

A.P. Statistics
Assignment 6-4

Remember to show your thinking through your work.

1. The mean time it takes to walk to the bus stop is 8 minutes (with a standard deviation of 2 minutes) and the mean time it takes for the bus to get to school is 20 minutes (with a standard deviation of 4 minutes). The distributions are normal.
- a. How long will it take (in minutes), on average, to get to school?

- b. What is the standard deviation of the trip to school?

- c. What is the probability that it will take longer than 30 minutes to get to school?

Due to a miscalculation, we realize it actually takes an average of 10 minutes to walk to the bus stop.

- d. How long will it take (in minutes), on average, to get to school?

- e. What is the standard deviation of the trip to school?

- f. What is the probability that it will take longer than 30 minutes to get to school?

2. Laboratory data show that the time required to complete two chemical reactions in a production process varies. The first reaction has a mean time of 40 minutes and a standard deviation of 2 minutes; the second has a mean time of 25 minutes and a standard deviation of 1 minute. The two reactions are run in sequence during production. There is a period of 5 minutes between the two reactions as the

product of the first reaction is pumped into the vessel where the second reaction will take place.

- a. What is the mean time required for the entire process?

- b. What is the standard deviation of the combined process?

3. The design of an electronic circuit calls for a 100-ohm resistor and a 250-ohm resistor connected in series so that their resistances add. The components used are not perfectly uniform, so that the actual resistances vary independently according to normal distributions. The resistance of 100-ohm resistors has mean 100 ohms and standard deviation 2.5 ohms, while that of 250-ohm resistors has mean 250 ohms and standard deviation 2.8 ohms.

- a. What is the distribution of the total resistance of the two components in series?

- b. What is the probability that the total resistance lies between 345 and 355 ohms?