

Kansas City Area Teachers of Mathematics  
2015 KCATM Contest

# Mathletics

## Grade 5

Instructions:

- Do **NOT** turn this page until instructed to do so.
- WRITE YOUR **TEAM NUMBER** AND **SCHOOL NAME** ON THE LINE PROVIDED ON THE FRONT OF EACH SHEET EACH TIME YOU BEGIN A NEW PROBLEM.
- You will want to use a calculator on this test, but **NO cell phones** **calculators can be used!**
- Blank scratch paper can be used. Please do **NOT** write on the team number card, as they are reused each year.
- You may **not** use rulers, protractors or other measurement devices on this test.

Problems # 1-3

This is a relay problem.

Team Number: \_\_\_\_\_ School: \_\_\_\_\_

Students: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**Problems 1-3** (3 minutes, 3 points)

**1. Find the smallest 3-digit number that is divisible by 2, 3, 4, 5, 6 and 7.**

**Answer:** \_\_\_\_\_

**2. Prime numbers are numbers that have only one and the number as factors. Subtract the sum of the prime numbers between 30 and 50 from your answer to #1 \_\_\_\_\_.**

**Answer:** \_\_\_\_\_

**3. The answer to #2 \_\_\_\_\_ is the amount of money in your savings account. If you add \$15 per week for the next year to the account, how much money would you have in the account without counting interest?**

**Answer:** \_\_\_\_\_

**TEAM #:** \_\_\_\_\_ **School Name** \_\_\_\_\_

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### **Problem # 4**

**Do NOT turn the page until you are told to do so.**

**Team Number:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Problem 4** (3 points, 3 minutes)

The distance between Town A and Town B is 210 km on Hwy 57. At 9:20AM, a bus set off from Town A to Town B with an average rate of speed of 60 km/hr. At the same time, a car left Town B to Town A with an average rate of speed of 80 km/hr.

**Calculate the time at which the car met the bus on the Hwy 57.**

**Answer: \_\_\_\_\_AM**

**TEAM #: \_\_\_\_\_ School Name \_\_\_\_\_**

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### **Problem # 5**

**Do NOT turn the page until you are told to do so.**

**Team Number:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Problem 5** *(2 minutes, 2 points)*

A palindrome is a number that reads the same from right to left as it does from left to right, like 131.

**What 3-digit palindromic number has digits that add to 18 and multiply to 196?**

**Answer:** \_\_\_\_\_

**TEAM #:** \_\_\_\_\_ **School Name** \_\_\_\_\_

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### **Problem # 6**

**Do NOT turn the page until you are told to do so.**

**Team Number:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Problem 6** (2 minutes, 2 points)

The dividend of 6952 is divided by a single digit number. The quotient is a 4-digit number. There is no remainder. All the digits 1, 2, 3, 4, 5, 6, 7, 8, and 9 are used exactly once.

What is the divisor, E, and what is the quotient, ABCD?

$$\begin{array}{r} \text{A B C D} \\ \hline \text{E)6 9 5 2} \end{array}$$

**Answers:**

**E :** \_\_\_\_\_

**Quotient :** \_\_\_\_\_

**TEAM #:** \_\_\_\_\_ **School Name** \_\_\_\_\_



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### **Problem # 7**

**Do NOT turn the page until you are told to do so.**

**Team Number:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Problem 7** (1 minute, 1 point)

- Allie calls his Dad every 3 days.
- Ben calls every 4 days.
- Calvin calls every 6 days.

**Once in every \_\_\_\_\_ days,  
all three will call on the same day.**

**Answer:** \_\_\_\_\_

**TEAM #:** \_\_\_\_\_ **School Name** \_\_\_\_\_

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### **Problem # 8**

**Do NOT turn the page until you are told to do so.**

**Team Number:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Problem 8** (3 points, 3 minutes)

The members of the chess team played each of the other members exactly one time. Over 25 games of chess were played.



**What is the least possible number of members on the team?**

**Answer:** \_\_\_\_\_

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## **Grade 5**

### **Problem # 9**

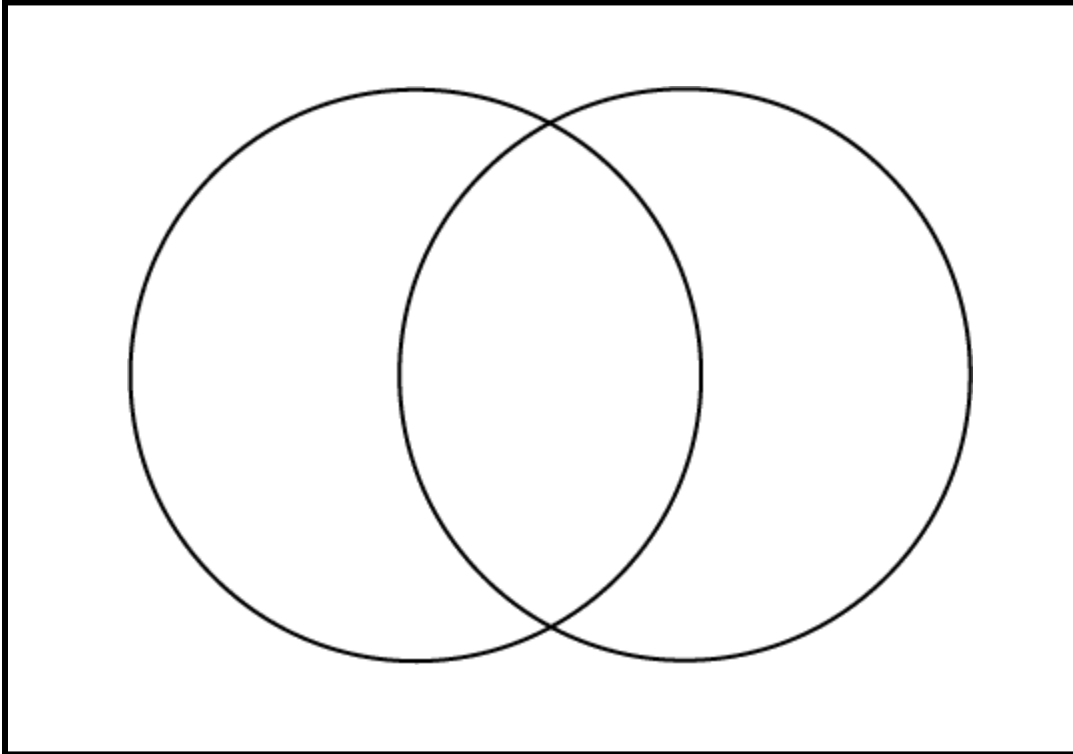
**Do NOT turn the page until you are told to do so.**

**Team Number: \_\_\_\_\_ School: \_\_\_\_\_**

**Problem 9** (2 points, 2 minutes)

In a school of 320 students, 85 students are in the band, 200 students are on sports teams, and 60 students participate in both activities.

How many students are involved in neither band nor sports?



**Answer:** \_\_\_\_\_

**TEAM #:** \_\_\_\_\_ **School Name** \_\_\_\_\_

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### **Problem # 10**

**Do NOT turn the page until you are told to do so.**

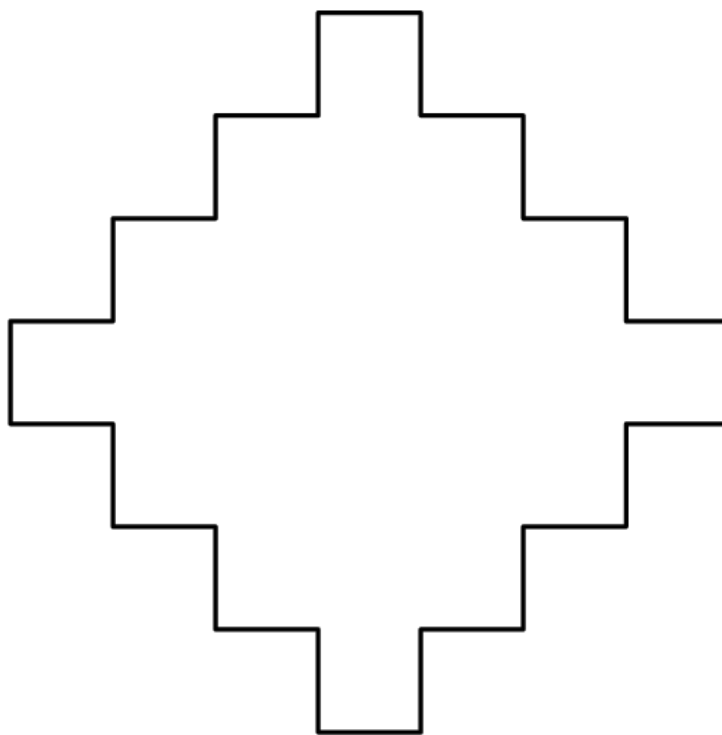
**Team Number:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Problem 10** (1 point, 1 minute)

In the polygon shown, each side is perpendicular to its adjacent sides, and all 28 of the sides are congruent.

The perimeter of the polygon is 56.

**What is the area of the polygon?**



**Answer:** \_\_\_\_\_ sq. units

**TEAM #:** \_\_\_\_\_ **School Name** \_\_\_\_\_



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### **Problem # 11**

**Do NOT turn the page until you are told to do so.**

**Team Number:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Problem 11** (3 points, 3 minutes)

The Freedom Tower in New York City is the tallest building in North America. It is 1776 ft. tall. You want to see how much money you would have if you stacked pennies the height of Tower.

**How much money (*in dollars and cents*) would you have if you were able to stack pennies the height of Freedom Tower?**

Mathematics for the Middle School, NCTM, Sept. 2014, pg.78

One penny is 0.155 cm thick. One inch = 2.54 cm



**Answer:** \_\_\_\_\_

**TEAM #:** \_\_\_\_\_ **School Name** \_\_\_\_\_

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### **Problem # 12**

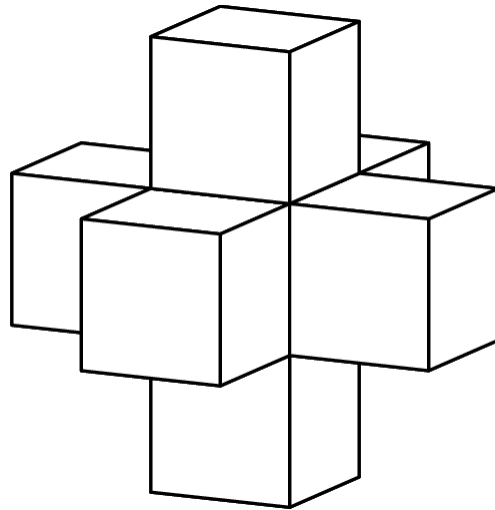
**Do NOT turn the page until you are told to do so.**

**Team Number:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Problem 12** (2 points, 2 minutes)

A shape is created by joining seven congruent cubes, each with side lengths of 10 cm.

What is the ratio (*in reduced fraction form*) of the volume to the surface area of the shape?



Answer: \_\_\_\_\_

TEAM #: \_\_\_\_\_ School Name \_\_\_\_\_

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### **Problem # 13**

**Do NOT turn the page until you are told to do so.**

**Team Number:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Problem 13** (3 points, 3 minutes)

**Determine the percent of the art work design that is black.** All circles are tangent (touching at one point). Use the table of values to help you. *Keep your answer in  $\pi$ .*



circle #	radius	area
1	2	$4\pi$
2	4	$16\pi$
3	6	$36\pi$
4	8	$64\pi$
5	10	$100\pi$
6	12	$144\pi$

**Answer:** \_\_\_\_\_ sq. units

**TEAM #:** \_\_\_\_\_ **School Name** \_\_\_\_\_

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### **Problem # 14**

**Do NOT turn the page until you are told to do so.**

**Team Number:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Problem 14** (3 points, 3 minutes)

Fill in the shapes with appropriate numbers.

$$\frac{\triangle}{13} + \frac{\circ}{\triangle} - \frac{1}{5} = \frac{548}{585}$$

Answers:  $\frac{\circ}{\triangle}$

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### **Problem # 15**

**Do NOT turn the page until you are told to do so.**

**Team Number:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Problem 15** (2 points, 2 minutes)

A ball is dropped from 40 feet and hits the ground. At each bounce, it bounces back  $\frac{1}{2}$  the previous height. It is caught when its bounce was 5 feet.

**What is its total distance that the ball traveled?**

**Answer:** \_\_\_\_\_

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### Problem # 16

Do NOT turn the page until you are told to do so.

Team Number: \_\_\_\_\_ School: \_\_\_\_\_

**Problem 16** (1 point, 1 minute)

Six students are waiting in line for the bus. Christina is ahead of Beth, Barbie is three places behind Sara. Jane is directly behind Rebecca. Barbie is directly behind Beth.



**In what position is Jane?**

**Answer:** \_\_\_\_\_

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### **Problem # 17**

**Do NOT turn the page until you are told to do so.**

**Team Number:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Problem 17** (3 points, 3 minutes)

**Solve:**  $\frac{1}{x} + \frac{3}{2x} = 5$

**Answer:** \_\_\_\_\_

**TEAM #:** \_\_\_\_\_ **School Name** \_\_\_\_\_

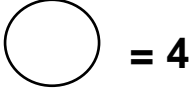
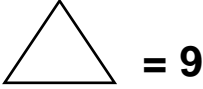
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### Answer Key

#	PTS	Solutions
1	1	420
2	1	199
3	1	\$1001
4	3	10:50AM
5	2	747
6	2	E: 4, Quotient: 1738
7	1	12 days
8	3	7 people (30 games)
9	2	<p>95 students</p> <p style="text-align: center;"><math>25 + 60 + 140 = 225</math></p> <p style="text-align: right;"><math>320 - 225 = 95</math></p> <p style="text-align: center;"><a href="http://www.regentsprep.org/regents/math/algebra/AP2/PracVenn.htm">http://www.regentsprep.org/regents/math/algebra/AP2/PracVenn.htm</a></p>
10	1	100 sq. units
11	3	\$3,492.42
12	2	1/5 or 1:5

<b>13</b>	<b>3</b>	<b><math>60\pi</math></b>
<b>14</b>	<b>3</b>	 
<b>15</b>	<b>2</b>	<b>105 ft.</b>
<b>16</b>	<b>1</b>	<b>Rebecca is second. Front to Back: Rebecca, Jane, Sarah, Christina, Beth, Barbie</b>
<b>17</b>	<b>3</b>	<b><math>\frac{1}{2}</math> or 0.5</b>
	<b>34</b>	<b>TOTAL POINTS</b>