

Kansas City Area Teachers of Mathematics  
2017 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 **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. Which expression is “three more than twice n”?

- A.  $2n - 3$     B.  $2(3) + n$     C.  $3 + 2 + n$     D.  $2n + 3$     E. None of the above

102. Which **statement is equivalent** to  $90 = 9 \times 10$  ?

- A. 9 is 10 less than 90    B. 90 is 9 more than 10    C. 9 is 10 times as many as 90  
D. 90 is 9 times as many as 10    E. None of the above

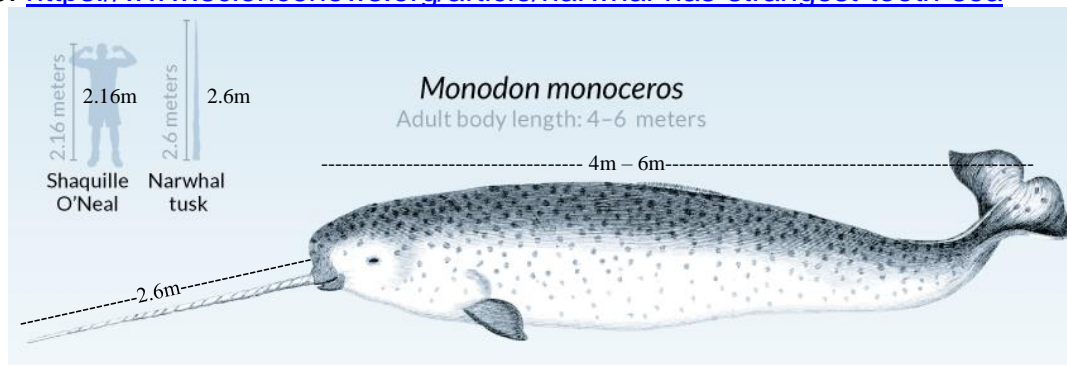
103. An orca whale is 30 feet long. A blue whale is 3 times the length of an orca whale. Which **equation** shows the relationship between the lengths of the orca whale and the blue whale?

- A.  $3 \times 30 = 90$     B.  $3 + 30 = 33$     C.  $3 \times 10 = 30$   
D.  $30 + 30 + 30 + 30 = 120$     E. None of the above

104. A humpback whale is approximately 42 feet in length. A beluga whale is  $\frac{1}{3}$  that length. **Which expression would give you the length of the beluga whale?**

- A.  $42 \text{ ft.} + 3$     B.  $42 \text{ ft.} \times 3$     C.  $42 \text{ ft.} \div 3$   
D.  $42 \text{ ft.} - 3$     E. None of the above

105. Compare the Narwhal whale tusk to Shaquille O’Neal in the graphic found on the website: <https://www.sciencenews.org/article/narwhal-has-strangest-tooth-sea>



**Which statement is NOT true?**

- A. The tusk is approximately  $\frac{1}{3}$  to  $\frac{1}{2}$  the Narwhal’s body length.  
B. The tusk shown is 0.44 meters longer than Shaquille.  
C. Doubling Shaquille’s height would give you approximately the body length of a smaller Narwhal whale.  
D. Approximately 10 times Shaquille’s height is the length of a Narwhal whale from tooth to tail.  
E. None of the above

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106. Which is the correct list of **all factors** of 24?

- A. 1, 2, 6, 12, 24      B. 1, 3, 4, 6, 8      C. 1, 2, 3, 4, 6, 8, 24  
D. 1, 2, 3, 4, 6, 8, 12, 24      E. None of the above

107. Continue the pattern of adding three to the numbers. **What would be the 10<sup>th</sup> term?**

**4, 7, 10, ...**

- A. 40      B. 41      C. 34      D. 31      E. None of the above

108. Forty-eight is **NOT a multiple** of which number?

- A. 16      B. 9      C. 12      D. 24      E. None of the above

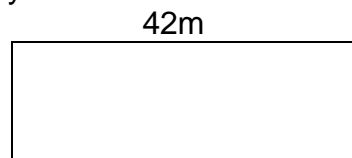
109. What number times itself is 144?

- A. 11      B. 13      C. 14      D. 15      E. None of the above

110. Which of the following numbers is NOT prime?

- A. 1      B. 23      C. 31      D. 17      E. None of the above

111. A rectangular lane pool is 42m long. **It is 6 times longer than it is wide.** Use the diagram to help you find the dimensions of the pool, then find the **perimeter**.



- A. Perimeter = 84 m      B. Perimeter = 96 m  
C. Perimeter = 98 m      D. Perimeter = 588 m      E. None of the above

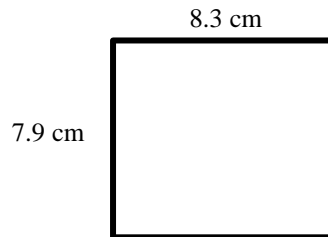
112. Which statement gives the solution of finding the perimeter of a rectangle?

- A. Double the length and add the width  
B. The sum of twice the length and twice the width  
C. Add the length and the width  
D. Multiply the length and the width  
E. None of the above

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Use the following rectangle to answer #113-114. Determine the perimeter and area of the rectangle.



113. What is the **perimeter** of the rectangle?

- A. 15.2 cm    B. 16.2 cm    C. 65.57 cm    D. 32.4 cm    E. None of the above

114. What is the **area** of the rectangle?

- A. 15.2 cm<sup>2</sup>    B. 16.2 cm<sup>2</sup>    C. 32.4 cm<sup>2</sup>    D. 65.57 cm<sup>2</sup>    E. None of the above
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115. Your elementary school (K-5) is trying to raise money for the recent tornado damage in Oak Grove, MO. They hope to raise \$650. Each of the grades K-3 had donations of \$80 each. Fourth grade raised \$145. How much would 5<sup>th</sup> grade need to raise to be able to reach the goal of raising \$650?

- A. \$235    B. \$265    C. \$185    D. \$195    E. None of the above

116. Find the product of 72 and 20 then subtract 2 hundreds + 4

- A. 1244    B. 1236    C. 1644    D. 1416    E. None of the above

117. Find the remainder when 212 is divided by 3.

- A. 0    B. 1    C. 2    D. 3    E. None of the above

118. What is the value of "n" when  $n + 9 = 28$ ?

- A. 19    B. 21    C. 17    D. 21    E. None of the above

119. What operation shows the repeated addition fact below?

$$13 + 13 + 13 + 13 + 13$$

- A.  $13^5$     B.  $(5)(13)$     C.  $13 \div 5$     D.  $13 + 5$     E. None of the above

120. "Like terms" are similar to "like items" you see in organized retail stores. Which of the following expressions contain only "like terms"?

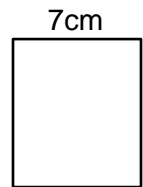
- A.  $5a + 6b$
- B.  $5p + 6p$
- C.  $7r - 3r + 1s$
- D.  $8x - 7y$
- E. None of the above

121. Simplify the expression by adding the "like terms":  $5c + 6c + 8d + 2d$

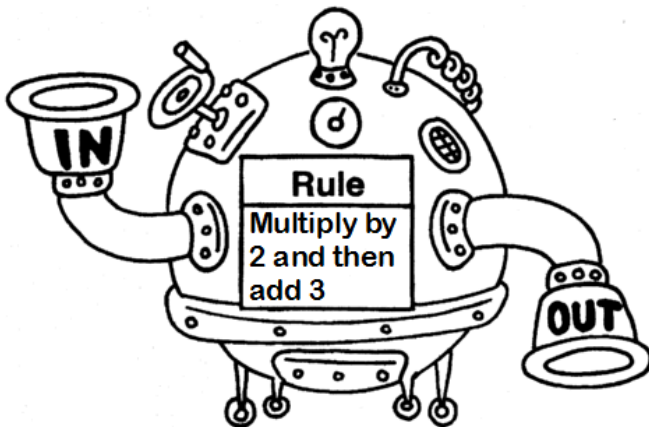
- A.  $21cd$
- B.  $13cd + 8cd$
- C.  $11c + 10d$
- D.  $7d + 14c$

122. Given a rectangle's area is 56 square centimeters and one side is 7cm, find the unknown side length,  $x$ .

- A.  $x = 7$  cm
- B.  $x = 8$  cm
- C.  $x = 9$  cm
- D.  $x = 14$  cm
- E. None of the above

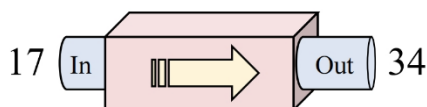


123. Use the function machine to find the value of output "y" when the input is 9.



- A. 14
- B. 24
- C. 15
- D. 21
- E. None of the above

124. Given the function machine, which of these rules would **NOT** work to produce the correct output in this example?



- A. Add 17
- B. Double the input
- C. Triple the input and subtract 10
- D. Add  $3 \times 5 + 2$
- E. None of the above

125. What is the **quotient** of 96 and 8?

- A. 104      B. 88      C. 12      D. 768      E. None of the above

126. Twelve hundred people were polled about their views on charter schools.  
If  $\frac{3}{4}$  of them did not know what a charter school was, how many would that be?

- A. 720 people      B. 600 people      C. 800 people  
D. 900 people      E. None of the above

127. Before the school carnival, **300 students** pre-ordered 25 tickets each at a cost of \$4 for the 25 tickets. How many tickets would have to be printed and how much money will the school make on these tickets?

- A. 750 tickets; \$120      B. 1200 tickets; \$100      C. 600 tickets; \$1200  
D. 7500 tickets; \$1200      E. None of the above

128. Kiley is four less than half her mother's age. If her mother is 36, how old is Kiley?

- A. 12      B. 14      C. 16      D. 17      E. None of the above

129. Solve for the value of  $n$  that would make the equation true:  $4x + 1 = 29$

- A.  $n = 4$       B.  $n = 5$       C.  $n = 7$       D.  $n = 8$       E. None of the above

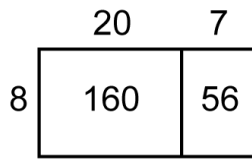
130. If each letter of the alphabet is assigned a number starting with  $A = 1$ ,  $B = 2$ , etc., the values of the letters in the alphabet will start to look like this:

<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 "**college**"?

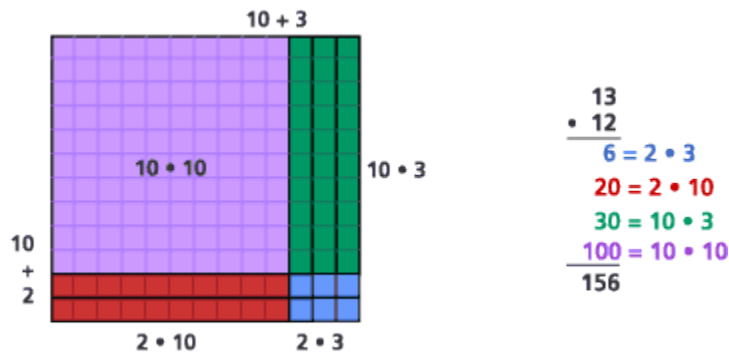
- A. 59      B. 47      C. 60      D. 54      E. None of the above

131. Jaime solved a multiplication problem by drawing an area model.  
**What is the problem and what is the solution?**



- A.  $8 \times 56$ ; Answer = 216
- B.  $28 \times 7$ ; Answer = 206
- C.  $78 \times 2$ ; Answer = 104
- D.  $27 \times 8$ ; Answer = 216
- E. None of the above

132. The following shows 2 models of multiplication: **area model and partial products**.  
 Which equation shows the division problem from these multiplication problems?



- A.  $156 \div 13 = 12$
- B.  $156 \div 20 = 13$
- C.  $156 \div 100 = 56$
- D.  $156 \div 26 = 6$
- E. None of the above

133. What is the **greatest common factor, GCF**, of 60 and 24?

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

134. Penelope has a large pile of pennies when she emptied her change. She wants to count them quickly. What is the **best way** to organize the pennies to be able to quickly count how many pennies she has?

- A. Stack the pennies in groups of 5
- B. Stack the pennies in groups of 3
- C. Stack the pennies in groups of 10
- D. Stack the pennies in groups of 25
- E. None of the above

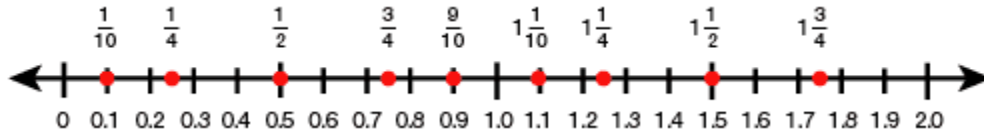
135. Which inequality below is **NOT true**?

- A.  $1 \text{ ft} < 18 \text{ in.}$
- B.  $8 \text{ ounces} < 1 \text{ cup}$
- C.  $4 \text{ feet} > 36 \text{ in.}$
- D.  $2 \text{ gallons} > 7 \text{ quarts}$
- E. None of the above

136. Which inequality below IS true?

- A. 12 kilograms < 12,000 grams
- B. 8 liters > 9,000 milliliters
- C. 4 yards > 4 meters
- D. 6 feet > 1 yard
- E. None of the above

Use the number line below for problems #137-139.



137. How many tenths are in  $1\frac{1}{10}$  ?

- A. 1
- B. 10
- C. 11
- D. 12
- E. None of the above

138. What is the fraction that represents 1.25?

- A.  $\frac{3}{4}$
- B. 1
- C.  $1\frac{1}{2}$
- D.  $1\frac{3}{8}$
- E. None of the above

139. What is  $\frac{1}{2} - \frac{1}{10}$  ?

- A. 0.1
- B. 0.2
- C. 0.3
- D. 0.4
- E. None of the above

140. Reading is the greatest indicator of success in school. In elementary school we ask the students to read, read, read! Your school has set a goal of 10,000 books in a month. Kindergarteners are read to by parents or they read on their own 20 books each. First and second graders read to their parents or read on their own 16 books each. Third through 5<sup>th</sup> graders read longer books, so they read 10 books each. Use the data below to see how many more books they need to read to meet their goal.

Grade	# of Students	Grade	# of Students
Kindergarten	100	3 <sup>rd</sup> grade	112
1 <sup>st</sup> grade	115	4 <sup>th</sup> grade	131
2 <sup>nd</sup> grade	120	5 <sup>th</sup> grade	125

- A. 440
- B. 560
- C. 640
- D. 660
- E. None of the above