

Kansas City Area Teachers of Mathematics  
2015 KCATM Math Competition

**ALGEBRAIC REASONING AND DATA  
GRADE 4**

**INSTRUCTIONS**

- **Do not open this booklet** until instructed to do so.
- Time limit: **15 minutes**
- You **may use calculators** on this test.
- Use the  **$\pi$  key** on your calculator **or 3.14** as the approximation for pi.
- Mark your answer on the answer sheet by **FILLING in the CIRCLE**.
- You **may not use rulers, protractors, or other measurement devices** on this test.

Student Name \_\_\_\_\_ Student Number \_\_\_\_\_

School \_\_\_\_\_

101. A blue scarf costs \$3. A red scarf costs 6 times as much as a blue scarf. Which expression shows how much 5 red scarves cost?

- A.  $c = (\$3 + \$6) \times 5$       B.  $c = (\$3 \times 6) \times 5$       C.  $c = \$3 \times 5 + 6$   
 D.  $c = \$3 \times 5$       E. None of the above

102. What is the value of  $M + L - K$  when  $L = 3$ ,  $M = 2$ ,  $K = 6$ ?

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

103. If Grace’s brother is 3 years older than Grace, and her sister is half the age of Grace, what is the sum of their ages if Grace is 8?

- A. 24      B. 15      C. 22      D. 23      E. None of the above

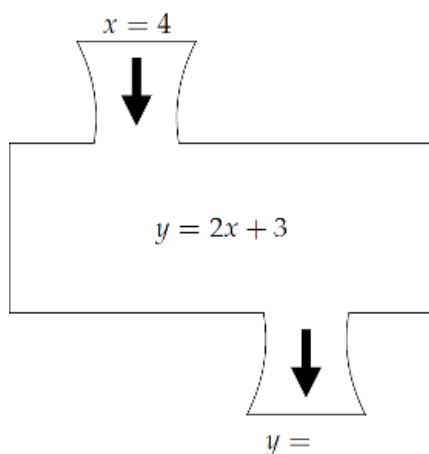
104. Autumn and Charlie each ran a mile. It took Autumn 11.79 minutes. It took Charlie 9.08 minutes. Which number sentence can Charlotte use to **best estimate** the difference in their times?

- A.  $A - C = 11 - 9$       B.  $A - C = 12 - 10$       C.  $C - A = 12 - 9$   
 D.  $A - C = 12 - 9$       E. None of the above

105.  $N$  stands for the number of hours of sleep Alex gets each night. Which of the following expressions represents the number of hours of sleep Alex gets in a week?

- A.  $N + 7$       B.  $N \times 7$       C.  $N \times 7$       D.  $N \div 7$       E. None of the above

106. Use the function machine to find the value of output “y” when the input for “x” is 4.



- A. 11  
 B. 9  
 C. 5  
 D. 1  
 E. None of the above

107. Four more than a number is 12. What is the number?

- A. 16      B. 3      C. 8      D. 48      E. None of the above

108. In the pattern below, which of the following would go into the blank space?



- A. ○      B. □      C. ○      D. △      E. None of the above

109. The number of tomato plants and the number of tomatoes harvested are listed below in the table. If this pattern were to continue, how many tomatoes would be on 44 plants?

<b># of Plants</b>	2	4	6	8	10	12	14	16	18	44
<b>Tomatoes</b>	22	44	66	88	110	132	154	176	198	?

- A. 444      B. 584      C. 484      D. 648      E. None of the above

110. On Thursday, Jaime played 2 games on the computer. On Friday, Jaime played 7 games. On Saturday, Jaime played 12 games. If the pattern continued, how many games did Jaime play on Wednesday, the sixth day?

- A. 19      B. 21      C. 27      D. 32      E. None of the above

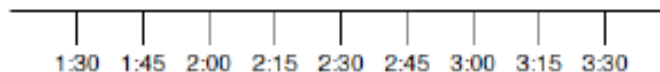
111. If each letter of the alphabet is assigned a number starting with A = 1, B = 2, etc., the values of the letters in the alphabet will start to look like this:

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>
1	2	3	4	5	6	7	8	9	0	11	12	13
<b>N</b>	<b>O</b>	<b>P</b>	<b>Q</b>	<b>R</b>	<b>S</b>	<b>T</b>	<b>U</b>	<b>V</b>	<b>W</b>	<b>X</b>	<b>Y</b>	<b>Z</b>
14	15	16	17	18	19	20	21	22	23	24	25	26

If your code is the **sum** of the letter values, what is the value of **“Mathematics”**?

- A. 112      B. 103      C. 110      D. 93      E. None of the above

112. Use the number line to help you find the time you need to leave for the airport if it takes 45 minutes to drive there and you need to arrive at the airport one hour early for a 3:30 flight.



- A. 1:15      B. 1:45      C. 2:00      D. 2:15      E. None of the above

113. Tommy is shorter than Jimmy. Tommy is taller than Billy. Denny's height is between Tommy and Jimmy's height. Who is the shortest person?

- A. Tommy      B. Jimmy      C. Billy      D. Denny      E. None of the above

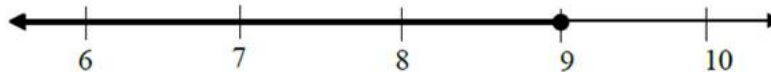
114. What is the greatest common factor, GCF, of 18 and 24?

- A. 4      B. 6      C. 8      D. 12      E. None of the above

115. You have three bags, each containing two marbles. Bag A contains two red marbles, Bag B contains two blue marbles, and Bag C contains one red marble and one blue marble. If you put all the marbles into one bag and pull out one marble. What is the probability of it being a blue marble?

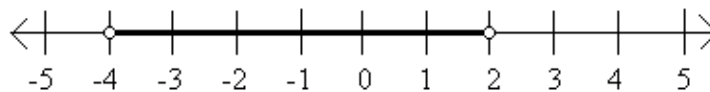
- A.  $\frac{1}{3}$       B.  $\frac{1}{4}$       C.  $\frac{1}{2}$       D.  $\frac{2}{3}$       E. None of the above

116. Which inequality is graphed below?



- A.  $N < 9$       B.  $N > 9$       C.  $N \leq 9$       D.  $N \geq 9$       E. None of the above

117. Which inequality is graphed below?

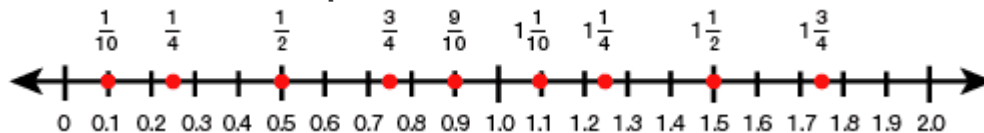


- A.  $-4 < N < 2$       B.  $-4 > N > 2$       C.  $2 \leq N \leq -4$       D.  $2 \geq N \geq -4$       E. None of the above

118. Solve for n:  $3n + 6 = 39$

- A. 15      B. 11      C. 135      D. 99      E. None of the above

Use the number line below for problems 119 and 120.



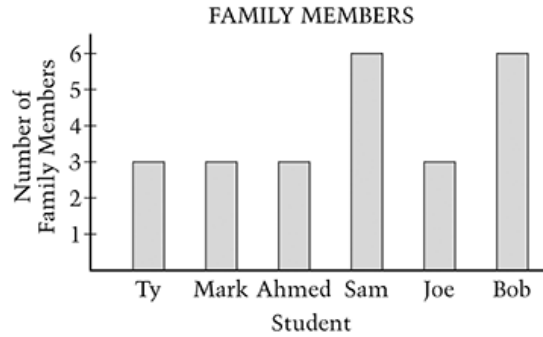
119. What is the decimal value of  $1\frac{3}{4}$ ?

- A. 1.25      B. 1.7      C. 1.8      D. 1.75      E. None of the above

120. There is a pattern of fractions starting with  $\frac{1}{4}$  and going upward above the line, except for one number in the pattern. Which number is missing in this pattern of fractions?

- A.  $\frac{1}{5}$       B. 1      C.  $\frac{5}{4}$       D.  $1\frac{3}{8}$       E. None of the above

121. Complete the table based on the graph:



Name	Ty	Mark	Ahmed	Sam	Joe	Bob
# of Family Members						

Use this information to find the ratio of number of family members of Sam compared to all of the others.

- A.  $\frac{1}{2}$       B.  $\frac{1}{4}$       C.  $\frac{1}{3}$       D.  $\frac{1}{6}$       E. None of the above
122. Hollister has a sale that has buy one get one half off (BOGO). Which equation represents the cost of purchasing 2 pair of jeans at a cost of \$37 each.

- A.  $C = 2 \times \$37$                       B.  $C = \$37 + \$18.50$                       C.  $C = \$37 + 19.50$   
 D.  $C = \$37 + .05 \times \$37$                       E. None of the above

123. It takes Dion three times as long to get ready for baseball practice as it does Dasjon. It takes Lamont 10 minutes less than Dion to get ready. If Dasjon takes 8 minutes to get ready, how long does it take Lamont to get ready?

- A. 14 min.      B. 16 min.      C. 24 min.      D. 34 min.      E. Not given



124. What are the three numbers that precede the numbers in the sequence of numbers:

\_\_\_ \_\_\_ \_\_\_ 4 , 8, 16

- A.  $\frac{1}{4}, \frac{1}{2}, 1$       B.  $\frac{1}{2}, 1, 2$       C.  $\frac{1}{4}, 1, 2$       D.  $1, \frac{1}{2}, \frac{1}{4}$       E. None of the above
125. It will cost \$520 to take a field trip to a local museum which includes the cost of lunch. Three adults will pay their own way which is \$60 out of the total cost. If there are 25 students, **how much will each student** have to pay if they split the rest?

- A. \$18.40      B. \$20.80      C. \$13.60      D. \$23.20      E. None of the above

126. Below you see 4 different exponent explanations. Using the pattern of the powers of 10, what would be the value of  $10^0$  ?

Multiplication Expression	Words and/or Pictures	Exponential Notation	Standard Notation
$10 \times 10 \times 10$	 ten cubed	$10^3$	1,000
10		$10^1$	10
$10 \times 10 \times 10 \times 10$	ten to the fourth power	$10^4$	10,000
$10 \times 10 \times 10 \times 10 \times 10$	ten to the fifth power	$10^5$	100,000

- A. 100      B. 0.1      C. 1,000,000      D. 1      E. None of the above

127. Solve this proportion:

$$\frac{x}{45} = \frac{1}{9}$$

- A. 3      B. 4      C. 5      D. 6      E. None of the above

128. What are the next three numbers in the pattern:

200, 100, 50, \_\_\_\_, \_\_\_\_, \_\_\_\_

- A.  $10, 5, 2\frac{1}{2}$       B. 10, 5, 1      C.  $25, 12\frac{1}{2}, 6\frac{1}{4}$   
 D. 25, 12, 6      E. None of the above

129. What is the next number in the pattern: -34, 30, -26, 22, -18, 14

- A. 9      B. 10      C. -9      D. -10      E. None of the above

130. You have four friends coming over to play video games. Each one of you has a favorite game. **How many different ways** can the 4 games be played?

- A. 24      B. 12      C. 6      D. 4      E. None of the above

131. You want your family to go to Disney World in Orlando, Florida. It is 1,250 miles from Kansas City. You want to find out how much it will cost in gas to make the trip. If your family car gets 18 miles per gallon (mpg) and the cost of gas is an average of \$2.50, how much would it **cost for gas to make the round trip** to Orlando?

- A. \$172.61      B. \$347.22      C. \$562.50      D. \$112.50      E. None of the above

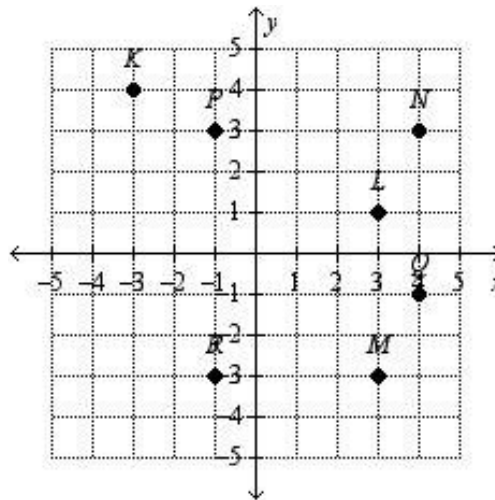
132. Which of the following numbers is **NOT** prime?

- A. 1                  B. 2                  C. 13                  D. 29                  E. All are prime

133. What is the value of the following expression:  $(-3)^2 \times (4 + 8) \div 2$

- A. -18                  B. -36                  C. 54                  D. 15                  E. None of the above

Use the coordinate graph for problems 134-136.



134. Which 3 points below do **NOT** make a right triangle?

- A. L, M, R                  B. P, N, Q                  C. P, R, M                  D. P, L, M                  E. None of the above

135. If P, N and R are three vertices of a rectangle, **what would be the coordinates of the fourth vertex of the rectangle ?**

- A. (4, -3)                  B. (3, -4)                  C. (-3, 4)                  D. (-4, -3)                  E. None of the above

136. Plot the point A(-1, 1). What is the **area of the quadrilateral ALMR?**

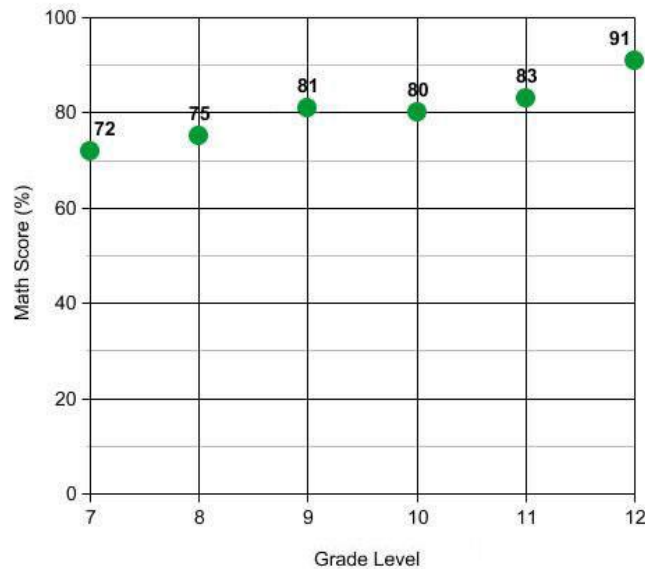
- A. 4 sq. units                  B. 16 sq. units                  C. 25 sq. units  
D. 20 sq. units                  E. None of the above

137. Which sign would make the following statement true?

$$0.724 \text{ \_\_\_ } 29/40$$

- A. <                  B. =                  C. >                  D. ≥                  E. Not given

138. Analyze the graph below. Which statement is correct?



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- A. Math scores grew by 3% each grade level.  
 B. The pts. on the graph are: (7, 72), (8, 75), (9,81), (10,80), (11,83), (12,91)  
 C. Eleventh graders scored 19% higher than 7<sup>th</sup> graders.  
 D. The pts. on the graph are: (72, 7), (75,8), (81,9), (80,10), (83,11), (91,12)  
 E. All statements are correct.
139. Which number is “forty-eight less than half three-hundred ninety-two”?
- A. 103      B. 736      C. 148      D. 188      E. None of the above
140. Which property is NOT used to solve this problem?

$$3(n - 2) = 24 + n$$

$$3n - 6 = 24 + n$$

$$2n - 6 = 24$$

$$2n = 30$$

$$n = 15$$

- A. Addition property of equality  
 B. Division property of equality  
 C. Distributive property  
 D. Subtraction property of equality  
 E. All properties above are used.



Shade the correct answer!

Example: A ● C D E

Name \_\_\_\_\_

School \_\_\_\_\_

- 101. A B C D E
- 102. A B C D E
- 103. A B C D E
- 104. A B C D E
- 105. A B C D E
- 106. A B C D E
- 107. A B C D E
- 108. A B C D E
- 109. A B C D E
- 110. A B C D E
- 111. A B C D E
- 112. A B C D E
- 113. A B C D E
- 114. A B C D E
- 115. A B C D E
- 116. A B C D E
- 117. A B C D E
- 118. A B C D E
- 119. A B C D E
- 120. A B C D E

- 121. A B C D E
- 122. A B C D E
- 123. A B C D E
- 124. A B C D E
- 125. A B C D E
- 126. A B C D E
- 127. A B C D E
- 128. A B C D E
- 129. A B C D E
- 130. A B C D E
- 131. A B C D E
- 132. A B C D E
- 133. A B C D E
- 134. A B C D E
- 135. A B C D E
- 136. A B C D E
- 137. A B C D E
- 138. A B C D E
- 139. A B C D E
- 140. A B C D E

Shade the correct answer!

Example: A  B  C  D  E

Name \_\_\_\_\_

School \_\_\_\_\_

**ANSWER KEY 3.15.15**

- 101. A  B  C  D  E
- 102.  A  B  C  D  E
- 103. A  B  C  D  E
- 104. A  B  C  D  E
- 105. A  B  C  D  E
- 106.  A  B  C  D  E
- 107. A  B  C  D  E
- 108.  A  B  C  D  E
- 109. A  B  C  D  E
- 110. A  B  C  D  E
- 111.  A  B  C  D  E
- 112. A  B  C  D  E
- 113. A  B  C  D  E
- 114. A  B  C  D  E
- 115. A  B  C  D  E
- 116. A  B  C  D  E
- 117.  A  B  C  D  E
- 118. A  B  C  D  E
- 119. A  B  C  D  E
- 120. A  B  C  D  E

- 121. A  B  C  D  E
- 122. A  B  C  D  E
- 123.  A  B  C  D  E
- 124. A  B  C  D  E
- 125.  A  B  C  D  E
- 126. A  B  C  D  E
- 127. A  B  C  D  E
- 128. A  B  C  D  E
- 129. A  B  C  D  E
- 130.  A  B  C  D  E
- 131. A  B  C  D  E
- 132.  A  B  C  D  E
- 133. A  B  C  D  E
- 134. A  B  C  D  E
- 135.  A  B  C  D  E
- 136. A  B  C  D  E
- 137.  A  B  C  D  E
- 138. A  B  C  D  E
- 139. A  B  C  D  E
- 140. A  B  C  D  E