CheggSolutions - Thegdp

Probability and Statistics

Topic: Standard Normal Distribution

Given is a standard normal variable Z, with a mean of 0 and standard deviation of 1.

The tasks are to find:

1. $P(Z \leq 1.29)$
2. $P(-0.76 < Z \leq 1.92)$

Task 1: Calculating $P(Z \leq 1.29)$

Step 1: Identify the given values and the standard normal distribution property.

- Given:
- Z is a standard normal variable.
- The probability of interest is $P(Z \leq 1.29)$.

Supporting Statement and Explanation: Using the property of the standard normal distribution.

Step 2: Use the Z-table to find the cumulative probability.

A Z-table provides the cumulative probability for a given Z-score.
For $Z = 1.29$, the cumulative probability (from the Z-table) is approximately 0.9015.

Supporting Statement and Explanation: The Z-table is used to find the probability of a Z-score being less than or equal to a given value.

Therefore, $P(Z \leq 1.29) = 0.9015$.

Task 2: Calculating $P(-0.76 < Z \leq 1.92)$

Step 1: Identify the given values and the standard normal distribution property.

- Given:
- Z is a standard normal variable.
- The probability of interest is $P(-0.76 < Z \leq 1.92)$.

Supporting Statement and Explanation: Using the property of the standard normal distribution.

Step 2: Use the Z-table to find the cumulative probabilities.

A Z-table provides the cumulative probability for a given Z-score.
For $Z = -0.76$, the cumulative probability (from the Z-table) is approximately 0.2236.
For $Z = 1.92$, the cumulative probability (from the Z-table) is approximately 0.9726.

Supporting Statement and Explanation: The Z-table is used to find the probability of Z-scores being less than or equal to given values.

Step 3: Calculate the probability for the range $-0.76 < Z \leq 1.92$.

The required probability is the difference between the cumulative probabilities at $Z = 1.92$ and $Z = -0.76$:

$$P(-0.76 < Z \leq 1.92) = P(Z \leq 1.92) - P(Z \leq -0.76)$$
$$= 0.9726 - 0.2236 = 0.7490$$

Supporting Statement and Explanation: The probability of a range of Z-scores is the difference between the cumulative probabilities at the endpoints of the range.

Final Solution:

$$P(Z \leq 1.29) = 0.9015$$
$$P(-0.76 < Z \leq 1.92) = 0.7490$$