11.13 More on insurance: STATE: We ask what is the probability that the average loss for 10,000 such policies will be greater than $85, when the long-run average loss is $75? PLAN: Use the central limit theorem to approximate this probability. SOLVE: The central limit theorem says that, in spite of the skewness of the population distribution, the average loss among 10,000 policies will be approximately *N* ($75, $300/ ) = *N* ($75, $3) Now *P*( >$85) = P(*Z* > ) = *P*(*Z* > 3.33) = 1 – 0.9996 = 0.0004. CONCLUDE: We can be about 99.96% certain that average losses will not exceed $85 per policy.

11.27 Glucose testing: Let *X* be Shelia’s measured glucose level. (a) *P*(*X* > 140) = *P*(*Z* > 1.5) = 0.0668. (b) If is the mean of four measurements (assumed to be independent), then has a *N*(122, 12/ ) = *N*(122 mg/dl, 6 mg/dl) distribution, and *P*( > 140) = *P*(*Z* > 3) = 0.0013.

11.34 Airline passengers get heavier: STATE: What is the probability that the total weight of the 22 passengers exceeds 4500 lb? PLAN: Use the central limit theorem to approximate this probability. SOLVE: If *W* is total weight, then the sample mean weight is = *W*/22. The event that the total weight exceeds 4500 pounds is equivalent to the event that exceeds 4500/22 = 204.55 lb. The central limit theorem says that is approximately Normal with mean 190 lb and standard deviation 35/ = 7.462 lb. Therefore, *P*(*W* > 4500) = *P*( > 204.55) = *P*(*Z* > ) = *P*(*Z* > 1.95) = 0.0256. CONCLUDE: There is a small chance—about 2.56%—that the total weight exceeds 4500 lb.