= 4 Math 323   Test 2 March 2,1994

A random variable Y is Poisson with mean $\lambda = 2$. Find the expected value $E(X^2)$. $E(X^2) = 6$ $E(X^2) = 4$ $E(X^2) = 2$ $E(X^2) = 8$ $E(X^2) = 12$ 1:abcde 2:acebd 3:cbaed 4:cadbe

Before accepting a shipment of 30 appliances a large buyer will take a sample of 4 of the 30 and check them carefully for defects. If more than one in the sample are defective the shipment is rejected. Of the 30, it is known that 2 are defective. What is the probability that the shipment will be accepted? $\frac{858}{870}$ $\frac{208}{870}$ $\frac{650}{870}$ $\frac{220}{870}$ $\frac{836}{870}$ 1:bcaed 2:acebd 3:dbcea 4:cadbe

Incoming calls at a local switchboard follow a Poisson distribution with an average rate of 3 calls per minute. If a call comes in at 1:00, what is the probability that the second call comes in by 1:01?
.95 .72 .83 .05 .28 1:cbdae 2:bdaec 3:daecb 4:aecbd

The amount of raw sugar which can be processed in a factory in one day has an exponential distribution with a mean of 5 (tons).What is the probability of processing at least 6 tons in one day? .30 .42 .36 .24 .45 1:acbed 2:cbeda 3:bedac 4:adbec

In problem 4, what is the probability that the factory processes at least 5 tons next week on exactly two of the first three days? .257 .225 .375 .667 .312 1:baced 2:acedb 3:cedba 4:edbac

(Refer to problem 4 again.) How many tons of raw sugar should be stocked daily at the factory so that the probability of running out of sugar that day will be less than .05? (The factory cannot buy fractions of a ton, so round off your answer to the next integer.) 15 12 8 8 21 1:cbade 2:badec 3:adecb 4:decba

A jeweller has received a shipment of 100 diamonds. He knows that 20% of these are of top quality. What is the probability that 50 diamonds must be examined to get 10 of top quality? $\binom{49}{9}(.2)^{10}(.8)^{40}$ $\binom{50}{10}(.2)^{10}(.8)^{40}$ $\binom{49}{10}(.2)^{10}(.8)^{40}$ $\binom{49}{9}(.2)^9(.8)^{40}$ $\binom{50}{10}(.2)^9(.8)^{40}$ 1:bdaec 2:daecb 3:aecbd 4:ecbda

The probability generating function of the random variable X is

$$P(t) = \frac{1}{32}[1 + 5t + 10t^2 + 10t^3 + 5t^4 + t^5].$$

What is the expected value E[X(X-1)]? 5 20 160 4 6 1:edcba 2:daecb 3:aecbd 4:ecbda

The number of trucks crossing the stateline on I-65 southbound follows a Poisson distribution. If the average number of crossings is 60 per hour, what is the probability that at least one truck crosses in the next minute?
.632 .368 .721 .435 .596 1:abcde 2:bcdea 3:cdeab 4:deabc 4:eabcd

In problem 9, what is the probability that 3 trucks cross the line between 12:00 to 12:02 and 2 trucks cross between 1:00 and 1:02? .049 .451 .156 .206 .317 1:bacde 2:acdeb 3:cdeba 4:debac

An archer manages to hit the bulls-eye of his target 30% of the time. What is his probability of hitting the bulls-eye at least 2 times in 10 tries? .851 .912 .741 .776 .827 1:baecd 2:aecdb 3:ecdba 4:cdbae

Let X be a number chosen at random from the real numbers in the interval (5,10). What is the probability that 3 times the distance from X to 5 is greater than 4 times the distance from X to 10? $\frac{3}{7}$ $\frac{6}{7}$ $\frac{4}{7}$ $\frac{5}{7}$ $\frac{2}{7}$ 1:ecbda 2:bdaec 3:dabce 4:dabce

What does the sum
$$\sum_{y=1}^{\infty} y^2(1-p)^{y-1}p$$
equal? $\frac{2-p}{p^2}$ $\frac{1-p}{p^2}$ $\frac{1}{p^2}$ $\frac{1-p}{p}$ $\frac{p}{(1-p)^2}$ 1:baecd 2:cdbae 3:dbaec 4:ecdba

What does the integral
$$\int_0^\infty \frac{1}{9}x^2 e^{-\frac{x}{3}} dx$$
equal? 6 18 9 27 12 1:ecbad 2:decba 3:ecbad 4:cbade

For which value of k is the function,
$$f(x) = \begin{cases} kx^5 & \text{for } 0 \le x \le 1 \\ 0 & \text{elsewhere} \end{cases},$$

a probability density function?

6 $\frac{1}{6}$ $\frac{1}{5}$ 5 7 1:cbeda 2:edacb 3:dacbe 4:cbeda

Which one of the following 5 functions cannot be a probability density function, no matter what value of k we choose? All 5 are defined to be 0 for x less than 1, but for x greater than 1 are defined by $\frac{k}{x}$ $\frac{k}{x^2}$ ke^{-x} kxe^{-x} $\frac{k}{x^3}$ 1:cdeab 2:cdeab 3:deabc 4:abcde

A pair of dice is rolled until a sum of 7 appears. What is the probabilty that this occurs on the third roll? .116 .342 .193 .218 .095 1:adbec 2:becad 3:becad 4:ecadb

The number of radioactive particles emitted from a radioactive substance follows a Poisson distribution with a mean of 2 particles a minute. What is the average time elapsed for 5 particles to be emitted? 2.5 minutes 10 minutes 20 minutes 5 minutes 1.25 minutes 1:edacb 2:edacb 3:dacbe 4:edacb