Kansas City Area Teachers of Mathematics
2013 KCATM Math Competition

STATISTICS and PROBABILITY
GRADES 7-8

INSTRUCTIONS

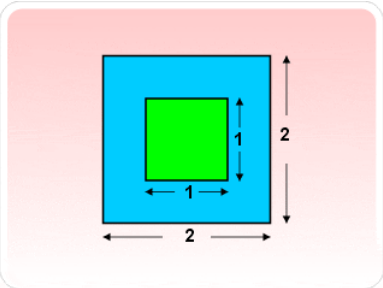
- **Do not open this booklet** until instructed to do so.
- Time limit: **20 minutes**
- You **may use calculators** on this test.
- Mark your answer on the answer sheet by **FILLING in the oval**.
- You **may not use rulers, protractors, or other measurement devices** on this test.

Student Name _____ Student Number _____

School _____

101. **Using trials** to establish the probability of an event is called:
A. Theoretical probability B. Experimental probability C. Survey probability
D. Estimation probability E. None of the above

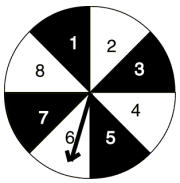
102. Use the square below to determine the **geometric probability of landing in the center green square,** assuming that it lands inside the larger square.



A. 1/4
B. 1/2
C. 3/8
D. 1/8
E. None of the above

103. What is the probability of rolling an **even number greater than 3** on a standard number cube with numbers 1-6.
A. 1/2 B. 2/3 C. 1/6 D. 5/6 E. None of the above

104. On the spinner below, what is the probability of landing on a **prime number**?



A. 5/8 B. 3/8 C. 1/2
D. 3/4 E. None of the above

105. What is the probability of **flipping 3 heads in a row** on a coin?
A. 1/2 B. 1/4 C. 1/8 D. 0 E. None of the above

106. If the probability of having blond hair in your math class is 4 out of 27, what are the **odds** of blond hair in your math class?
A. 4:31 B. 23:27 C. 4:23 D. 23:4 E. None of the above

107. If the probability of snow is 60%, what is the probability that it will **NOT** snow?
A. 3/5 B. 4/5 C. 1/5 D. 2/5 E. None of the above

108. What is the probability of selecting a **consonant** out the letters of the alphabet?
A. 3/13 B. 5/26 C. 21/26 D. 7/26 E. None of the above

109. If a tetrahedon has its faces and base labeled with the numbers 1 – 4, what is the probability that you will roll **a factor of 6**?
A. 1/4 B. 3/4 C. 1 D. 1/2 E. None of the above

110. If there is a 4% return on iPADS, how many would you expect to be returned if 150,000 were sold?
A. 6000 B. 600 C. 60 D. 6 E. None of the above

Use the results table for tossing 2 number cubes for problems #111-#114. Ex: (1,1) means to roll a "one" on the first number cube and a "one" on the second number cube. P(E) = Probability of the Event

(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

111. What is the **P(even sum)** on the two number cubes?

A. 22/36 B. 1/2 C. 13/18 D. 5/9 E. None of the above

112. What is the **P(sum <5)** on the two number cubes?

A. 5/36 B. 1/6 C. 5/6 D. 1/5 E. None of the above

113. What is the **P(sum of 8)** on the two number cubes?

A. 5/36 B. 1/6 C. 5/6 D. 1/5 E. None of the above

114. What is the **P(sum > 9)** on the two number cubes?

A. 5/36 B. 1/6 C. 5/6 D. 1/5 E. None of the above

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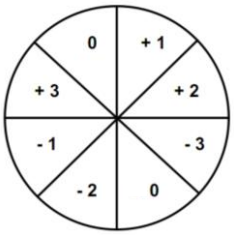
115. What is the probability of landing on a number from the set of Natural numbers: **P({Natural #'s})** on the spinner?



A. 1/2
B. 3/8
C. 1/4
D. 5/8
E. None of the above

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116. **How many different combinations** of 3 letters would there be using**: A B C** ?

A. 4 B. 5 C. 6 D. 7 E. None of the above

117. If you had choices of 5 ice cream flavors, 3 syrup toppings, and 4 different types sprinkles for an ice cream sundae, how **many different sundaes** could be made?

A. 60 B. 35 C. 12 D. 19 E. None of the above

118. If you were running for President of your class and there were six people running against you, what would be the probability of you winning the Presidency, **P(President of Club)**?

A. 1/7 B. 1/8 C. 7/8 D. 6/7 E. None of the above

119. **With replacement**, if you draw a green gumball out of a bag that has 6 green gumballs out of 15, what would be the probability that you would **draw a green out twice in a row**?

A. 12/15 B. 12/25 C. 4/25 D. 4/15 E. None of the above

Use the stem and leaf plot for problems #120 and #121.

Difference Between Winning and Losing Super Bowl Scores (1981-2000)

0	1 4 5 6 7 7
1	0 0 3 4 5 7 7 9
2	2 3 9
3	2 5 6
4	5

Key: 1| 0 means 10 points

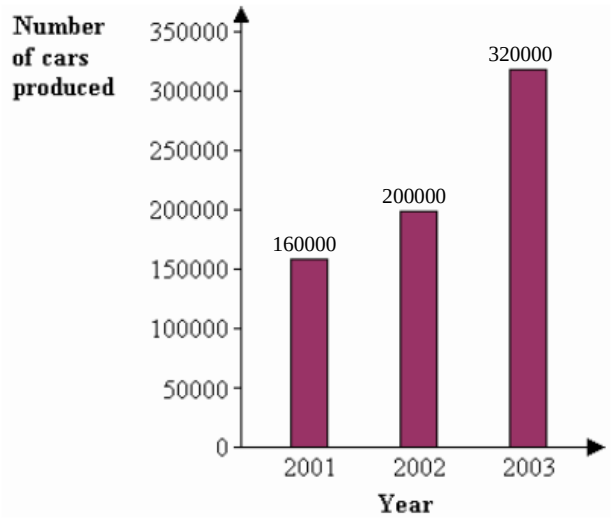
120. What is the probability of winning a game by less than 8 points?

A. 1/3 B. 3/10 C. 6/21 D. 8/21 E. None of the above

121. What is the probability of winning a game by over 29 points?

A. 7/21 B. 1/4 C. 1/5 D. 4/21 E. None of the above

Use the data from the Number of Cars produced for #122-124.



122. What is the mean number of cars (to the nearest 10,000) produced over the three years shown?

A. 225,000 B. 227,000 C. 230,000 D. 226,000 E. None of the above

123. What is the range of number of cars over the three year?

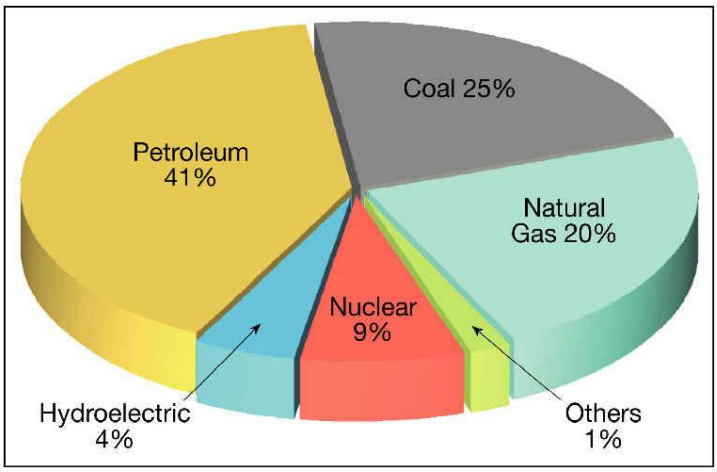
A. 480,000 B. 120,000 C. 160,000 D. 40,000 E. None of the above

124. If 2004 the number of cars produced was 250,000, which value would **NOT** change?

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

Use the data from Rochdale in the United Kingdom to answer problems #125-127.

U.S. Energy Consumption, 2007



125. The average energy consumption per person in 2007 was 334 million BTUs (British Thermal Units)? How much of that came from coal?

A. 30.1 million BTUs B. 66.8 million BTUs C. 83.5 million BTUs D. 136.9 million BTUs
E. None of the above

126. What would be the degree of the central angle for Petroleum use? Round to the nearest degree.

A. 148^{o} B. 32^{o} C. 72^{o} D. 90^{o} E. None of the above

127. Which category represents 66.8 million BTUs?

A. Petroleum B. Coal C. Natural Gas D. Nuclear E. Hydroelectric

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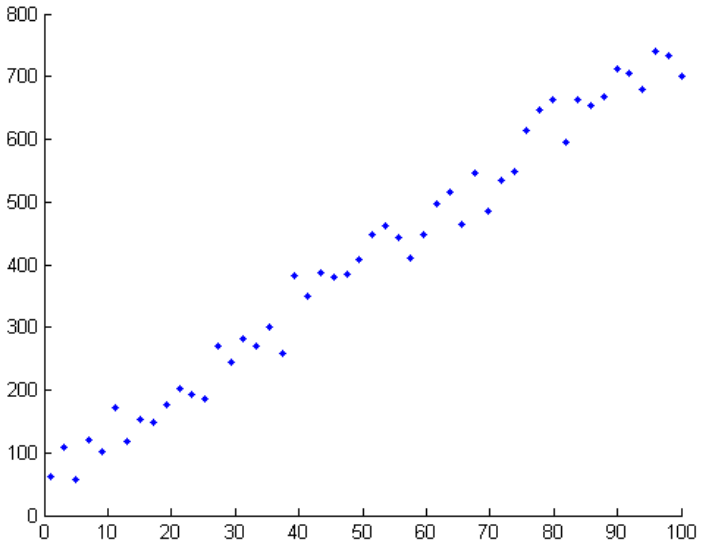
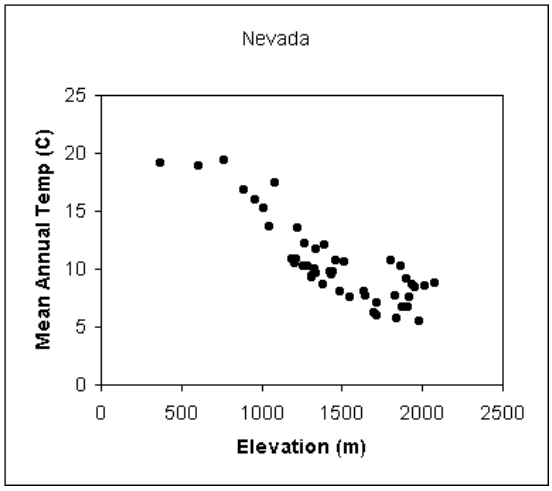
128. Use the graph below to select the **most reasonable equation for the best-fit line** (from the equations listed below). Consider the horizonal to be the x-axis, and the vertical axis to be the y-axis.



A. T = 5(x) + 2
B. T = 5(x) + 55
C. T = 0.6(x) + 70
D. T = -6(x) + 55
E. T = 7x

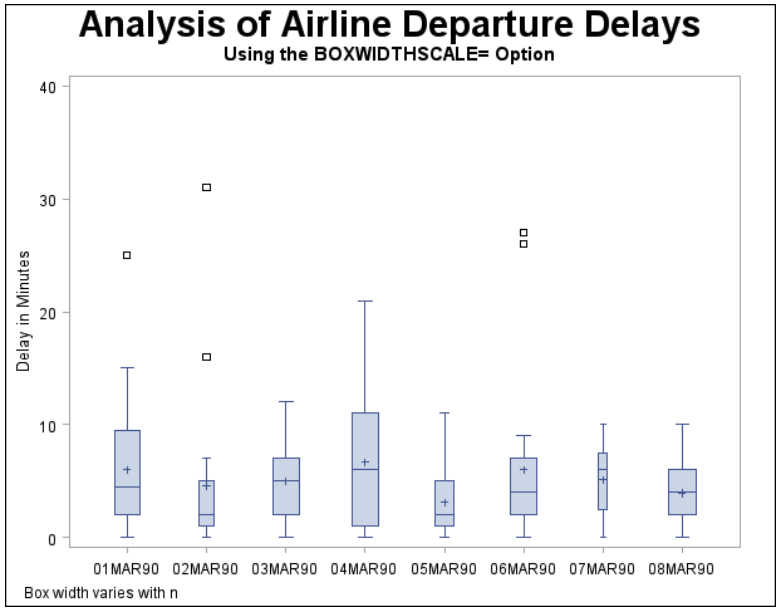
129. Use the data on Mean Annual Rainfall vs. Elevation in Nevada to discuss **correlation** of data.

Mean Annual Rainfall v. Elevation, Nevada



A. The data shows a strong positive correlation between the temperature and the elevation.
B. The data shows a weak positive correlation between the temperature and the elevation.
C. The data shows a very weak negative correlation between the temperature and the elevation.
D. The data shows a strong negative correlation between the temperature and the elevation.
E. None of the above

Use the Airborne Departure Delay Plots separated by day to answer problems #130 and #131.



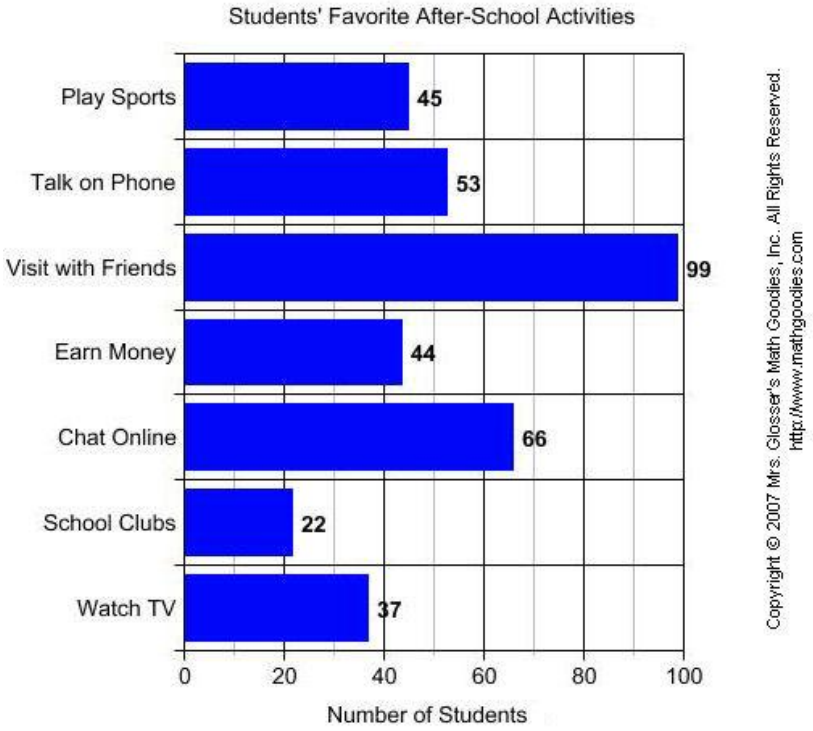
130. Which of these days had the largest range of data?

A. 02Mar90 B. 03Mar90 C. 05Mar90 D. 06Mar90 E. 07Mar90

131. Which conclusion could you **NOT** make comparing the data?

A. The inter-quartile range (the middle 50%) is relatively consistent except for days of extreme range fluctuations.
B. March 2nd had the least variability in delay times.
C. The median number of minutes a plane was delayed on all days shown was less than 10 minutes.
D. Outliers on the graph appeared on March 1, 2, and 6, which meant that on those days there were one or two times that a plane had an abnormally longer delay.
E. None of the above

Use the data in the histogram of students favorite after-school activity to answer problems #132 and #133.



132. How many people are in the data set?

A. 99 B. 403 C. 306 D. 77 E. None of the above

133. Which conclusion can NOT be make from this data?

A. More people preferred visiting with friends than any category.
B. Sixty percent of the students talk on the phone, visit with friends, or chat online after school.
C. The students in school clubs had a high grade average than other preference groups.
D. The range of data was 77.
E. None of the above

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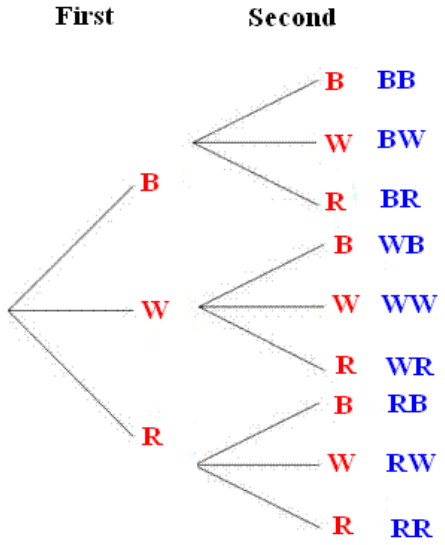
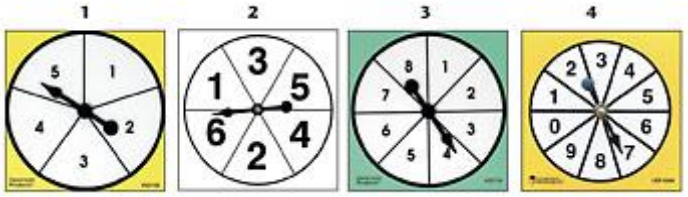
134. Use the tree diagram below to determine the probability of a BB outcome.



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

135. If you have the 4 spinners below, which one would give you a better probability of landing on a prime number?



A. Spinner # I
B. Spinner # 2
C. Spinner # 3
D. Spinner # 4
E. None of the above

Use the <u>sample</u> license plates to answer problems #136 and #137.

A	B	C	D
			
3 letters, 3 numbers can repeat	7 numbers can repeat	6 letters and or 6 numbers can repeat	4 number, 3 letters can repeat

136. If you follow the rule below the plates, which state would have the least possible number of **different combinations of license plates**?

A. Texas B. Illinois C. New York D. California E. Texas and Illinois

137. How would the number of possibilities change **IF Texas** uses a combination of **<u>either</u> letters or numbers for the <u>last three places</u>** on their license plates?

A. The number grew by 1000.
B. The number multiplied by 1000.
C. The number grew by 3000
D. The number multiplied by 3000.
E. None of the above

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138. Given the graph below, what is the geometric probability of selecting the shaded region of this grid target? Round to the nearest percent.

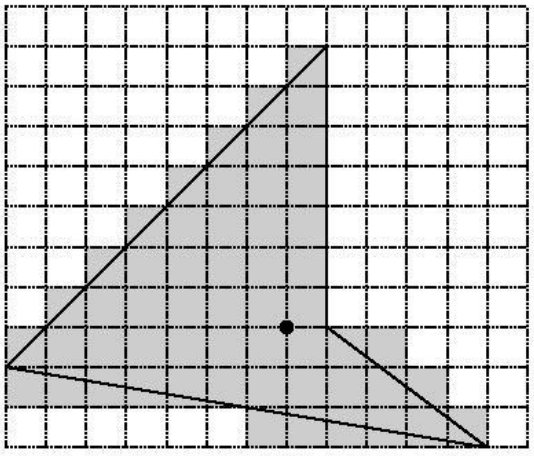

Figure 1: A polygon and unit squares intersecting it

A. 38%
B. 43%
C. 55%
D. 30%
E. None of the above

139. If the mean of ages of the 27 students on your swim team is 13.2 years old, **how is the mean affected** when you include the coach's age of 58 in your data?

A. The mean rose to 15.6 years old.
B. The mean rose to 16.2 years old.
C. The mean rose to 14.8 years old.
D. The mean rose to 17.1 years old.
E. None of the above

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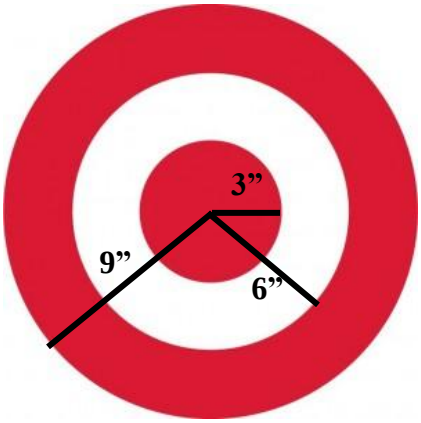
140. Assuming that a dart was thrown and it hit the target, what is the probability of landing in the white region of the target, if each consecutive ring has the radius that is 3" larger than the previous ring as shown?



A. 1/3
B. 1/5
C. 3/5
D. 4/9
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

2013 KCATM Statistics and Probability **Grades 7-8**

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

Name_____

School _____

ANSWER KEY

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