STA 110B Name_____

Spring 2000 Section_____

Quiz 6

week of 28FEB2000

1. (3 points) At a car dealership, the auto servicing department plans to check/service/etc. fifty cars per 8-hour day. In order to do so, it must spend no more time than an average of 1.6 hours per car. The length of time required to perform these services for a car has a mean equal to 1.4 hours and standard deviation of 0.7 hour. What proportion of all days will the service department have to work overtime?

$$\begin{aligned} P(\bar{X} > 1.6) &= P(Z > \frac{1.6 - 1.4}{\frac{0.7}{\sqrt{50}}}) \\ &= P(Z > 2.02) \\ &= 0.022 \end{aligned}$$

2. (3 points) An airline finds that 5% of the persons making reservations on a certain flight will not show up for the flight. If the airline sells 160 tickets for a flight with only 155 seats, what is the probability that a seat will be available for every person holding a reservation and planning to fly?

$$\begin{aligned} P(p < \frac{156}{160}) &= P(Z < \frac{\frac{155.5}{160} - 0.95}{\sqrt{\frac{0.95(0.05)}{160}}}) \\ &= P(Z < 1.27) \\ &= 1 - P(Z > 1.27) \\ &= 1 - 0.102 \\ &= 0.898 \end{aligned}$$

3a. (1 point) A die will be rolled some number of times, and you win \$1 if it shows an ace (i.e., shows a "1") more than 20% of the time. Which is better: 60 rolls or 600 rolls?

Law of large numbers: 60 rolls

b. (1 point) As in (a), but you win \$1 if the percentage of aces is more than 15%.

Law of large numbers: 600 rolls

c. (1 point) As in (a), but you win \$1 if the percentage of aces is between 15% and 20%.

Law of large numbers: 600 rolls

d. (1 point) As in (a), but you win \$1 if the percentage of aces is exactly $16\frac{2}{3}\%$.

Law of large numbers: 60 rolls