

Math 1600, Section 12, Fall 2016 – Statistics
Lab 8 – October 27, 2016

Names:

Group:

1. If X is normally distributed with at mean of 20 and a standard deviation of 5, find:

a. $P[X < 18]$

b. $P[X < 29]$

c. $P[X > 27]$

d. $P[X > 11]$

e. $P[12 < X < 31]$

2. If X is normally distributed with a mean of 14 and a standard deviation of 3, find b such that:

a. $P[X < b] = .7995$

b. $P[X > b] = .001$

c. $P[X < b] = .063$

3. The diameter of hail hitting the ground during a storm is normally distributed with a mean of 0.5 inch and a standard deviation of 0.1 inch. What is the probability that:

a. A hailstone picked at random will have a diameter greater than 0.71 inch?

b. Two hailstones picked in a row will have diameters greater than 0.6 inch? (Assume independence of the two diameters.)

c. By the end of the storm, what proportion of hailstones would have had diameters greater than 0.71 inch?

4. The time for an emergency medical squad to arrive at a sport center on the edge of a town is distributed as a normal variable with mean 17 minutes and standard deviation 3 minutes.

a. Determine the probability that the time to arrive is

- i. More than 22 minutes

- ii. Between 13 and 21 minutes

- iii. Between 15.5 and 18.5 minutes

b. Which arrival period of duration one minute is assigned the highest probability by the normal distribution?

5. **Binomial:** Suppose that for a particular type of cancer, chemotherapy provides a 5-year survival rate of 80% if the disease could be detected at an early stage. Among 19 patients diagnosed to have this form of cancer at an early stage who are just starting chemotherapy, find the probability that:

a. Fourteen will survive beyond five years.

b. Six will die within 5 years.

c. The number of patients surviving beyond five years will be between 9 and 13 (both inclusive).

d. Find the expectation and standard deviation of the number of five year survivors.

6. A construction company submits bids for two projects. Below are the profit and probability of winning each project. Assume that the outcomes of the two bids are independent.

	Profit	Chance of Winning Bid
Project A	\$ 75,000	0.50
Project B	\$120,000	0.65

a. List the probable outcomes (win/not win) for the two projects combined and find their probabilities.

b. Let X denote the company's total profit for the two contracts. Determine the probability distribution of X .

c. If it costs the company \$2000 for preparatory surveys and paper work for the two bids, what is the expected net profit?