Mathematics 030 Test 2 Friday, January 28, 2005

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. An experiment consists of tossing three fair coins. Let X be the random variable which counts the number of heads. Find prob$\{X = 2\}$.

A: $\frac{2}{3}$	B: $\frac{3}{8}$	C: $\frac{1}{2}$	D: $\frac{1}{4}$	E: $\frac{1}{3}$

2. A die has been loaded in such a way that the numbers 1,2,3,4,5 and 6 have probabilities .1, .1, .1, .2, .2, and .3 respectively. You are to receive \$5 if an even number turns up but you must pay \$2 if an odd number turns up. What are your expected winnings?

A: \$0.80	B: \$3.00	C: \$0.60	D: \$2.20	E: \$2.40

3. A random variable X has values $-3, 4$ and 6 with respective probabilities $\frac{1}{3}, \frac{1}{2}$ and $\frac{1}{6}$. The mean of X is 2. Find the variance of X.

A: 13	B: 15	C: 17	D: 19	E: 21

4. For what value of k is the function $f(x) = 3kx^2$ on the interval $1 \leq x \leq 3$ and $f(x) = 0$ elsewhere, a probability density function for a continuous random variable X?

A: $\frac{3}{8}$	B: $\frac{2}{3}$	C: $\frac{1}{12}$	D: $\frac{1}{24}$	E: $\frac{1}{26}$

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

A: $\frac{2}{3}$	B: $\frac{1}{5}$	C: $\frac{4}{9}$	D: $\frac{3}{4}$	E: $\frac{8}{9}$

6. Let X be a continuous random variable with density function $y = f(x)$. Suppose $\int_{-\infty}^{\infty} xf(x)dx = 3$ and $\int_{-\infty}^{\infty} x^2 f(x)dx = 15$. Find the variance of X.

A: 6	B: 9	C: 12	D: 18	E: 24

7. The lifetime of a certain car model is exponentially distributed with a mean of 7 years. Find the probability that one of these cars will still be in use 9 years after purchase.

A: $1 + e^{-9/7}$	B: $1 - e^{-9/7}$	C: $e^{-9/7}$	D: 0	E: 1

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$\{-1.16 \leq Z \leq 2.43\}$.

A: 0.8845	B: 0.8695	C: 0.3845	D: 0.1305	E: 0.1155

9. Let Z be a standard normal random variable. Find prob$\{Z \geq 1\}$.

A: 0.8413	B: 0.6587	C: 0.3413	D: 0.1587	E: 0.0398

10. Let X be a normal random variable with mean $\mu = 10$ and standard deviation $\sigma = 2$. Find prob$\{11 \leq X \leq 15\}$.

A: 0.7191	B: 0.0403	C: 0.0873	D: 0.6853	E: 0.3023