

Statistics (IMRA)

Subject: Mathepn TJ0 -1.317 TD[(f)1.6 (o)2.1 (cus)3.7 (i)3.5 (n)6 (g o)8.1 (n)0.5 (f)1.6 (l)]TJ5.431 0 Td[(u)6 (e)3 (nc)5.8 (y)0.5 (a)7.9nd)0.5 (s)

- (i) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process
- (ii) use a problem-solving model that incorporates analyzing given information, formulating a plan or

- (xvi) communicate [mathematical reasoning's] implications using multiple representations, including language as appropriate
- (E) create and use representations to organize, record, and communicate mathematical ideas;
 - (i) create representations to organize mathematical ideas
 - (ii) create representations to record mathematical ideas
 - (iii) create representations to communicate mathematical ideas
 - (iv) use representations to organize mathematical ideas
 - (v) use representations to record mathematical ideas
 - (vi) use representations to communicate mathematical ideas
- (F) analyze mathematical relationships to connect and communicate mathematical ideas; and
 - (i) analyze mathematical relationships to connect mathematical ideas
 - (ii) analyze mathematical relationships to communicate mathematical ideas
- (G) display, explain, or justify mathematical ideas and arguments using precise mathematical language in written or oral communication.
 - (i) display mathematical ideas using precise mathematical language in written or oral communication
 - (ii) display mathematical arguments using precise mathematical language in written or oral communication
 - (iii) ~~display mathematical arguments using precise mathematical language in written or oral communication~~

- (ii) describe variability using sampling distributions
 - (iii) model variability using population distributions
 - (iv) model variability using sampling distributions
- (4) Categorical and quantitative data. The student applies the mathematical process standards to represent and analyze both categorical and quantitative data. The student is expected to:
 - (A) distinguish between categorical and quantitative data;
 - (i) distinguish between categorical and quantitative data
 - (B) represent and summarize data and justify the representation;
 - (i) represent data
 - (ii) summarize data
 - (iii) justify the representation
 - (C) analyze the distribution characteristics of quantitative data, including determining the possible existence and impact of outliers;
 - (i) analyze the distribution characteristics of quantitative data including determining the possible existence of outliers
 - (ii) analyze the distribution characteristics of quantitative data including determining the possible impact of outliers
 - (D) compare and contrast different graphical or visual representations given the same data set;
 - (i) compare and contrast different graphical or visual representations given the same data set
 - (E) compare and contrast meaningful information derived from summary statistics given a data set; and
 - (i) compare and contrast meaningful information derived from summary statistics given a data set
 - (F) analyze categorical data, including determining marginal and conditional distributions, using two-way tables.
 - (i) analyze categorical data, including determining marginal distributions, using two-way tables
 - (ii) analyze categorical data, including determining conditional distributions, using two-way tables
- (5) Probability and random variables. The student applies the mathematical process standards to connect probability and statistics. The student is expected to:
 - (A) determine probabilities, including the use of a two-way table;
 - (i) determine probabilities including the use of a two-way table
 - (B) describe the relationship between theoretical and empirical probabilities using the Law of Large Numbers;
 - (i) describe the relationship between theoretical and empirical probabilities using the Law of Large Numbers
 - (C) construct a distribution based on a technology-generated simulation or collected samples for a discrete random variable; and
 - (i) construct a distribution based on a technology generated simulation or collected samples for a discrete random variable
 - (D) compare statistical measures such as sample mean and standard deviation from a technology-simulated sampling distribution to the theoretical sampling distribution.

- (i) compare statistical measures from a technology simulated sampling distribution to the theoretical sampling distribution
- (6) Inference. The student applies the mathematical process standards to make inferences and justify conclusions from statistical studies. The student is expected to:
 - (A) explain how a sample statistic and a confidence level are used in the construction of a confidence interval;
 - (i) explain how a sample statistic [is] used in the construction of a confidence interval
 - (ii) explain how a a confidence level [is] used in the construction of a confidence interval
 - (B) explain how changes in the sample size, confidence level, and standard deviation affect the margin of error of a confidence interval;
 - (i) explain how changes in the sample size affect the margin of error of a confidence interval
 - (ii) explain how changes in the confidence level affect the margin of error of a confidence interval
 - (iii) explain how changes in the standard deviation affect the margin of error of a confidence interval
 - (C) calculate a confidence interval for the mean of a normally distributed population with a known standard deviation;
 - (i) calculate a confidence interval for the mean of a normally distributed population with a known standard deviation
 - (D) calculate a confidence interval for a population proportion;
 - (i) calculate a confidence interval for a population proportion
 - (E) interpret confidence intervals for a population parameter, including confidence intervals from media or statistical reports;
 - (i) interpret confidence intervals for a population parameter, including confidence intervals from media or statistical reports
 - (F) explain how a sample statistic provides evidence against a claim about a population parameter when using a hypothesis test;
 - (i) explain how a sample statistic provides evidence against a claim about a population parameter when using a hypothesis test
 - (G) construct null and alternative hypothesis statements about a population parameter;
 - (i) construct null hypothesis statements about a population parameter
 - (ii) construct alternative hypothesis statements about a population parameter
 - (H) explain the meaning of the p-value in relation to the significance level in providing evidence to reject or fail to reject the null hypothesis in the context of the situation;
 - (i) explain the meaning of the p-value in relation to the significance level in providing evidence to reject or fail to reject the null hypothesis in the context of the situation
 - (I) interpret the results of a hypothesis test using technology-generated results such as large sample tests for proportion, mean, difference between two proportions, and difference between two independent means; and
 - (i) interpret the results of a hypothesis test using technology generated results
 - (J) describe the potential impact of Type I and Type II Errors.
 - (i) describe the potential impact of Type I Errors

- (ii) describe the potential impact of Type II Errors

(7) Bivariate data. The student applies the mathematical process standards to analyze relationships among bivariate quantitative data. The student is expected to:

(A) analyze scatterplots for patterns, linearity, outliers, and influential points;

- (i) analyze scatterplots for patterns
- (ii) analyze scatterplots for linearity
- (iii) analyze scatterplots for outliers
- (iv) analyze scatterplots for influential points

(B) transform a linear parent function to determine a line of best fit;

- (i) transform a linear parent function to determine a line of best fit

(C) compare different linear models for the same set of data to determine best fit, including discussions about error;

- (i) compare different linear models for the same set of data to determine best fit, including discussions about error

(D) compare different methods for determining best fit, including median-median and absolute value;

- (i) compare different methods for determining best fit, including median-median
- (ii) compare different methods for determining best fit, including absolute value

(E) describe the relationship

(i)

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