

Kansas City Area Teachers of Mathematics
2014 KCATM Contest

Mathletics

Grade 4

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 **may** use calculators on this test (*not* cell phone calculators).
- Blank scratch paper can be used. Do **NOT** write on the team number card.
- 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. The sum of the digits is 14. The number is a multiple of 5. The number is in the thousands. The number is odd. The number is less than 2250. Which of the following numbers is correct?

1058, 1580, 1545, 1832, 2435, 1355, 905, 2290, 2345, 860

Answer: _____

2. _____ is the number of students who are in a middle school. How many buses would the school have to order if all of them were taking a field trip to the home opener of the KC Royals if 65 students are on each bus?

(Answer from #1)



Answer: _____ buses

3. If the total cost to rent the buses is \$4,800 and _____ buses were used, what is the cost per bus?

(Answer from #2)

Answer: \$_____

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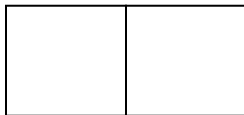
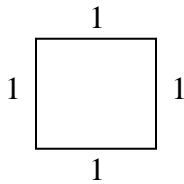
Problem # 4

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

Team Number: _____ **School:** _____

Problem 4 (2 points, 2 minutes)

- You own a restaurant. The tables you use are square and have one chair per side. When more than 4 people are dining, you put the square tables next to each other in the pattern below. Use the table to develop the pattern for finding the number of people who can sit at the table. How many people can sit at 100 tables if they could be placed end to end?



Tables	1	2	3	4						100
People	4									

ANSWER: _____

TEAM #: _____ **School Name** _____

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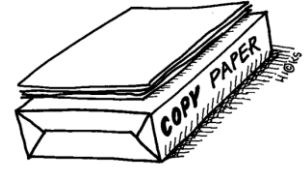
Problem # 5

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

Team Number: _____ **School:** _____

Problem 5 (2 points, 2 minutes)

Jerry works at a copy center, where 15 copies weigh 135 grams. He must complete 1850 copies. How many more copies should Jerry make if the total weight of the copies already made is 6588 grams?



(NCTM Mathematics Teaching in the Middle School, August 2013)

ANSWER: _____

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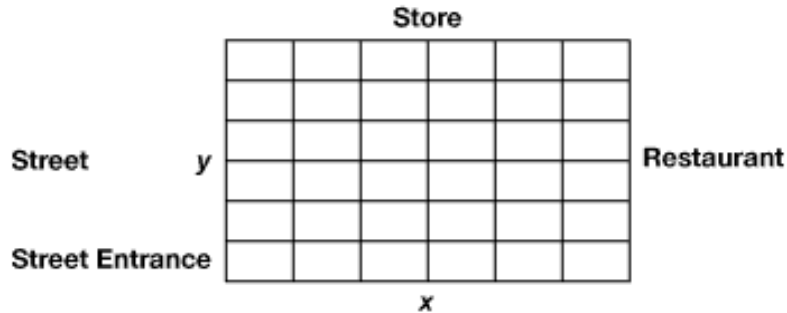
Problem # 6

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

Team Number: _____ **School:** _____

Problem 6 (2 minutes, 2 points)

Park and Lock - http://www.eduplace.com/kids/mhm/brain/gr4/ch11/bt_04_11_q.html



Spaces in the parking lot are shown as ordered pairs.

- The Abbot family parked their blue car in the first row in spot (1,1).
- The Beekman family parked their red car in the first row, just 4 units to the right of the Abbot's car.
- The Costa's black car is halfway between the Abbot's car and the Beekman's car but 3 units closer to the store.
- The Dwight's brown car is in the same row as the Costa's car, but 2 cars closer to the restaurant.

What are the coordinates for each car's parking space?

http://www.eduplace.com/kids/mhm/brain/gr4/ch11/bt_04_11_q.html

Beekman: (__,__)

Costa: (__,__)

Dwight: (__,__)

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Problem # 7

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Problem 7 (1 minute, 1 point)

Travis has a red t-shirt, a green t-shirt, a blue t-shirt and an orange t-shirt. He has green, blue and black jeans and two pair of shoes. How many different combinations can he wear?

Adapted from <http://www.livebinders.com/play/play?id=1686>

Answer: _____

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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)

In the equation,

$$\frac{2}{*} - \frac{*}{5} = \frac{1}{15}$$

The * symbol stands for the same whole number value. Find its value.

Answer: * = _____

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Problem # 9

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Problem 9 (3 points, 3 minutes)

Compute the answers to all four of the fraction problems below. Answers MUST be in simplified FRACTION form (MIXED numbers when needed.)

A. Ahna spent $3\frac{3}{4}$ hours practicing piano and $2\frac{2}{3}$ hours on a project for school. What is the **total** of Ahna's piano practice and project work?

Answer: _____

B. Brian has $3\frac{3}{4}$ hours before going to his baseball game. He used $2\frac{2}{3}$ hours of that time playing a game on his PlayStation 4. **How much time was left** before his ballgame?

Answer: _____

C. Caitlin needs $3\frac{3}{4}$ cups of flour for a cookie recipe. She thinks she has enough flour to make $2\frac{2}{3}$ **times her recipe**. How much flour does she have?

Answer: _____

D. Daniel has $3\frac{3}{4}$ feet of string for his guitar. He wants **divide** it into pieces that are $2\frac{2}{3}$ feet long.

Answer: _____

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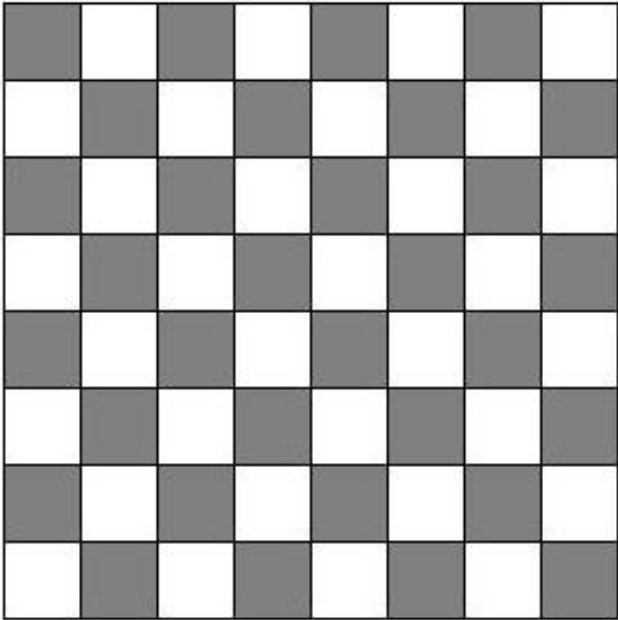
Problem # 10

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

Team Number: _____ **School:** _____

Problem 10 (3points, 3 minutes)

How many total squares are there on a checkerboard?



Answer: _____

Team Number: _____ **School:** _____

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Problem # 11

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

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Problem 11 (2 points, 2 minutes)

A cage contains birds and rabbits. There are sixteen heads and thirty-eight feet. How many **birds** are the in the cage?



Answer: Birds = _____

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Problem # 12

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

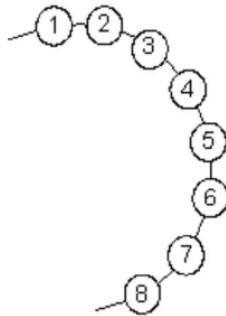
Team Number: _____ **School:** _____

Problem 12 (2 points, 2 minutes)

CHILDREN IN A CIRCLE

Problem

A group of children stand holding hands in a large circle and a teacher walks around the circle giving each child in order a number 1, 2, 3, 4, ...



If number 12 is standing opposite number 30, how many children are there in the circle?

ANSWER: _____

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Problem # 13

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

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Problem 13 *(2 points, 2 minutes)*

What is the **sum** of the whole numbers 1 through 100?

ANSWER: _____

TEAM #: _____ **School Name** _____

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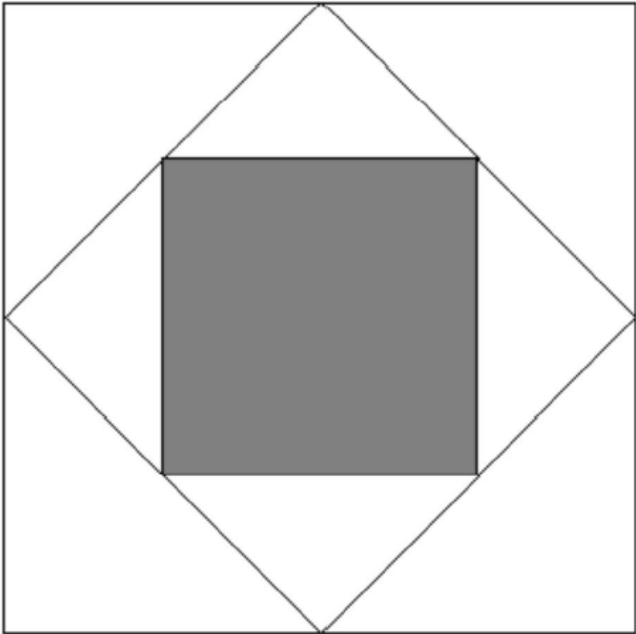
Problem # 14

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

Team Number: _____ **School:** _____

Problem 14 (1 point, 1 minute)

What fraction of the diagram is shaded?



ANSWER: _____

TEAM #: _____ **School Name** _____

Problem adapted from Math Conundrums, Marjorie Frank, Incentive Publications

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Problem # 15

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Problem 15 (2 points, 2 minutes)

How many numbers below 100 are divisible by 2 and 3?

Answer: \$ _____

TEAM #: _____ **School Name** _____

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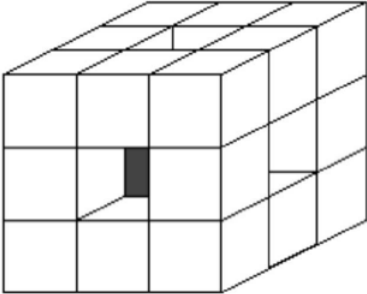
Problem # 16

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

Team Number: _____ **School:** _____

Problem 16 (2points, 2 minutes)

You start with a solid cube below using 1 x 1 smaller cubes. If you push one of the cubes right through the center of each face so you can see straight through every sides, how many cubes remain?



ANSWER: _____

TEAM #: _____ **School Name** _____

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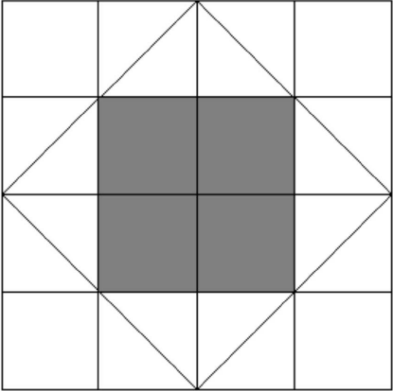
Grade 4

Answer Key

Many problems taken from: http://mathschallenge.net/problems/pdfs/mathschallenge_1_star.pdf

PT	#	Solutions
1	1	1355
1	2	21 buses
1	3	\$228.57
2	4	202
2	5	1118 copies
2	6	<p>The Beekman's car is in spot (5, 1). The Costa's car is in spot (3, 4). The Dwight's car is in spot (5, 4). http://www.eduplace.com/kids/mhm/brain/gr4/ch11/bt_04_11_s.html</p>

1	7	24 different outfits
3	8	<p style="text-align: center;">* = 3</p> <p>By trial,</p> $\frac{2}{3} - \frac{3}{5} = \frac{10}{15} - \frac{9}{15} = \frac{1}{15}$
3	9	<p style="text-align: center;">A. 6 5/12</p> <p style="text-align: center;">B. 1 1/12</p> <p style="text-align: center;">C. 10</p> <p style="text-align: center;">D. 1 13/32</p>
3	10	<p style="text-align: center;">204 squares</p> <p>Solution</p> <p>There are, $64 \times (1 \times 1)$, $49 \times (2 \times 2)$, $36 \times (3 \times 3)$, $25 \times (4 \times 4)$, $16 \times (5 \times 5)$, $9 \times (6 \times 6)$, $4 \times (7 \times 7)$ and $1 \times (8 \times 8)$ squares.</p> <p>Making $1 + 4 + 9 + 16 + 25 + 36 + 49 + 64 = 204$ squares in total.</p>
2	11	<p style="text-align: center;">13 birds</p> <p>Solution</p> <p>If we let the number of birds be represented by b and the number of rabbits be represented by r then we get the following two equations:</p> $b + r = 16 \quad (1)$ $2b + 4r = 38 \quad (2)$ <p>Dividing the second equation by two gives:</p> $b + 2r = 19 \quad (3)$ <p>If we now subtract equation (1) from equation (3) we get $r = 3$, and as $b + r = 16$ it follows that the number of birds, b, must be 13.</p>

<p>2</p> <p>12</p>		<p style="text-align: center;">36 children</p> <p>Solution</p> <p>Let c be the number of children in the circle. Half the children, $c/2$, will be in-between child 12 and child 30.</p> <p>So $12 + c/2 = 30$.</p> <p>Therefore $c/2 = 18$.</p> <p>That is, there are 36 children in the circle.</p> <hr/> <p style="text-align: right;">Problem ID: 31 (Jan 2001) Difficulty: 1 Star [mathschallenge.net]</p>
<p>2</p> <p>13</p>		<p style="text-align: center;">5050</p> <p>$1 + 100, 2 + 99, 3 + 98, \dots$ (5 pairs of 101 \rightarrow 50 x 101)</p>
<p>1</p> <p>14</p>		<p style="text-align: center;">1/4</p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>So $4/16 = 1/4$ of the diagram is shaded.</p> </div> </div>
<p>2</p> <p>15</p>		<p style="text-align: center;">16</p> <p>If the number is divisible by both 2 and 3 it will be divisible by 6. $16 \times 6 = 96$ ($17 \times 6 = 102$)</p> <p>So there are 16 numbers under 100 that are divisible by both 2 and 3.</p> <p>How many numbers under 100 are divisible by 2, 3 and 4?</p> <p>What about being divisible by 2, 3, 4 and 5?</p> <p>How many numbers under n are divisible by the integers 1 to m?</p> <hr/> <p style="text-align: right;">Problem ID: 46 (May 2001) Difficulty: 1 Star [mathschallenge.net]</p>
<p>2</p> <p>16</p>		<p style="text-align: center;">The number of small cubes remaining is 20.</p>
<p>30</p>		<p style="text-align: center;">TOTAL POSSIBLE POINTS</p>