

Kansas City Area Teachers of Mathematics  
2018 KCATM Math Competition

**STATISTICS and PROBABILITY**  
**GRADE 8**

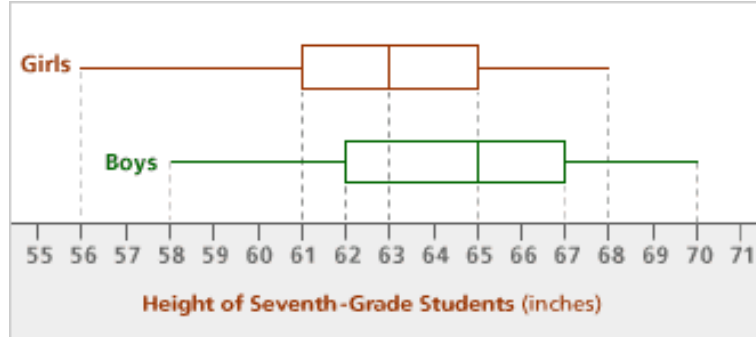
**INSTRUCTIONS**

- **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 \_\_\_\_\_

Use the box plot on heights of middle school students to answer #101-105.



101. Find the **difference in medians** from the girls (top graph) to the boys (bottom graph).

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

102. Find the **difference in the interquartile ranges** from the girls to the boys.

- A. The interquartile ranges are the same.
- B. The boys' interquartile is 1 greater than the girls' interquartile.
- C. The girls' interquartile is 1 greater than the boys' interquartile.
- D. The girls' interquartile is 2 greater than the boys' interquartile.
- E. None of the above

103. Based on this data, what is the **median height of a girl** in 7<sup>th</sup> grade?

- A. 5'1"
- B. 5'2"
- C. 5'3"
- D. 5'4"
- E. None of the above

104. Based on this data, what is the **range of heights of boys** in 7<sup>th</sup> grade?

- A. 2" above
- B. 3"
- C. 4"
- D. 5"
- E. None of the above

105. Which conclusion can you **Not** draw based on the data in the graph?

- A. Boys are generally taller than girls in 7<sup>th</sup> grade.
- B. Twenty-five percent of the boys were between 65"-67" tall.
- C. The shortest boy was 2 inches taller than the shortest girl.
- D. The mean of the heights for girls is 63" or 5'3" tall.
- E. None of the above

106. Six colored cubes are laced in a sack. Two are primary colors. Four are secondary colors. One block is randomly drawn from the sack. What is the probability Not selecting a primary color?

- A. 0      B. 1/6      C. 1/3      D. 1/2      E. 2/3

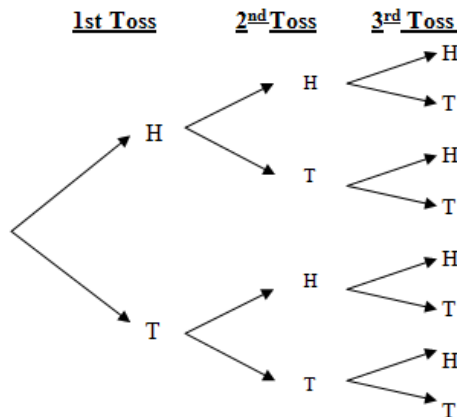
107. What is the probability of rolling a sum of five when there are two die?

- A. 1/9      B. 1/6      C. 1/5      D. 1/3      E. None of the above

108. A regular six-sided die is tossed. **What is the probability of rolling a prime factor of 100?**

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

**For problems #109-110, three fair coins are flipped.**



109. What is the total number of possible outcomes for the three flips?

- A. 1      B. 3      C. 6      D. 8      E. 9





110. What is the probability that **two are heads and one is a tail?**

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

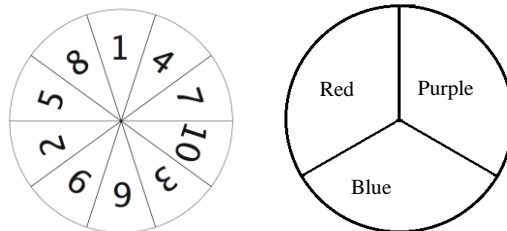
111. What is the probability that **NONE of the coins are heads?**

- A. 7/8      B. 5/8      C. 1/2      D. 3/8      E. 1/8

Use the standard deck of cards shown to answer problems #112-115.

<p>A 2 3 4 5 6 7 8 9 10 J Q K</p> 	<p><b>112. How many cards</b> are in a standard deck ?</p> <p>A. 4                      B. 13                      C. 50 D. 52                      E. None of the above</p>
<p>A 2 3 4 5 6 7 8 9 10 J Q K</p> 	<p><b>113. What is the probability</b> of getting <b>face card</b> out of the deck of cards?</p> <p>A. 0.23                      B. 0.10                      C. 0.16 D. 0.06                      E. None of the above</p>
<p>A 2 3 4 5 6 7 8 9 10 J Q K</p> 	<p><b>114. What is the probability</b> of getting an <b>Jack of Diamonds or an Ace of Hearts?</b></p> <p>A. 1/52                      B. 2/51                      C. 1/26 D. 1/13                      E. None of the above</p>
<p>A 2 3 4 5 6 7 8 9 10 J Q K</p>  <p><a href="http://www.anlyzemath.com">www.anlyzemath.com</a></p>	<p><b>115. What is the probability</b> of getting an <b>even red numbered card?</b></p> <p>A. 0.192                      B. 0.231                      C. 0.385 D. 0.432                      E. None of the above</p>

Use the two spinners below to answer problems #116 –118.



116. If the color spinner is spun, what is the probability of landing on a primary color?
- A. 1/3                      B. 2/3                      C. 0                      D. 1                      E. None of the above
117. If the number spinner is spun, what is the probability that a number is a multiple of 3?
- A. 10%                      B. 33 1/3%                      C. 40%                      D. 50%                      E. None of the above
118. When spinning both spinners, what is the probability that you will spin a 3 and Purple?
- A. 1/10                      B. 1/15                      C. 1/30                      D. 2/13                      E. None of the above

Use the data in the table on Selected Champion Trees for problems #119-121.

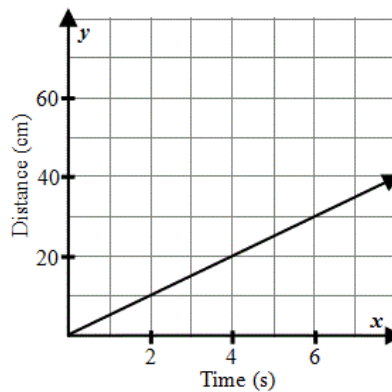
Selected Champion Trees

Tree Type	Circumference (ft)	Height (ft)	Spread/Diameter (ft)
Giant Sequoia (Calif.)	83.2	275	107
Coast Redwood (Calif.)	79.2	321	80
Swamp Chestnut Oak (Tenn.)	23.0	105	216
Florida Crossopetalum (Fla.)	0.4	11	3
White Oak (Md.)	31.8	96	119

Source: Washington Post

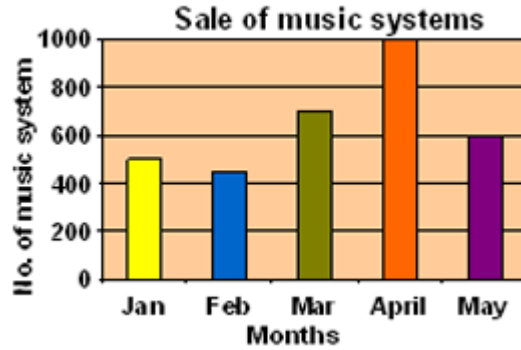
119. What is the **median spread/diameter** in feet of the trees listed?
- A. 216      B. 213      C. 119      D. 107      E. None of the above
120. What is the **mean circumferences** of the Champion trees?
- A. 31.8'      B. 96'      C. 161.8'      D. 310'      E. None of the above
121. What is the **difference in the heights of** the two California trees?
- A. 0.4 ft.      B. 1 ft.      C. 4 ft.      E. 82.8 ft.      E. None of the above

Use the graph on the distance an ant travels over time for problems #122-123.



122. What is the **rate** the ant travels in the first three seconds?
- A. .5 cm/s      B. 0.2 cm/s      C. 2 cm/s      D. 5 cm/s      E. 20/3 cm/sec
123. If the ant travels 11 seconds, **estimate the distance** it would travel.
- A. 10cm      B. 55 cm      C. 60cm      D. 75cm      E. None of the above

Use the bar graph data on music sales below for problems #124-125.



124. What is the largest **difference** in the sales of music systems from month to month?  
 A. 500      B. 400      C. 600      D. 300      E. None of the above
125. Which statement is **NOT** true based on the data on the sales of music systems?  
 A. The total number of sales from January through May was greater than 3,000.  
 B. The median sales month is May.  
 C. The range of total sales was approximately 580 comparing April and February.  
 D. Sales climbed between February and April.  
 E. All are true statements.

Use the table showing possible sums resulting from rolling two dice to answer problems #126-129.


126. What is the probability of getting a **sum of less than 7**?  
 A. 7/12      B. 1/12      C. 23/36      D. 5/2  
 E. None of the above
127. What is the probability of getting an **sum that is greater than or equal to 5**?  
 A. 1/6      B. 1/3      C. 1/2      D. 4/9  
 E. None of the above
128. What is the probability of getting an **even sum greater than or equal to 7**?  
 A. 5/18      B. 1/3      C. 1/2      D. 1/4      E. None of the above
129. What is the probability of getting a **multiple of 4 And factor of 12**?  
 A. 5/18      B. 1/3      C. 1/2      D. 1/4      E. None of the above

Use the average temperatures of Franklin and Jackson for problems #130-132.

Average Monthly High Temperature (F°) For Two U.S. Cities

	<u>Franklin</u>	<u>Jackson</u>
Jan.	29	15
Feb.	30	20
Mar.	35	22
Apr.	40	30
May	42	45
June	58	58
July	60	78
Aug.	59	77
Sept.	50	60
Oct.	42	58
Nov.	38	32
Dec.	30	20

130. Which average of the averages is greater and by how much?

- A. Franklin,  $0.17^\circ$       B. Jackson,  $0.17^\circ$       C. Franklin by  $1.7^\circ$   
D. Jackson by  $1.7^\circ$       E. None of the above

131. What is the **difference between the lowest temperatures** in both cities?

- A.  $19^\circ$       B.  $18^\circ$       C.  $14^\circ$       D.  $31^\circ$       E. None of the above

132. What is the **mode** temperature in Jackson?

- A.  $30^\circ$       B.  $58^\circ$       C.  $20^\circ$       D.  $20^\circ$  and  $58^\circ$       E. None of the above
- 

133. **How many different ways** can four people be seated at a circular table?

- A. 5      B. 15      C. 120      D. 25      E. None of the above

134. You are selecting your outfit for a trip to Grandma's house. You choose from 4 different shirts, 3 pair of pants, and 2 pair of shorts. **How many different outfits** can you have to choose to wear?

- A. 4      B. 7      C. 9      D. 24      E. None of the above

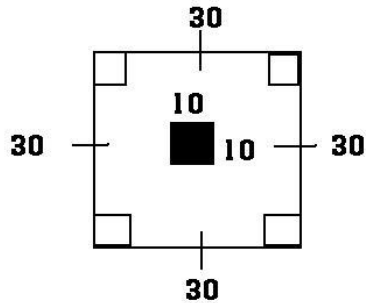
135. **How many different ways** can 6 books be placed on a shelf?

- A. 6      B. 60      C. 120      D. 720      E. None of the above

136. **How many different ways** can a four person committee be selected from a group of 10 people?

- A. 64      B. 56      C. 88      D. 49      E. None of the above

137. Find the **probability** of landing anywhere in the larger square?

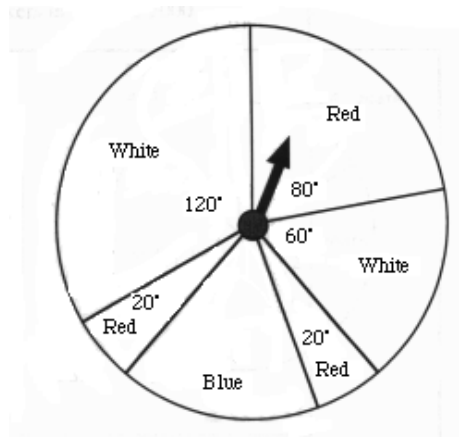


- A.  $1/9$
- B.  $1/6$
- C.  $1/93$
- D.  $1/10$
- E. 1

138. If you scored 84%, 75%, 70%, and 86%, **what would it take on your next test** to get an average score of exactly 80%?

- A. 84%
- B. 85%
- C. 86%
- D. 87%
- E. None of the above

Use the figure below for problems #139-140.



139. What is the probability of landing in the **Red** sections on the circle?

- A. 0.056
- B. 0.111
- C. 0.333
- D. 0.5
- E. None of the above

140. What is the probability of landing in the **Blue** section on the circle?

- B. 0
- B. 0.167
- C. 0.333
- D. 0.611
- E. None of the above