MATHEMATICS

Homework 10. Sampling Theory

In the questions 1, 2 and 3 you have to choose 1 correct answer from the list, in the questions 4, 5 and 6 you have to give an answer (**a positive integer**).

Question 1 (1 answer)**.** Out of 2000 families with 4 children each, one would expect to have

A at least 1 boy in 1024 families

B exactly 2 boys in 900 families

C 1 or 2 girls in 1000 families

D no girls in 125 families

Question 2 (1 answer)**.** The probability that 200 tosses of a coin will result in

A between 80 and 120 heads inclusive is 0.8962

B less than 90 heads is 0.0687

C less than 85 or more than 115 heads is 0.1286

D exactly 100 heads is 0.0258

Question 3 (1 answer)**.** Let χ^2 be a random variable having a chi-square distribution with the number of degrees of freedom ν. Then the value of χ^2, for which the area of the right-hand tail of the χ^2 distribution is 0.05, is equal to

A 14.7 if $\nu = 9$.

B 30.1 if $\nu = 19$.

C 42.3 if $\nu = 26$.

D 54.8 if $\nu = 36$.

Question 4. In a bowl, there are four apples of diameter 3, 7, 11 and 15 cm. Consider all possible samples of size two that can be drawn with replacement from the bowl. Find the mean of the sampling distribution of means.

Question 5. A manufacturer sends out 1000 boxes, each consisting of 100 pens. If 5% of the pens are normally defective, in how many of the boxes should we expect 98 or more good pens?

Question 6. The lifetimes of television tubes manufactured by a company have a normal distribution with a mean of 2000 hours and a standard deviation of 60 hours. We know that if 10 tubes are selected at random, then the probability that the sample standard deviation will lie between 50 and x hours is 0.49. Find x.