Mathematics 030 Test 2 Wednesday, February 1, 2006

INSTRUCTIONS: Use an HB pencil on the scantron card. Circle the correct answer to each question on this paper. You must hand in question paper, your scantron card and any rough work sheets. NO CALCULATORS ARE ALLOWED!

1. A pair of (ordinary, six-sided) dice is rolled. Find the probability that the sum of the numbers obtained is less than 6.

A: $\frac{5}{36}$	B: $\frac{6}{36}$	C: $\frac{10}{36}$	D: $\frac{15}{36}$	E: $\frac{16}{36}$

2. A jar contains 3 red balls, 2 green balls and 5 blue balls. You pick a ball at random from the jar, winning \$1 if the ball is red and \$4 if the ball is green; but if the ball is blue you must pay \$3. On the average, what should you expect to lose playing this game?

A: 20 cents	B: 30 cents	C: 50 cents	D: 40 cents	E: 60 cents

3. A random variable X has values $3, -2$ and 4 with respective probabilities $\frac{1}{4}, \frac{1}{8}$ and $\frac{5}{8}$. The mean of X is 3. Find the variance of X.

A: $\frac{174}{8}$	B: $\frac{102}{8}$	C: $\frac{78}{8}$	D: $\frac{30}{8}$	E: $\frac{21}{8}$

4. Determine the value of k so that $f(x) = k\sqrt{x}$ on $[0, 9]$ with $f(x) = 0$ elsewhere can be the probability density function of some continuous random variable X.

A: $\frac{2}{3}$	B: $\frac{3}{2}$	C: $\frac{1}{8}$	D: $\frac{1}{9}$	E: $\frac{1}{18}$

5. Let X be a continuous random variable with probability density function $f(x) = \frac{x^3}{4}$ for $0 \leq x \leq 2$ and $f(x) = 0$ elsewhere. Find prob$\{1 \leq X \leq 2\}$.

A: $\frac{15}{16}$	B: $\frac{3}{4}$	C: $\frac{1}{4}$	D: $\frac{1}{16}$	E: $\frac{1}{2}$

6. In problem 5 above, what is the mean of the random variable X?

A: 8	B: $\frac{4}{5}$	C: $\frac{31}{4}$	D: $\frac{31}{20}$	E: $\frac{32}{20}$

7. The lifetime of a certain battery is exponentially distributed with a mean of 200 hours. What is the probability that it will still be working after 220 hours?

A: $1 - e^{-11/10}$	B: $e^{-11/10}$	C: $1 - e^{-10/11}$	D: $e^{-10/11}$	E: $\frac{10}{11}$

Use the following table in questions 8,9 and 10.

The Standard Normal Random Variable, Values Give Prob$[0 \leq Z \leq z]$

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952

8. Let Z be a standard normal random variable. Find prob$\{Z \geq 1.47\}$.

A: .0708	B: .4292	C: .5708	D: .9292	E: .9853

9. Let Z be a standard normal random variable. Find prob$\{-1.8 \leq Z \leq 2.3\}$.

A: .4534	B: .9534	C: .4282	D: .5252	E: .0252

10. Let X be a normal random variable with $\mu = 8$ and $\sigma = 3$. Find prob$\{9.8 \leq X \leq 14.3\}$.

A: .1662	B: .7436	C: .2436	D: .2564	E: .7078