceeds by 0.14 the probability that a patient visits a therapist. What is the probability that a patient visits a therapist.

[A] 0.12 [B] 0.26 [C] 0.36 [D] 0.42 [E] 0.48

4. An urn contains 10 balls: 4 red and 6 blue. A second urn contains 16 red balls and an unknown number of blue balls, A single ball is drawn from each urn. The probability that both balls are the same color is 0.44. Calculate the number of blue balls in the second urn.

[A] 4 [B] 6 [C] 10 [D] 11 [E] 12

5. An insurer offers a health plan to the employees of a large company. As part of this plan, the individual employees may choose exactly two of the supplementary coverages A, B, and C or they may choose no supplementary coverage. The proportions of the company's employees that choose coverages A, B and C are $1/4$, $1/3$ and $5/12$, respectively. Determine the probability that a randomly chosen employee will choose no supplementary coverage.

[A] 0.1 [B] $22/49$ [C] $1/2$ [D] $26/37$ [E] $8/9$

[A] 0.1 [B] 0.2 [C] $1/3$ [D] $1/2$ [E] $3/4$

6. An auto insurance company has 10,000 policyholders. Each policyholder is classified as (belongs to a category):

1. young or old
2. male or female
3. married or single

Of these policyholders, 3000 are young, 4600 are male and 7000 are married. The policyholders can also be classified as 1320 young males, 3010 married males, and 1400 young

married persons. Finally, 600 of the policyholders are young married males. How many of the company's policyholders are young, female and single?

[A] 168 [B] 472 [C]644 [D]880 [E] 904

7. An actuary is studying the prevalence of three health risk factors, denoted by A, B and C, within a population of women. For each of the three factors, the probability is 0.1 that a woman in the population has only this risk factor (and not others). For any two of the three factors, the probability is 0.12 that she has exactly these two risk factors (but not the other). The probability that a woman has all three risk factors, given that she has A and B, is $1/3$. What is the probability that a woman has none of the three risk factors, given that she does not have risk factor A?

[A] $1/10$ [B] $1/6$ [C]0.467 [D]0.487 [E]0.522

8. The probability that a visit to a doctor results in:

- 1) neither labwork nor referral to a specialist is 0.35;
- 2) labwork is 0.4;
- 3) referral to a specialist is 0.3.

Find the probability that a visit results in both labwork and a referral.

[A] 0.05 [B] 0.08 [C]0.12 [D]0.20 [E]0.24

9. You are given $P(A \cup B) = 0.7$ and $P(A \cup B') = 0.9$. Find $P(A)$.

[A] 0.1 [B] 0.2 [C]0.4 [D]0.6 [E]0.7

10. A survey of a group's viewing habits over the last year revealed the following information:

- 1) 28% watched gymnastics
- 2) 29% watched baseball
- 3) 19% watched soccer
- 4) 14% watched gymnastics and baseball
- 5) 12% watched baseball and soccer
- 6) 10% watched gymnastics and soccer
- 7) 8% watched all three sports.

Calculate the percentage of the group that watched none of the three sports during last year.

[A] 22 [B] 38 [C]46 [D]52 [E]58