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Concept of Probability

Activity 1: Frequency Approach

Pair up into a group of 2 (or 3) students. One student will flip a coin and the other will record the results.

(a) Flip a coin ten times. What is the empirical probability from your experiment?

(b) Flip a coin 50 times. What is the empirical probability from your experiment?

Axioms of Probability

Activity 2: Probability

Suppose A and B are two disjoint events in a sample space S and that $P(A) = .22$; $P(B) = .33$. Calculate the following probabilities.

(a) $P(A \cup B)$

(b) $P(A \cap B)$

(c) $P(A' \cup B)$

(d) $P(A' \cap B)$

(e) $P(A - B)$

Activity 3: Probability

A ball is drawn at random from a box containing 6 red balls, 4 white balls, and 5 blue balls. Determine the probability that it is (a) red, (b) white, (c) blue, (d) not red, (e) red or white.

Activity 4: Probability

Determine the probability for the following events.

(a) Roll a 7 or 11 from a pair of fair 6 sided dice.

(b) A non-defective television found next if out of 2,300 televisions already examined, 15 were defective.

(c) At least 1 tails appears in 5 tosses of a fair coin.

(d) The probability of drawing an ace or a club in a standard deck.

Activity 5: Conditional Probability

(a) Five marbles are picked at random out of a jar containing 10 red marbles, 15 white marbles, 20 blue marbles, 25 orange marbles, and 30 purple marbles. What is the probability of picking one of each color, assuming you pick a marble one at a time?

(b) Drawing a king and a spades cards for first two draws from a well-shuffled 52 card deck.

Chapter 5: Sampling Theory

Organizing and Visualizing Data

Activity 6: Frequency Distributions

The graph below shows the distribution of scores of 30 students on a mathematics test.

Distribution of Math Test Scores
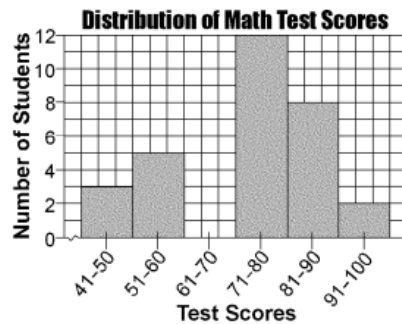
Complete the frequency table below using the data in the frequency histogram shown.

Test Scores	Frequency
91–100	
81–90	
71–80	
61–70	
51–60	
41–50	

(a)

Activity 7: Frequency Distributions

The scores on a mathematics test were 70, 55, 61, 80, 85, 72, 65, 40, 74, 68, and 84. Complete the accompanying table, and use the table to construct a frequency histogram for these scores.
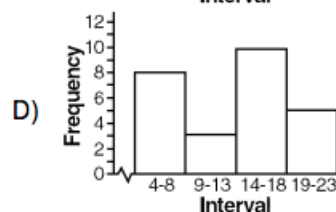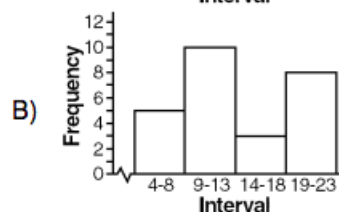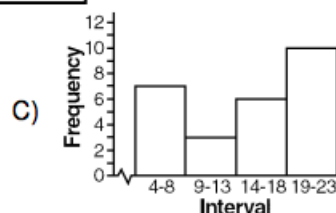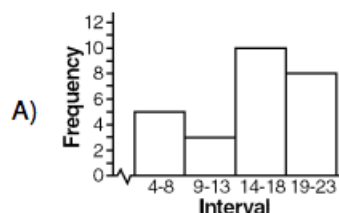
Score	Tally	Frequency
40-49		
50-59		
60-69		
70-79		
80-89		
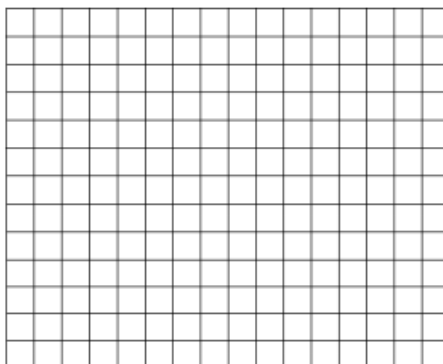
(a)

Which one of the following histograms represents the data in the table below?

Interval	Frequency
4-8	8
9-13	3
14-18	10
19-23	5

A)

B)

C)

D)

(b)

Measurements of Central Tendency

Activity 8: Mean-Median-Mode-Range

(a) Consider the data set $S = \{2, 5, 9, 3, 5, 4, 7\}$. Compute the mean.

(b) Consider the data sets $A = \{2, 5, 9, 3, 5, 4, 7\}$ and $B = \{2, 5, 9, 3, 5, 4\}$. Compute the median of each data set. (Don't forget to re-order the data first!)

(c) Consider the data sets $A = \{2, 5, 9, 3, 5, 4, 7\}$, $B = \{2, 5, 2, 3, 5, 4, 7\}$, $C = \{2, 5, 2, 7, 5, 4, 7\}$. Compute the mode(s) of each data set.

(d) Consider the data set $S = \{2, 5, 9, 3, 5, 4, 7\}$. Compute the range of the data set.

Measurement of Dispersion

Activity 9: Standard Deviation

x	$\bar{x}$	$x - \bar{x}$	$(x - \bar{x})^2$
Data Set 2			
13.4			
11.7			
18.3			
14.8			
14.3			
$\dfrac{\Sigma(x - \bar{x})^2}{n}$			
Standard Deviation: $\sqrt{\dfrac{\Sigma(x-\bar{x})^2}{n}}$			

(a)

(b) Compare Data Set 1 and Data Set 2. Which set of data has a greater standard of deviation?

Activity 10: Five-Number-Summary

(a) Find the five number summary, and draw a Box-Whisker plot for $S = \{15, 25, 20, 29, 29, 36, 29, 15, 26, 28, 24, 25\}$.

(b) Find the standard deviation for the set from problem 4.