Show all work and circle your final answers. Answers without justifying work will receive no credit. Partial credit will be given as appropriate, do not leave any problem blank.

1. (12 points) The serum cholesterol levels in men aged 18 to 24 are normally distributed with a mean of 178.1 and a standard deviation of 40.7. If a man aged 18 to 24 is randomly selected, find the probability that his serum cholesterol level is greater than 260.

2. (12 points) A company tests new employees for illegal drugs and 3.8% of prospective employees test positive. The company tests 150 prospective employees and finds that 10 of them test positive for drugs. Find the probability of at least 10 positive results among 150 subjects. Based on that value, do the 10 positive test results seem unusually high?
3. (7 points each) For women aged 18 to 24, systolic blood pressures are normally distributed with a mean of 114.8 and a standard deviation of 13.1.

(a) If a woman between the ages of 18 and 24 is randomly selected, find the probability that her systolic blood pressure is above 120.

(b) If a group of 20 women in the age range of 18–24 is randomly selected, find the probability that their mean systolic blood pressure is above 120.
4. (12 points) In crash tests of 15 Honda Odyssey minivans, collision repair costs are found to have a distribution that is approximately bell-shaped with a mean of $1786 and a standard deviation of $937. Construct the 99% confidence interval for the mean repair cost in all such vehicle collisions.
5. (12 points) A poll watcher recorded the times that 50 voters spent in the voting booth. The sample mean time spent was 53.1 seconds with a standard deviation of 7.4 seconds. Construct the 95% confidence interval for the mean time spent in the voting booth by all voters.

6. (14 points) The lengths of pregnancies are normally distributed with a mean of 268 days and a standard deviation of 15 days. If a baby is premature if the length of the pregnancy in the the lowest 4%, find the length of pregnancy which separates premature babies from those that are not premature.
7. (7 points each) In a recent election 611 voters were surveyed and 308 of them said they voted for the candidate who won the election.

(a) Find the sample proportion of voters who voted for the candidate who won.

(b) Find a 98% confidence interval estimate of the proportion of all voters who said they voted for the candidate who won.
8. (5 points each) A researcher wants to estimate the proportion of students aged 12–18 who use computers in school. The researcher wants to have a 95% level of confidence that the margin of error is 0.03.

(a) If a previous survey revealed that 82% of students used computers in schools, what should the minimum sample size be for the new study?

(b) What should the minimum sample size be if no previous information is available?