

Answer on Question #61216 – Math – Statistics and Probability

Question

In the city of Hongkong 70% of the people prefer a swamp candidate for a mayoral position .supposed 30 people from Hongkong were sampled

- i) What is the mean of the sampling distribution of P (sample proportion)?
- ii) What is the standard error of p?
- iii) What is the probability that 80% of this sample will prefer a candidate from swamp?

Solution

- i) The mean of the sampling distribution of P (sample proportion) is

$$\hat{p} = 0.7$$

- ii) The standard error of p is

$$SE = \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}} = \sqrt{\frac{0.7(1 - 0.7)}{30}} = 0.083666$$

- iii)

Using continuity correction

$$P(pn = k) = P(X = k) = P(k - 0.5 < X < k + 0.5),$$

$$p_1 = \frac{k - 0.5}{n} = 0.8 - \frac{0.5}{30} = 0.7833,$$

$$p_2 = \frac{k + 0.5}{n} = 0.8 + \frac{0.5}{30} = 0.8167,$$

$$z_1 = \frac{p_1 - \hat{p}}{SE} = \frac{0.7833 - 0.7}{0.083666} = 1.00,$$

$$z_2 = \frac{p_2 - \hat{p}}{SE} = \frac{0.8167 - 0.7}{0.083666} = 1.39.$$

The random variable Z has the standard normal distribution.

The probability that 80% of this sample will prefer a candidate from swamp is

$$P(p = 0.8) = P(1.00 < Z < 1.39) = P(Z < 1.39) - P(Z < 1.00) = 0.9177 - 0.8413 = 0.0764.$$

Answer: i) 0.7; ii) 0.083666; iii) 0.0764.