Kansas City Area Teachers of Mathematics
2013 KCATM Math Competition

STATISTICS and PROBABILITY GRADE 6

INSTRUCTIONS

- **Do not open this booklet** until instructed to do so.

- Time limit: **20 minutes**

- You **may use calculators** on this test.

- Mark your answer on the answer sheet by **FILLING in the oval**.

- You **may not use rulers, protractors, or other measurement devices** on this test.

- Choice **E** is a valid answer. It will be either "None of the above" or "All are true."

Student Name _____   Student Number _____

School _____

101. At four different locations, the cost of a taco salad is: $7.99, $5.49, $6.50, $8.50.
What is the arithmetic mean of the cost of a salad?
   A. $7.67   B. $6.00   C. $6.75   D. $7.12   E. None of the above

102. What is the probability of tossing a heads on a coin?
   A. 1/2   B. 1/3   C. 1/4   D. 1   E. None of the above

103. What is the probability of getting a "4" when you toss a regular 6-sided die?
   A. 1/2   B. 1/3   C. 1/4   D. 1/6   E. None of the above

Use the following ordered 20 exam scores to answer problems 104-108:
    58, 59, 67, 69, 70, 71, 73, 74, 74, 74, 75, 78, 83, 84, 87, 88, 89, 89, 95, 100

104. What is the **median** score of the data?
   A. 74   B. 74.5   C. 75   D. -64   E. None of the above

105. What is the **mode** of the data?
   A. 58   B. 89   C. 100   D. 42   E. None of the above

106. What is the **range** of the data?
   A. 42   B. 74   C. 100   D. 58   E. None of the above

107. *Divide the data in half.* Find the **median of the lower half** of the data and find the **median of the upper half** of the data. The difference between them is called the Interquartile Range (IQR). **Which set of values is used to find the IRQ?**
   A. 87.5 – 70.5 = 17   B. 88 – 71 = 17   C. 87 – 70 = 17
   D. 100 – 58 = 42   E. None of the above

108. Which **plot** shows the data?

E.   None of the above
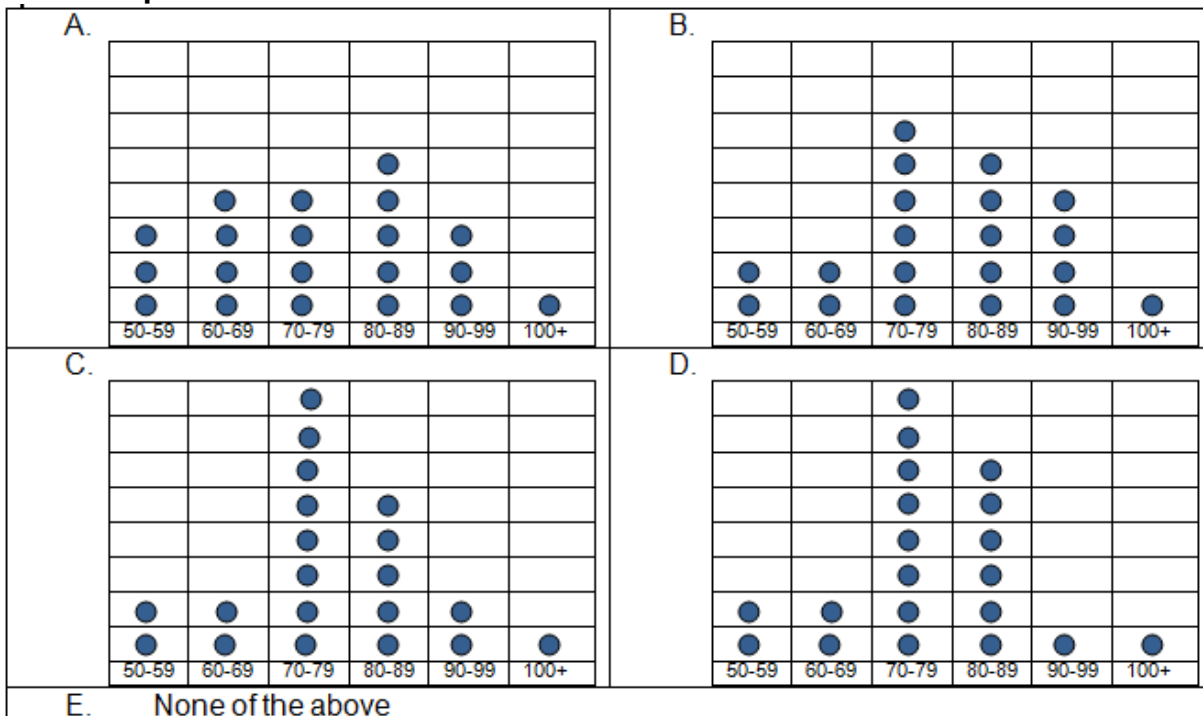
Use the box plot on Middle School texting for problems 109-110. Middle school students were sampled to see how much they texted. The box plot shows the results of the sample. The data is tailed off on the larger amounts.

Hint:
A box plot shows 5 data points: the minimum, the 1st Quartile value, the median or 2nd Quartile value, the 3rd Quartile value, and the maximum value.

Middle School Texting
Middle School Texting
Text message sent yesterday
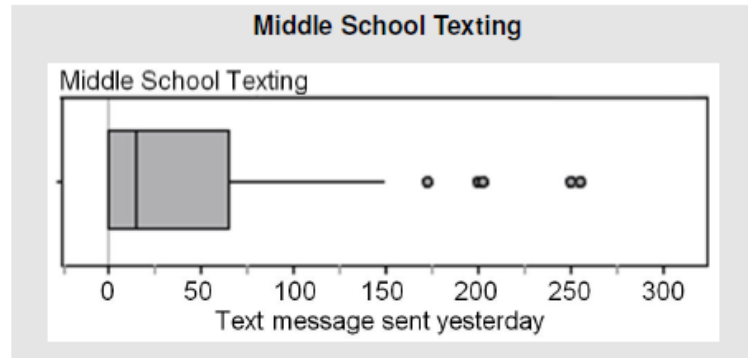
http://commoncoretools.me/wp-content/uploads/2011/12/ccss_progression_sp_68_2011_12_26_bis.pdf

109. What is the **approximate median value** of the number of text messages sent for the sample of middle school students yesterday?

   A. 0   B. 20   C. 70   D. 150.

110. **Which conclusion can you draw** about the data tailing off on the larger amounts?
   A. More people sent 250 texts than sent no texts.
   B. The majority of the data fell between zero texts and seventy texts, but two people in the sample sent 250 or more texts.
   C. All middle school students have cell phones and text.
   D. Less than fifty percent of the middle school students sent less than 70 texts.
   E. None of the above

111. Which one of the following statements is **NOT** a statistical question you could analyze?
   A. How old are the students in my school?
   B. How old am I?
   C. How tall are the students in my school?
   D. How many pets do the students in my class have?

112. If you draw a marble out of a bag of marbles that contains 3 red, 4 blue, 5 yellow, and 4 green, what is the **probability of drawing a blue marble**?
   A. 1/2   B. 3/16   C. 1/4   D. 1/3   E. None of the above

113. If your class has 15 boys out of 25 students, what is the **probability of being a girl** in your class?
   A. 1/5   B. 2/5   C. 3/5   D. 4/5   E. None of the above

114. Compare the distributions of the height of students for ages 8 and 10 in the given box plots. Which statement is **NOT** true?

Comparing distributions with box plots

Heights of students (inches)
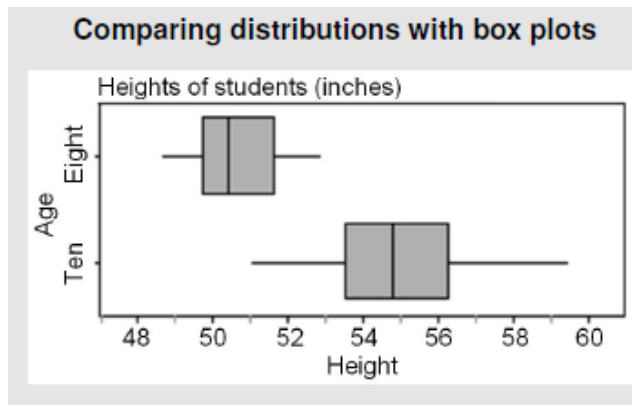
A. The range in heights for 8 yrs. old is greater than the range of heights for 10 yr. olds.
B. The median height is about 4-5 inches taller for 10 yr. olds than 8 yr. olds.
C. There is a larger spread of data in the 10 year olds than in the 8 year old students.
D. The tallest 10 yr. old student was over 59 inches tall.
E. All are true.

115. Which conclusion is **NOT** correct in describing the data presented in the line plot.

6-Trait Writing Rubric
Scores for Organization
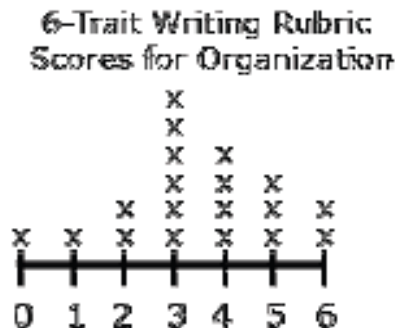
    A. The median value is 3.5.
    B. The range is 6.
    C. The data is symmetrical about the center of 3.
    D. The total number students in this data set was 19.
    E. All are true.

116. Scores for the first three tests in math were: 75%, 83%, and 92%. Your average after taking one more test was 84%. What was your **fourth test** score?

   A. 84%   B. 90%   C. 86%   D. 88%   E. None of the above

117. Your science teacher asked you to keep track of the low temperature each day this month. After recording all of the temperatures, you organized your data in the following frequency table. How many days was the temperature **less than or equal to 50°** Fahrenheit?

Temperature Range (Fahrenheit)	Number of Days (Frequency)
0-10 degrees	0
11-20 degrees	3
21-30 degrees	5
31-40 degrees	12
41-50 degrees	8
51-60 degrees	2

A. 20 days

B. 28 days

C. 10 days

D. 2 days

E. None of the above

118. The results of a survey of t-shirt sizes of elementary students in grades K-5 is shown in the pictograph below. **Which conclusion is true?**
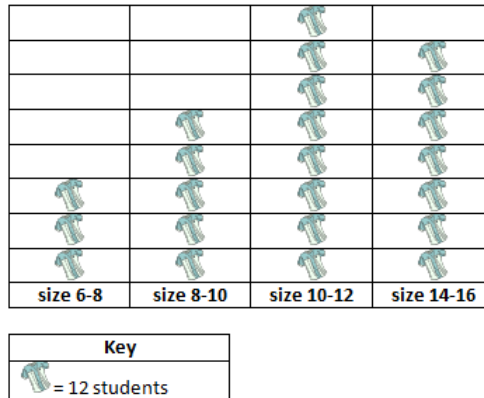

A. The total number of students wearing size 6-8 and 8-10 equals the number of students wearing size 10-12.

B. The number of students wearing size 6-8 is less than half the number of students wearing size 14-16.

C. The number of students wearing size 8-10 is 48.

D. The total number of students wearing size 14-16 is 24 more than the number of students who wear size 8-10.

E. All are true.

119. What is the probability of getting a 3 **or** a 5 when you throw a single 6-sided die?
    A. 1/6   B. 1/3   C. 1/2   D. 2/3   E. None of the above

120. What is the probability of being a prime number on a standard 6-sided die?
    A. 1/6   B. 1/3   C. 1/2   D. 2/3   E. None of the above

Use the box plot for the ages (in months) of students in a class of 6th grade students for problems 121-126.

Ages in Months of a Class of
6th Grade Students

132.5   139 142.5

130   135   140   145   150
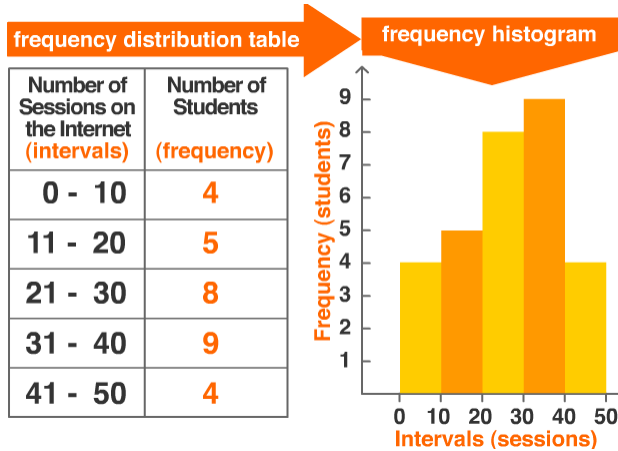Months
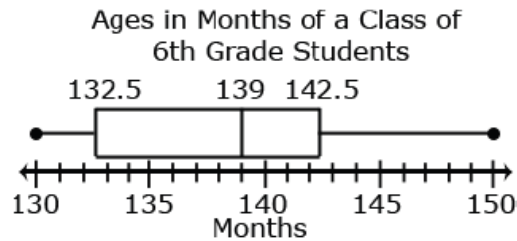
121. What is the **range** of the data?
    A. 20 months   B. 10 months   C. 150 months
    D. 3.5 months   E. None of the above

122. What is the **median** age in months?
    A. 132.5 months   B. 139 months   C. 142.5 months
    D. 150 months   E. None of the above

123. What is the **Interquartile Range** (IQR) of the data? *Hint: Q3 – Q1*
    A. 20 months   B. 10 months   C. 150 months
    D. 3.5 months   E. None of the above

124. Which statement is **NOT** true about the data?
    A. One-fourth of the students are between 130 months and 132.5 months.
    B. One-fourth of the students are between 132.5 months and 139months.
    C. One-fourth of the students are between 139 months and 142.5 months.
    D. One-fourth of the students are between 142.5 months and 150 months.
    E. All are true.

125. **Fifty percent of the data falls between** which of these?
    A. 130 months and142.5 months   B. 132.5 months and 150 months
    C. 130 months and 150 months   D. 132.5 months and 142.5 months
    E. None of the above

126. How old is the **oldest student in years and months** in this data set?
    A. 12 years, 4 months   B. 12 years, 5 months
    C. 12 years, 6 months   D. 12 years, 76 months
    E. None of the above

127. If the probability of rain is 15%, what is the probability that it will **NOT** rain?

    A. 50%   B. 15%   C. 100%   D. 85%   E. None of the above

Use the frequency table and the histogram for problems 128-130. The survey data shows the number of sessions the students were on the internet over one week period of time.

http://www.amathsdictionaryforkids.com/dictionary.html

frequency distribution table → **frequency histogram**

| Number of Sessions on the Internet (intervals)	Number of Students (frequency)
0 - 10	4
11 - 20	5
21 - 30	8
31 - 40	9
41 - 50	4

128. How many students were in the survey?
   A. 28   B. 30   C. 32   D. 34   E. None of the above

129. Is the data symmetrical about the center?
   A. no   B. yes   C. Not enough information

130. Which conclusion is **NOT** true?
   A. The probability of a student using the internet from 41-50 times a week is 2/15.
   B. The number of students using the computer from 31-50 times that week was equal to the number of students who used it from 0-20 times.
   C. The majority of the students used the internet from 21-40 times that week.
   D. The frequency number means the number of students who were on the internet.
   E. All are true.

131. Which statement is **NOT** true about probability?
   A. The probability that an event that is certain to happen is 1.
   B. The probability that an event that has no chance of happening is 0.
   C. Probability is the chance of something happening.
   D. Probability is the ratio of favorable events over the total number of events possible.
   E. All are true.
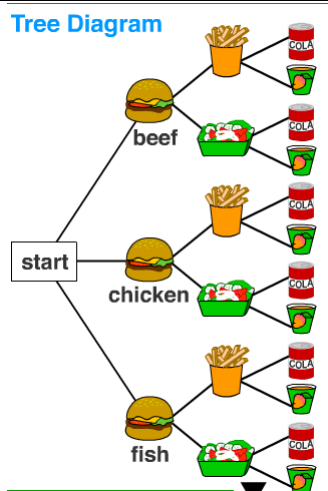
Use the dot plot for problems 132-133.

Weekly Test Result Averages

girls
boys
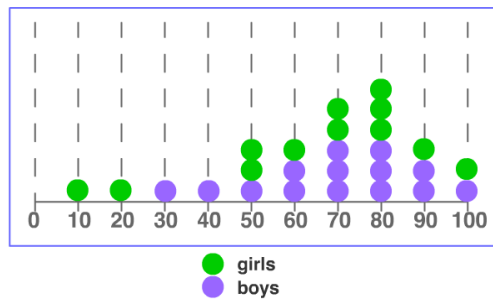
132. The data is considered to be:
    A. symmetrical   B. skewed to the left
    C. skewed to the right   D. strong test data   E. None of the above

133. Which statement is **NOT** true?
    A. The range of the test scores is 90.
    B. The mode of the test scores is the 80s.
    C. The median test score would be in the 70s.
    D. If 60% is passing, 20 students passed their test this week.
    E. All are true.

134. A tree diagram for menu choices of beef sandwich, chicken sandwich, or fish sandwich with fries or salad, or with juice or pop to drink is given. What is the probability of having a chicken sandwich with salad and juice?

|	
Tree Diagram start beef chicken fish http://www.amathsdictionaryforkids.com/dictionary.html	A. 1/5 B. 1/4 C. 1/12 D. 1/21 E. None of the above

Use the table of animal speeds, the box plot, and the histogram for problems 135-140.

Table of 37 animal speeds

Animal	Speed (mph)
Cheetah	70.00
Pronghorn antelope	61.00
Lion	50.00
Thomson's gazelle	50.00
Wildebeest	50.00
Quarter horse	47.50
Cape hunting dog	45.00
Elk	45.00
Coyote	43.00
Gray fox	42.00
Hyena	40.00
Ostrich	40.00
Zebra	40.00
Mongolian wild ass	40.00
Greyhound	39.35
Whippet	35.50
Jackal	35.00
Mule deer	35.00
Rabbit (domestic)	35.00
Giraffe	32.00
Reindeer	32.00
Cat (domestic)	30.00
Kangaroo	30.00
Grizzly bear	30.00
Wart hog	30.00
White-tailed deer	30.00
Human	27.89
Elephant	25.00
Black mamba snake	20.00
Six-lined race runner	18.00
Squirrel	12.00
Pig (domestic)	11.00
Chicken	9.00
House mouse	8.00
Spider (Tegenearia atrica)	1.17
Giant tortoise	0.17
Three-toed sloth	0.15

Source: factmonster.com/ipka/A0004737.html

Box plot and histogram of 37 animal speeds
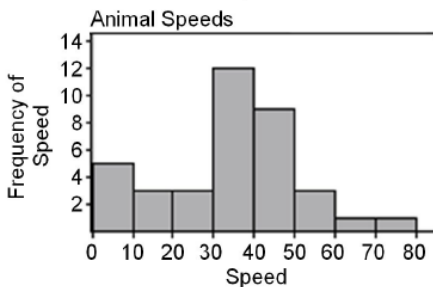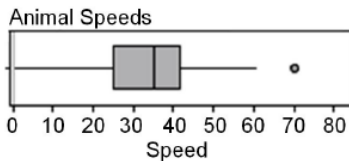
135. What is the **range of speeds** in miles per hour for the 37 animals listed?
A. 70 mph
B. 68.85 mph
C. 69.85 mph
D. 70.15 mph
E. None of the above

136. What is the **median speed** in mph? (*Hint: see box plot or data list*)
A. 30 mph
B. 40 mph
C. 32 mph
D. 35 mph
E. None of the above

137. Which animals represent the **mode** value?
A. Hyena, Ostrich, Zebra, Mongolian wild ass
B. Jackal, Mule deer, domestic rabbit
C. Lion, Thomson's gazelle
D. White-tailed deer, wart-hog, cat, kangaroo, grizzly bear
E. None of the above

138. Which range of speeds had the most animals? (*Hint: see histogram*)
A. 0-10 mph
B. 30-40 mph
C. 40-50 mph
D. 50-60 mph
E. None of the above

139. Which set of values does **NOT** represent 25% of the data: (*Hint: see box plot*)
A. 0-20 mph
B. 25-35 mph
C. 35-42 mph
D. 42-60 mph
E. None of the above

140. What is the **probability** that an animal can **run faster than 60 mph** in this sample set of animal speeds?
A. 1/30
B. 2/37
C. 3/37
D. 4/37
E. None of the above

Shade the correct answer!

Example: A   ●   C   D   E

Name_____

School _____

101.	A	B	C	D	E	121.	A	B	C	D	E
102.	A	B	C	D	E	122.	A	B	C	D	E
103.	A	B	C	D	E	123.	A	B	C	D	E
104.	A	B	C	D	E	124.	A	B	C	D	E
105.	A	B	C	D	E	125.	A	B	C	D	E
106.	A	B	C	D	E	126.	A	B	C	D	E
107.	A	B	C	D	E	127.	A	B	C	D	E
108.	A	B	C	D	E	128.	A	B	C	D	E
109.	A	B	C	D	E	129.	A	B	C	D	E
110.	A	B	C	D	E	130.	A	B	C	D	E
111.	A	B	C	D	E	131.	A	B	C	D	E
112.	A	B	C	D	E	132.	A	B	C	D	E
113.	A	B	C	D	E	133.	A	B	C	D	E
114.	A	B	C	D	E	134.	A	B	C	D	E
115.	A	B	C	D	E	135.	A	B	C	D	E
116.	A	B	C	D	E	136.	A	B	C	D	E
117.	A	B	C	D	E	137.	A	B	C	D	E
118.	A	B	C	D	E	138.	A	B	C	D	E
119.	A	B	C	D	E	139.	A	B	C	D	E
120.	A	B	C	D	E	140.	A	B	C	D	E

Shade the correct answer!
Example: A ● C D E

Name_____

School _____

ANSWER KEY

101.	A	B	C	●	E	121.	●	B	C	D	E
102.	●	B	C	D	E	122.	A	●	C	D	E
103.	A	B	C	●	E	123.	A	●	C	D	E
104.	A	●	C	D	E	124.	A	B	C	D	●
105.	A	B	C	D	●	125.	A	B	C	●	E
106.	●	B	C	D	E	126.	A	B	●	D	E
107.	●	B	C	D	E	127.	A	B	C	●	E
108.	A	B	C	●	E	128.	A	●	C	D	E
109.	A	●	C	D	E	129.	●	B	C	D	E
110.	A	●	C	D	E	130.	A	●	C	D	E
111.	A	●	C	D	E	131.	A	B	C	D	●
112.	A	B	●	D	E	132.	A	●	C	D	E
113.	A	●	C	D	E	133.	A	B	C	●	E
114.	●	B	C	D	E	134.	A	B	●	D	E
115.	A	B	●	D	E	135.	A	B	●	D	E
116.	A	B	●	D	E	136.	A	B	C	●	E
117.	A	●	C	D	E	137.	A	B	C	●	E
118.	A	B	●	D	E	138.	A	●	C	D	E
119.	A	●	C	D	E	139.	●	B	C	D	E
120.	A	B	●	D	E	140.	A	●	C	D	E