

Ceng272 -Exercise Set 6

6.4 Given a normal distribution with $\mu = 30$ and $\sigma = 6$, find

- (a) the normal-curve area to the **right** of $x = 17$;
- (b) the normal-curve area to the left of $x = 22$;
- (c) the normal-curve area between $x = 32$ and $x = 41$;
- (d) the value of a : that has 80% of the normal-curve area to the left;
- (e) the two values of x that contain the middle 75% of the normal-curve area.

6.9 A soft-drink machine is regulated so that it discharges an average of 200 milliliters per cup. If the amount of drink is normally distributed with a standard deviation equal to 15 milliliters,

- (a) what fraction of the cups will contain more than 224 milliliters?
- (b) what is the probability that a cup contains between 191 and 209 milliliters?
- (c) how many cups will probably overflow if 230-**milliliter** cups are used for the next 1000 drinks?
- (d) below what value do we get the smallest 25% of the drinks?

6.12 In the November 1990 issue of *Chemical Engineering Progress*, a study discussed the percent purity of oxygen from a certain supplier. Assume that the mean was 99.61 with a standard deviation of 0.08. Assume that the distribution of percent purity was approximately normal.

- (a) What percentage of the purity values would you expect to be between 99.5 and 99.7?
- (b) What purity value would you expect to exceed exactly 5% of the population?

6.13 The average life of a certain type of small motor is 10 years with a standard deviation of 2 years. The manufacturer replaces free all motors that fail while under guarantee. If he is willing to replace only 3% of the motors that fail, how long a guarantee should he offer? Assume that the lifetime of a motor follows a normal distribution.

6.17 The tensile strength of a certain metal component, is normally distributed with a mean 10,000 kilograms per square centimeter and a standard deviation of 100 kilograms per square centimeter. Measurements are recorded to the nearest 50 kilograms per square centimeter.

- (a) What proportion of these components exceed 10,150 kilograms per square centimeter in tensile strength?
- (b) If specifications require that all components have tensile strength between 9800 and 10,200 kilograms per square centimeter inclusive, what proportion of pieces would we expect to scrap?