

Problem 1: Consider the following sample of data values:

10, 9, 7, 12, 11, 9, 12, 8, 13, 10

(a) Find P_{27} .

$$10 \cdot \frac{27}{100} = 2.7 \rightsquigarrow \text{3rd number}$$
$$P_{27} = 9$$

(b) Find P_{70} .

$$10 \cdot \frac{70}{100} = 7.0 \rightsquigarrow \text{average of the 7th and 8th number}$$
$$P_{70} = \frac{11 + 12}{2} = 11.5$$

Problem 2: Construct a stem-and-leaf plot of the following data:

11, 21, 11, 12, 35, 22, 35, 31, 37, 42, 41, 32, 64

1		1	1	2		
2		1	2			
3		1	2	5	5	7
4		1	2			
5						
6		4				

Stem Unit: 10

Problem 3: A die is rolled 3 times. What is the probability of getting at least one 4?

$$P(N \geq 1) = 1 - P(N = 0) = 1 - {}_3C_0 (0.1667)^0 (0.8333)^4 = 1 - 0.5786 = 0.4214$$

Problem 4: You want to estimate the proportion of Americans who like the health care reform bill. You want the error to be at most 0.03 and you want the confidence level to be 99%. You have no prior estimate of the proportion. What should your sample size be? What if you had data suggesting the proportion of Americans supporting the bill was 56%?

$$\begin{aligned} n &= \left\lceil \frac{z_{\alpha/2}^2 \cdot 0.25}{E^2} \right\rceil \\ n &= \left\lceil \frac{2.575^2 \cdot 0.25}{0.03^2} \right\rceil \\ n &= \left\lceil \frac{1.6577}{0.0009} \right\rceil \\ n &= \lceil 1841.88 \rceil \\ n &= 1,842 \end{aligned}$$

If the data suggests a 56% of persons support the bill, we can use $\hat{p} = 0.56$.

$$\begin{aligned} n &= \left\lceil \frac{z_{\alpha/2}^2 \hat{p} \hat{q}}{E^2} \right\rceil \\ n &= \left\lceil \frac{2.576^2 \cdot 0.56 \cdot 0.44}{0.03^2} \right\rceil \\ n &= \left\lceil \frac{1.63506}{0.0009} \right\rceil \\ n &= \lceil 1816.72 \rceil \\ n &= 1,817 \end{aligned}$$