Solutions

(1) Each measurement in the population has an equal probability of being chosen in the sample.

(2) a) 1-in-50 systematic sample

b) simple random sample

c) stratified random sample

d) cluster sample

(3) 0.001 0.002 ... 0.450 0.451 0.452 ... 0.900

x_1 x_2 x_{450} x_1 x_2 x_{450}

Ignore 0.000 and 0.901 through 0.999

0.357 → x_{357}

0.812 → x_{362} (812 - 450 = 362)

0.942 IGNORE

0.240 → x_{240}

0.006 → x_6

0.711 → x_{261} (711 - 450 = 261)

Sample: x_{357}, x_{362}, x_{240}, x_6, x_{261}

(4)

1,2,4	1,2,8	1,2,9
1,4,8	1,4,9	1,8,9
2,4,8	2,4,9	2,8,9
4,8,9		

Note that there should be $5C3 = 10$ possible samples.

(5) There are NCn possible samples.

(6) Use a simple random sample to choose 20 rats. These will be Group A. The remaining 20 rats will automatically form Group B.

(7) Need $800(0.35) = 280$ diet cans and
$800(0.65) = 520$ regular cans.

(8) Total # produced today $= 10{,}650 + 4{,}350 = 15{,}000$

$$\% \text{ regular} = \frac{10{,}650}{15{,}000} = 0.71$$

$$\% \text{ diet} = \frac{4{,}350}{15{,}000} = 0.29$$

Need $600(0.71) = 426$ regular cans and
$600(0.29) = 174$ diet cans.

(9) A stratified random sample should be used instead of a simple random sample when the population is split into two or more different subpopulations (groups).

(10) Advantage: It's easy to plan.

Disadvantage: The sample is <u>not random</u>.