Kansas City Area Teachers of Mathematics
2014 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 **π 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.

(Some of the questions on this exam were adapted from the NCTM website and other resources available on state websites to help prepare for the CCSSM.)

Student Name _____ Student Number _____

School _____

101. Carla spent $20 on a video game. If Carla spent 1/5 of her savings account on the game, how much did Carla originally have in her savings account?

A. $4 B. $16 C. $40 D. $100 E. $140

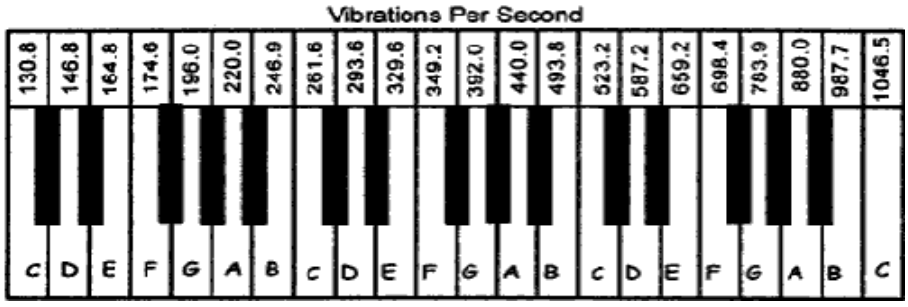
102. The gravitational pull on Jupiter is approximately 2.64 of Earth's gravitational pull. If you weigh 78 pounds (lbs) on Earth, about how much would you weigh on Jupiter?

A. 206 lbs B. 29.5 lbs C. 100 lbs D. 22 lbs E. Not given

103. A farmer plants 115 saplings per row in his tree farm. How many **FULL rows** would he be able to plant with 30,500 saplings?

A. 205 B. 365 C. 265 D. 270 E. Not given

104. The first note with a frequency of 220 vibrations per second on the keyboard below is labeled with the letter **A**. Find a pattern of the vibrations per second for the other keys labeled with **"A"**. IF the keyboard were to be extended, **how many vibrations per second** would be produced when the **fourth "A"** is played?



(NCTM: Adapted from Everyday Mathematics Sixth Grade Resource Book, from the University of Chicago School Mathematics Project [Chicago, Ill.: Everyday Learning Co., 1999].)

A. 880.0 B. 1760.0 C. 1400.5 D. 1320 E. Not given

105. Scientists use the distance between dinosaur fossil footprints to estimate how fast dinosaurs moved. About how far could Tyrannosaurus Rex run in 30 minutes if scientists estimate that it could run about 25 miles per hour?

A. 12.5 mi. B. 13.8 mi. C. 15 mi. D. 65 mi. E. Not given

106. An apple farmer noticed a pattern in the number of apples he was picking from his trees. He picked 5 from the first tree, 8 from the second tree, and 11 from the third tree. If this pattern were to continue, how many apples would he get from the 10th tree?

Tree	1	2	3	4	5	6	7	8	9	10
Apples	5									

A. 14 B. 32 C. 28 D. 39 E. Not given

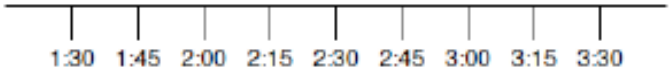
107. Mathematician Sophie Germain worked with codes and mathematics. If each letter of the alphabet is assigned a number starting with A = 1, B = 2, etc., the values of the letters in the alphabet will start to look like this:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	2	3	4																						

If your code is the **sum** of the letter values, what is the value of **"KCATM"**?

A. 33 B. 38 C. 48 D. 50 E. Not given

108. What time does Dominico have to leave his house to arrive at his friend's house by a quarter 'til 3 if the trip takes 90 minutes? Use the number line to help you.



A. 1:15 B. 1:45 C. 2:00 D. 2:15 E. Not given

109. George has been the name of three of our presidents. The most popular presidential name has been James (6 presidents). John and William tie (each had 4). Franklin was the name of 2 presidents. President Barack Obama is the 44th president. Complete the table of data.

Name	George	James	John	William	Franklin
# of Presidents					

Use this information to find the fraction representing presidents whose first name was James, Franklin, William, **or** John.

A. $\frac{4}{11}$ B. $\frac{7}{22}$ C. $\frac{15}{44}$ D. $\frac{19}{44}$ E. Not given

110. Exactly $37.00 was collected at lunch which included the meal and milk. Each meal cost $1.50 and a carton of milk cost $0.25. If 28 milk containers were sold, which equation could be used to solve for the number of "n" lunches that were sold?

A. 1.75n = 37 B. 1.50 x 28 + 0.25n = 37 C. 1.50n + 0.25 x 28 = 37
D. (1.50n + 0.25) x 28 = 37 E. Not given

111. It takes Arthur twice as long as Barry and half as long as Colin to ride his bike to school. If it takes Barry 7 minutes to ride his bike to school, how long does it take Colin to get to school?

A. 14 min. B. 17.5 min. C. 25 min. D. 28 min. E. Not given

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

72, 36, 18, ___, ___, ___

A. $10,5,2\frac{1}{2}$ B. $10,4,2$ C. $9,4\frac{1}{2},2\frac{1}{2}$ D. $9,4\frac{1}{2},2\frac{1}{4}$ E. Not given

113. What is the next number in the pattern: 16, 13, 18, 15, 20, ___

A. 17 B. 18 C. 19 D. 25 E. Not given

114. Roman numerals are still used today. If I = 1, V = 5, and X = 10, which Roman Numeral is the number **"nine"**?

A. IXV B. XII C. IX D. XIV E. Not given

115. Three friends want to be at the front of a line to buy a new game console at Super-Store. How many different ways could the three friends line up in front of the store?

A. 3 B. 4 C. 5 D. 6 E. Not given

116. Lewis and Clark took about two and a half years to travel 8000 miles. If you make the 8,000 mile trip, about how much would it cost at today's prices of $3.30 per gallon of gas in a car that gets 25 miles per gallon (mpg)?

A. $825 B. $1056 C. $2640 D. $26,400 E. Not given

117. What are the missing numbers in the pattern: 2510, 2520, ____, ____, 2550

A. 2530, 2560 B. 2540, 2545 C. 2630, 2540
D. 2540, 2560 E. Not given

118. The 125 fourth-grade students at Cedar Hills School donate pennies to raise $75 for a local charity. What is the **minimum** number of pennies **each student** needs to bring if they are to meet their goal of collecting $75?

A. 75 B. 60 C. 100 D. 82 E. Not given

119. How do you change his distance of 3,457 kilometers into meters?

A. Multiply 3,457 by 10
B. Divide 3,457 by 100
C. Divide 3,457 by 1000
D. Multiply 3,457 by 1000

120. Your school is having a canned food drive for Harvesters. How many **total cans** would you have if you made a solid pyramid with 13x13 cans on the first level, 12x12 on the second level and continue the pattern all the way up to just one can on top?

A. 91 B. 1310 C. 819 D. 2,162,160
E. Not given

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

A. 17 B. 29 C. 43 D. 133 E. All are prime

122. What is the value of the following expression: 3 x (4 + 8) ÷ 2

A. 10 B. 18 C. 32 D. 20 E. Not given

123. If $n^2 = n \times n$, and $n^3 = n \times n \times n$, what is the value of 2^6?

A. 12 B. 16 C. 32 D. 64 E. Not given

124. The 4-Man Bob sled results from the 2014 Sochi Winter Olympics are in the table:

Position	Team	Heat 3 Time	Heat 4 Time	Overall Time
1. Gold	Russia 1	55.02	55.39	3:40.60
2. Silver	Latvia 1	55.15	55.31	3:40.69
3. Bronze	United States 1	55.30	55.33	3:40.99

By how much did Russia beat the USA in the overall time?

A. 0.59 sec. B. 0.31 sec. C. 0.39 sec. D. 0.21 sec. E. Not given

125. Use the table of values to help you convert the value of 84 inches to feet.

A. 6 ft. B. 7 ft. C. 8 ft. D. 9 ft.
E. Not given

Foot and inch equivalences

feet	inches
0	0
1	12
2	24
3	

126. Mr. Kaloti (K) is 3 year less than twice as old as his son, Manpreet (M). Which equation represents the numerical relationship between their ages?

A. 2K – 3 = M B. 2M – 3 = K C. 2M + 3 = K D. 2K + 3 = M E. Not given

127. Lindsey's Candies has been studying how much chocolate people have been eating in different countries.

Chocolate consumption per capita (kg)		
Country	**2002**	**2005**
Poland	3	4
Australia	4	5
Denmark	9	8
Belgium	8	11

Which country consumed the least chocolate per capita in 2005?

A. Poland B. Australia C. Denmark D. Belgium E. Johnson

(from http://www.ixl.com/math/grade-4/read-a-table#sthash.GHfbvt8s.dpuf)

128. Examine the operation of how to use the number of days to find the number of beans in a classroom jar. On Day 29, how many beans would be in the jar?

Day	Operation	Beans
0	3 x 0 + 4	4
1	3 x 1 + 4	7
2	3 x 2 + 4	10
3	3 x 3 + 4	13
4	3 x 4 + 4	16
5	3 x 5 + 4	19

A. 22 B. 91 C. 97
D. 159 E. Not given

129. Which sign would be **correct** when comparing the values: 3,457 ___ 3,456

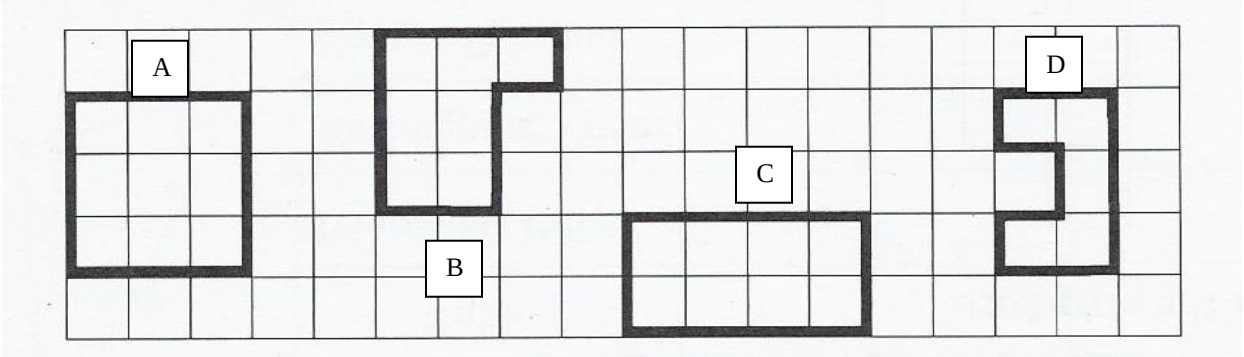
A. < B. = C. > D. ≤ E. Not given

130. Which sign would be **correct** when comparing the following values:

three-fifteenths ___ three-twelfths

A. < B. = C. > D. ≥ E. Not given

131. Which shape below has a **perimeter** figured with the expression: (3 x 2) + (3 x 2)?



E. None of the above

132. Which number is “seven less than twice twenty-seven”?

A. 20 B. 43 C. 46 D. 47 E. Not given

133. Which number is “nine more than a third of seventy-two”?

A. 30 B. 33 C. 36 D. 39 E. Not given

134. Which is the correct expression for “fourteen less than a half a number”?

A. 14 – n B. 2n – 14 C. 14 – 0.5n D. 0.5n – 14 E. Not given

135. Find the value for the expression: 32/4 + (16 – 4) x 3 ÷ 6

A. 14 B. 55 C. 6 D. 60 E. Not given

136. Which statement shows the **distributive property**?

A. 7 x (2 x 5) = (7 x 2) x 5 B. (7 + 2) + 5 = 7 + (2 + 5)
C. 7 x (2 x 5) = 7 x (2 x 5) D. 7(2 + 5) = (7 x 2) + (7 x 5)
E. None of the above

137. Which statement shows the **commutative property of addition**?

A. 8 x (3 x 11) = (8 x 3) x 11 B. 8 + (3 + 11) = 8 + (3 + 11)
C. 8 + 3 + 11 = 8 + 11 + 3 D. 8 + (3 + 11) = (8 + 3) + 11
E. None of the above

138. Which one of the following shows the **associative property**?

A. 6 x 6 = 6 x 4 + 6 x 2 B. (6 x 2) x 5 = 6 x (2 x 5)
C. (6 + 2) + 5 = (2 + 6) + 5 D. (6 x 2) x 5 = (2 x 6) x 5
E. Not given

139. Joe and Sally make 72 cookies for a bake sale. They will put equal numbers of cookies into bags for the sale. They want to put great than 2 but fewer than 10 cookies into each bag. Sally says that they can put 9 cookies into each of 8 bags or 8 cookies into each of 9 bags. Joe thinks there are more ways to distribute the cookies into bags. How many **ways** can they distribute the cookies with fewer than 8 cookies per bag?

A. 2 B. 3 C. 4 D. 5 E. Not given

140. If in September your parents give you 1 penny on Day 1, 2 pennies on Day 2, 4 pennies on Day 3, and 8 pennies on Day 4. If the pattern continues, how many pennies will your parents give you on the last day of the month?

Day	1	2	3	4	5	6	7	8	9	10	11	…
#Pennies	1	2	4	8								…

A. 30 B. 8,192 C. 16,384 D. 32,768 E. Not given

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

Name_____

School _____

ANSWER KEY

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