Kansas City Area Teachers of Mathematics
2015 KCATM Math Competition

STATISTICS and PROBABILITY
GRADES 7-8

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. A number is chosen at random from 1 to 20. What is the probability of selecting a factor of 12?

A. 5% B. 10% C. 30% D. 60% E. None of the above

102. When rolling a six-sided die, what is the probability of getting a multiple of 3?

A. 1/6 B. 1/3 C. 1/2 D. 5/6 E. None of the above

103. Suzie rolled a six-sided die five times and each time the die landed with "3" up. What is the probability of the die landing with "3" up on the sixth roll?

A. 5/6 B. 2/3 C. 1/2 D. 1/3 E. None of the above

104. A number is chosen at random from 1 to 20. What is the probability that the number is a factor of 10 or a multiple of 7?

A. 10% B. 20% C. 30% D. 50% E. None of the above

The number of text messages sent by a randomly selected group of students yesterday is shown in the table below. Use this data to answer questions 105-108.

18	**35**	**53**	**44**	**26**	**57**	**23**
27	**47**	**33**	**4**	**35**	**39**	**41**

105. To the nearest tenth, what is the **mean** number of texts sent by these students yesterday?

A. 34.0 B. 34.4 C. 48.1 D. 35.0 E. None of the above

106. What is the median of this data?

A. 34.0 B. 35.0 C. 35.5 D. 36.0 E. None of the above

107. What is the mode of this data?

A. 34.4 B. 34.0 C. 35.0 D. 57.0 E. None of the above

108. What is the range for this data?

A. 14.0 B. 53.0 C. 57.0 D. 481.0 E. None of the above

Use the data from the experiment to answer questions 109-111. Two six-sided dice were rolled ten times and the results are shown in the table below. (The result 1-6 means that a one was rolled on the first die and a six was rolled on the second die.)

1-6	**3-3**	**4-2**	**6-2**	**5-3**
2-5	**4-3**	**5-4**	**2-1**	**3-5**

109. Using the experiment, what is the probability that a 4 was rolled first?

A. 1/6 B. 1/5 C. 3/10 D. 1/10 E. None of the above

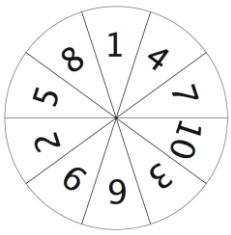
110. Using the experiment, what is the probability of getting a sum of 7?

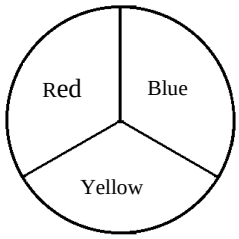
A. 7/36 B. 0 C. 2/5 D. 5/6 E. None of the above

111. What is the mean sum of the two dice for this experiment?

A. 3.5 B. 3.4 C. 6.9 D. 4.0 E. None of the above

Use the spinners shown below to answer questions 112 –115.





112. If each spinner is spun once, how many different outcomes are in the sample space?

A. 3 B. 10 C. 13 D. 30 E. None of the above

113. What is the probability of spinning an even number on the first spinner and red on the second spinner?

A. 1/6 B. 1/30 C. 1/3 D. 1/2 E. None of the above

114. A trial consists of spinning each spinner once. If 60 trials are conducted, how many times would you expect to get the outcome (7, Yellow)?

A. 2 B. 3 C. 5 D. 8 E. None of the above

115. A trial consists of spinning both spinner once. If 60 trials are conducted, how many times would you expect to get the outcome (4, Red)?

A. 3 B. 5 C. 6 D. 8 E. None of the above

Use the highway fuel efficiency, in miles per gallon, of randomly selected cars shown in the table to answer questions 116-117:

40	**36**	**29**	**45**	**51**	**36**	**48**	**34**
36	**22**	**13**	**42**	**31**	**44**	**32**	**34**

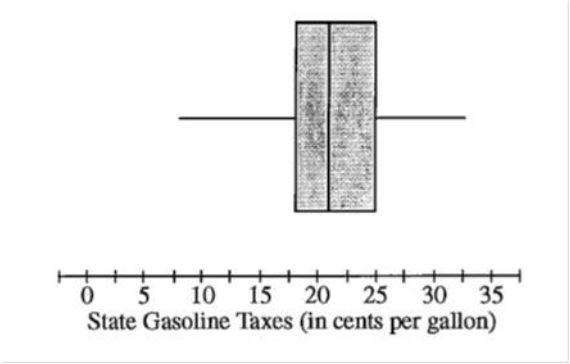
116. Which of the statements is true?

A. The mean of the data is 35.8 miles per gallon.
B. The mode of the data is 36 miles per gallon.
C. The median of the data is 36 miles per gallon.
D. The range of the data is 38 miles per gallon.
E. All of the above are true.

117. Which measure would change if you added a car that got 36 miles per gallon?

A. Mean B. Mode C. Median D. Range E. None of the above

Use the boxplot below to answer questions 118-122. The boxplot below shows the distribution of state gasoline taxes for all 50 states.



118. Which of the following **can** be determined from looking at the box plot?

A. maximum B. median C. range

D. interquartile range E. All of the above

119. What is the approximate **interquartile range** of the data?

A. 25 B. 7 C. 30 D. 21 E. None of the above

120. What is the approximate **median** of the data?

A. 25 B. 7 C. 30 D. 21 E. None of the above

121. About how many states have gasoline sales taxes between 18 cents per gallon and 25 cents per gallon?

A. 50 B. 25 C. 13 D. 7 E. None of the above

122. **Using the information on the box plot**, which of the following is **NOT** true about this set of data?

A. The median of the data is 21.
B. More states charge below 25 cents per gallon than above 25 cents per gallon.
C. One-fourth of the states charge 18 cents per gallon or less.
D. The range of taxes is about 25 cents per gallon.
E. All are true.

123. Establishing the probability of an event without using trials is called:

A. Theoretical probability
B. Experimental probability
C. Survey probability
D. Estimation probability
E. None of the above.

124. The ratio of the number of times an event occurs to the total number of trials is:

A. Theoretical probability
B. Experimental probability
C. Survey probability
D. Estimation probability
E. None of the above.

125. Steve has won 3 out of the last 4 races that he has run. What are the odds in favor of Steve winning a race?

A. 3:4 B. 1:4 C. 1:3 D. 3:1 E. None of the above.

126. How many **different combinations** can be made from the letters: C A T?

A. 1 B. 3 C. 6 D. 12 E. None of the above.

A bag contains 6 red marbles, 4 green marbles, 7 blue marbles and 3 white marbles. Use this information to answer questions 125 – 128.

127. A marble is drawn, **replaced**, and then a second marble is drawn. What is the probability that both marbles are white?

A. 3/20 B. 1/2 C. 9/400 D. 1/20 E. None of the above.

128. A marble is drawn, **replaced**, and then a second marble is drawn. What is the probability that a blue marble is drawn and then a red marble is drawn?

A. 13/20 B. 21/200 C. 6/20 D. 7/20 E. None of the above.

129. A marble is drawn and is **NOT replaced**. Then a second marble is drawn. What is the probability that both marbles are white?

A. 1/4 B. 3/10 C. 1/2 D. 9/380 E. None of the above.

130. A marble is drawn and **NOT replaced**. Then a second marble is drawn. What is the probability that the first marble drawn is blue and the second is red?

A. 42/400 B. 13/380 C. 21/190 D. 13/20 E. None of the above.

Use the stem-and-leaf plot below for questions 129-131. Forty students took a statistics examination having a maximum of 50 points.

0|28
1|2245
2|01333358889
3|001356679 Key: 1|4 = 14
4|22444466788
5|000

131. The median of the score distribution is equal to

A. 23 B. 31 C. 32 D. 33 E. None of the above.

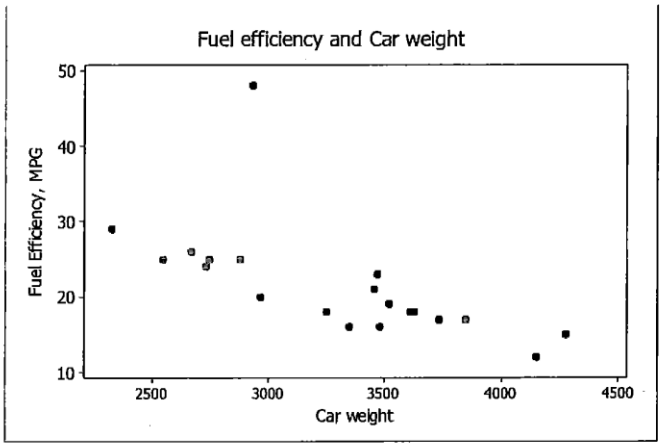
132. What is the probability that a student received a score less than 40 points?

A. 28% B. 40% C. 72% D. 80% E. None of the above

133. What is the range of the score distribution?

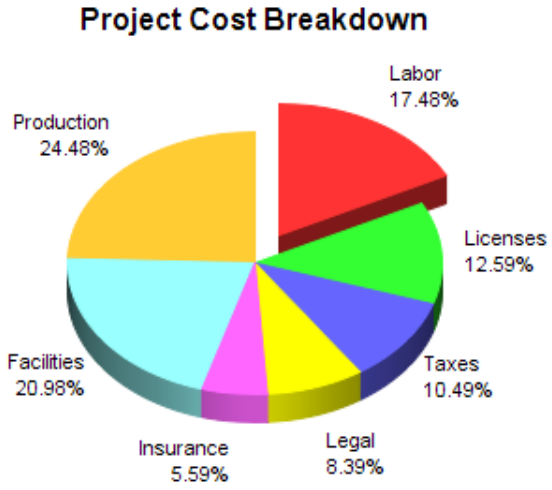
A. 50 B. 48 C. 40 D. 30 E. None of the above.

134. Use the scatterplot below that shows the fuel efficiency (in miles per gallon) and weight (in pounds) of twenty subcompact cars to discuss the correlation.



A. The data shows a strong positive correlation between fuel efficiency and car weight.
B. The data shows a weak positive correlation between the fuel efficiency and car weight.
C. The data shows a weak negative correlation between the fuel efficiency and car weight.
D. The data shows a strong negative correlation between the fuel efficiency and car weight.
E. None of the above.

Use the pie chart below to answer questions 133-135. A construction company made the following pie chart for one of its recent projects.



135. What is the measure of the central angle for Insurance? Round to the nearest tenth of a degree.

A. 10.1º B. 5.6º C. 20.1º D. 5.0º
E. None of the above

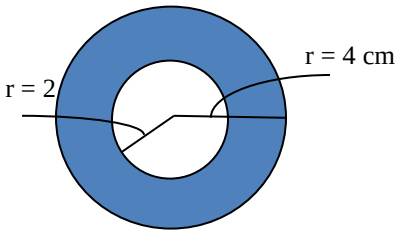
136. In degrees, how much bigger are the production costs than the taxes costs?

A. 88.1º B. 37.8º C. 125.9º D. 50.3º
E. None of the above

137. If the company spent a total of $500,000 on the project, how much was spent on licenses, to the nearest dollar?

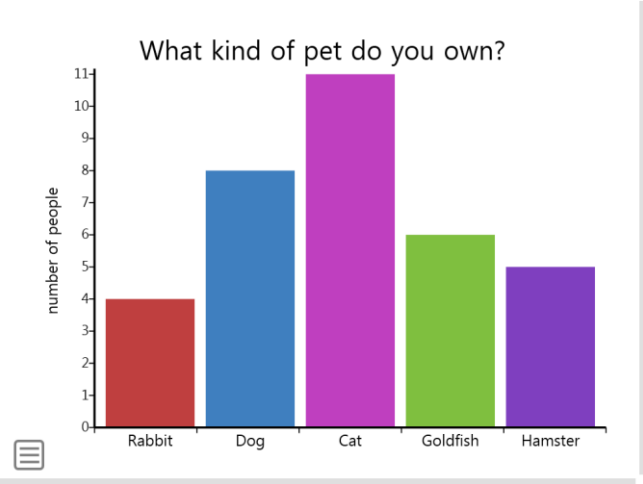
A. $13 B. $1,300 C. $6,295 D. $62,950
E. None of the above.

138. Use the circle below to determine the **geometric probability of landing in the shaded area** around the white circle, assuming that it lands somewhere inside the larger circle.



A. 1/2
B. 1
C. 1/3
D. 1/4
E. None of the above

Use the data from the type of pet owned to answer questions 139-140.



139. What is the range of the frequencies of the pets owned?

A. 11 B. 4 C. 7 D. 6.8 E. None of these

140. If the number of dogs changed to 9, which value would change?

A. median B. mode C. mean
D. range E. None of these

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
ANSWER KEY

Name_____
School _____

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