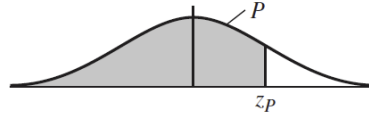**Spring 2026: Mathematical Statistics**
Recitation Worksheet 3
Feb. 13, 2026

1. [7.3] Which of the following is a random variable?

   (a) population mean

   (b) population size, N

   (c) sample size, n

   (d) sample mean

   (e) variance of sample mean

   (f) largest value in sample

   (g) population variance

   (h) estimated variance of sample mean

2. [7.10] True or False? If a sample from a population is large, a histogram (i.e., frequency plot with values on the x-axis and their frequencies on the y-axis) of the values in the sample will be approximately normal, even if the population is not normal.

3. [7.20] In one example in the textbook, a 95% confidence interval for μ was found to be (1.44, 1.76). Because μ is some fixed number, it either lies in this interval or it doesn't, so it doesn't make any sense to claim that $P(1.44 \leq \mu \leq 1.76) = .95$. What do we mean, then, by saying this is a "95% confidence interval?"

4. [7.9] In a simple random sample of 1,500 voters, 55% said they planned to vote for a certain proposition, and 45% said they would vote against it. The estimated margin of victory for the proposition is thus $55\% - 45\% = 10\%$. What is the standard error of this estimated margin? What is a 95% confidence interval for the margin? (You'll need a calculator or device that can serve as one.)

5. [7.19] Using the central limit theorem, how should the constant k be chosen so that the interval $(-\infty, \bar{X} + k\frac{S_n}{\sqrt{n}})$ is a 90% confidence interval for μ — i.e., so that $P(\mu \leq \bar{X} + k\frac{S_n}{\sqrt{n}}) = .9$? This is called a one-sided confidence interval. How should k be chosen so that $(\bar{X} - k\frac{S_n}{\sqrt{n}}, \infty)$ is a 95% one-sided confidence interval? [Use the table on the reverse of this page.]

TABLE 2 Cumulative Normal Distribution—Values of P Corresponding to z_p for the Normal Curve

z is the standard normal variable. The value of P for $-z_p$ equals 1 minus the value of P for $+z_p$; for example, the P for -1.62 equals $1 - .9474 = .0526$.

z_p	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936