

6037549 – Shahid Jadavji

ADM 2303 - Assignment 5 Part 2

Question 1

Find, Probability of mean income of **Canadian** sample above \$40807:

Use z-score

$$z = \frac{31639 - 40807}{0.31 \times 31639}$$

$$z = -0.93$$

$$P(z < -0.93) = 0.1762$$

$$1 - 0.1762 = 0.8238$$

The probability of the Canadian mean income being above \$40807 is 83.4%

Find, Probability of mean income of **Norwegian** sample above \$31639:

$$z = \frac{40807 - 31639}{0.31 \times 40807}$$

$$z = 0.93$$

$$P(z > 0.93) = 0.7642$$

$$1 - 0.7642 = 0.2358$$

Therefore, the probability of the Norwegian mean income being above \$31639 is 23.6%

The consequence of not assuming that income per capita is normally distributed is that the sample values will not be independent and random, while the sample size will not be large enough to effectively represent the unknown population.

Question 2

Probability of 52 cod reaching a mean market size of 25.6 months or less instead of 26 months:

$$z = \frac{25.6 - 26}{1/\sqrt{52}}$$

$$z = -2.88$$

$$P(z < -2.88) = 0.0020$$

We can see that the probability of 52 cod reaching a mean market size of 25.6 months or less is 0.2%

Probability of 52 cod weighing a mean of 3.9 kg or more instead of 3.75 kg:

$$z = \frac{3.9 - 3.75}{0.38 / \sqrt{52}}$$

$$z = 2.85$$

$$P(z > 2.85) = 0.9978$$

$$1 - 0.9978 = 0.0022$$

Calculations

Therefore, the probability of 52 cod weighing a mean of 3.9 kg or more is 0.2%

Probability of containing 250 cod weighing a mean of 4.25 kg or more:

$$z = \frac{4.25 - 3.75}{0.38}$$

$$z = 1.31$$

$$P(z > 1.31) = 0.0941$$

Standard Deviation of sample size 250:

$$\sigma = \sqrt{\frac{0.0941(1 - 0.0941)}{250}}$$

$$\sigma = 0.0185$$

$$z = \frac{20/250 - 0.0941}{0.0185}$$

$$z = -0.77$$

$$P(z < -0.76) = 0.2206$$

$$1 - 0.2206 = 0.78$$

Therefore, the probability of containing 250 cod weighing a mean of 4.25 kg or more is 78%

Question 3

Probability of 411 conservative voters would have found the proportion supporting the scrapping of the liberal legislation to be 59% or more:

$$\sigma = \sqrt{\frac{0.5 \times 0.5}{411}}$$

$$\sigma = 0.02466$$

$$z = \frac{-\mu}{\sigma}$$

$$z = \frac{0.59 - 0.5}{0.02466}$$

$$z = 3.65$$

$$P(z > 3.65) = 0.9999$$

$$1 - 0.9999 = 0.0001$$

The probability of 411 conservative voters finding the proportion supporting the scrapping of the liberal legislation is 0.01%

Probability of 50% or more conservative voters supporting scrapping the liberal legislation:

$$z = \frac{0.5 - 0.5}{0.02466}$$

$$z = 0$$

$$P(z > 0) = 0.5$$

$$1 - 0.5 = 0.5$$

The probability of half or more conservative voters supporting scrapping the liberal legislation is 50%. It is very likely that 50% or more conservative voters supported the scrapping of the liberal legislation.

However, the standard deviation is very small; it would not be a lot higher than 50% of conservative voters.

This assignment conforms to the rules on academic integrity of the University of Ottawa:

Signature: Shahid Jadavji