Kansas City Area Teachers of Mathematics
2013 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. Rich went Valentine's Day shopping for his sweetheart. He purchased a sweater for $72.63, 2 dozen roses for $48.75 each, and a necklace for $120.16. How much did Rich spend on his girlfriend?

   Answer: _____

2. _____ is also the cost of gas for a trip. Your compact car
   (answer from #1)
   gets 36 miles per gallon. How many gallons did you purchase for your trip? Round this to the **nearest whole number** of gallons.

   Answer: _____ gallons

3. Grace worked _____ hours at $15.25 per hour. How much
   (answer from #2)
   did she earn? *(Do not round your answers.)*

   Answer: $_____

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Problem # 4

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

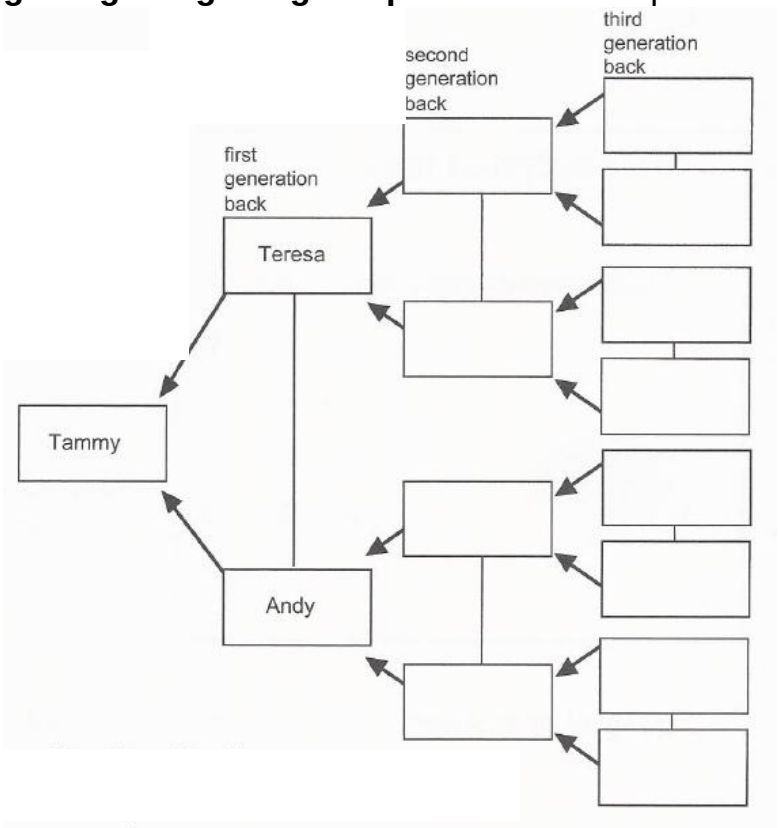
Team Number: _____ School: _____

Problem 4 *(3 points, 3 minutes)*

Ancestors are family members that came before your parents. Tammy asked her Grandma Emma to help her make a family tree. Complete the chart below (going back 3 generations) to answer the questions.

- Tammy's parents are Teresa and Andy.
- Teresa's mother and father are Emma and Joe.
- Joe's parents were Mary and Tom.
- Emma's mother and father were Sofia and Antonio.
- Andy's parents are Angela and Camilo.
- Angela's mother and father are Ana and Grandpa Mario.
- Camilo's mother and father was Elena and Peter.

a. Who was Tammy's **great grandfather** on her father's father's side?
b. If you would go 5 generations back (2 more generations back), **how many great-great-great grandparents** would a person have on this chart?



ANSWERS: a. _____

b. _____

TEAM #: _____ School Name _____

Problem adapted from Math Detective Beginning, Terri Hustad, The Critical Thinking Company

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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)*

Given the recipe for making 16 rolls, determine the amount needed in the recipe for making 24 rolls. (http://www.bbc.co.uk/education/mathsfile/printoffs/est2.html)

ANSWER: Complete the table.

Bread for 16 Rolls	**Bread for 24 Rolls**
1 pound (lbs.) of flour	_____ lbs. _____ oz. of flour
½ pint of warm milk	_____ pt. of warm milk
2 tsp. of dried yeast	_____ tsp. of dried yeast
4 ounces (oz.) butter	_____ oz. butter
1 egg	1 egg
2 Tbsp. poppy seeds	_____ Tbsp. poppy seeds

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Problem # 6

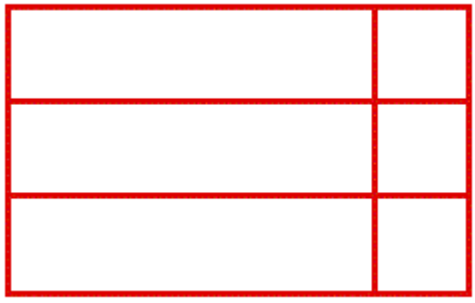
Do NOT turn the page until you are told to do so.

Team Number: _____ School: _____

Problem 6 *(2 minutes, 2 points)*

While flying over farmland, a pilot notices the rectangular shape of the fields below. She sketches the lines that divide the fields.

When she returns to the airport, she wonders how many different rectangles can be formed by the lines drawn?



HINT: Don't forget that a square is also a rectangle.

(http://mathforum.org/k12/k12puzzles/critical.thinking/puzz4.html)
Michael DiSpenzio's book called *Critical Thinking Puzzles*

Answer: _____

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Problem # 7

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

Team Number: _____ School: _____

Problem 7 *(2 minutes, 2 points)*

A city bus holds 50 passengers. No one may stand while the bus is running. The bus starts out empty and at the first stop, picks up forty people. At the second stop, fifteen people get off and no one gets on. At the third stop, the bus picks up ten more people and three people get off. At the fourth stop, no one gets off, but twenty-three people are waiting to get on. How many people can get on at the fourth stop to fill the bus?

This table may help you:

Stop #	Passengers that get on	Passengers that get off	Passengers on the bus	Empty Seats
1				
2				
3				
4				

Answer: _____

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Problem # 8

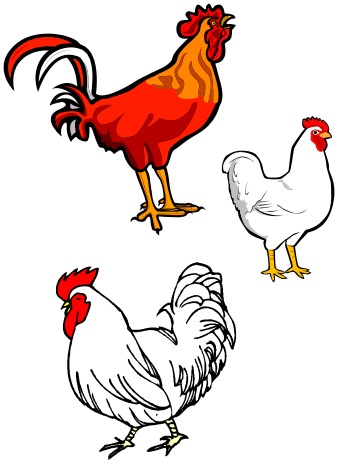
Do NOT turn the page until you are told to do so.

Team Number: _____ School: _____

Problem 8 *(3 points, 3 minutes)*

Farmer Joe counts 48 heads and 134 legs among the chickens and dogs on his farm. How many dogs and how many chickens does he have?

(http://mathforum.org/library/drmath/view/57511.html)



Answer: Chickens: _____

Dogs: _____

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Problem # 9

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

Team Number: _____ School: _____

Problem 9 *(3 points, 3 minutes)*

The letters A, B, C, D, and E have whole number values 1 through 5. Find the value of each letter using the equations and table below.

1. B + A = 6
2. E + B = C
3. E + C + B = 8

	A	**B**	**C**	**D**	**E**
1					
2					
3					
4					
5					

Answers: A = _____

B = _____

C = _____

D = _____

E = _____

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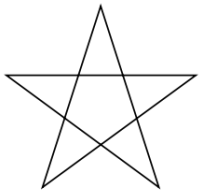
Problem # 10

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

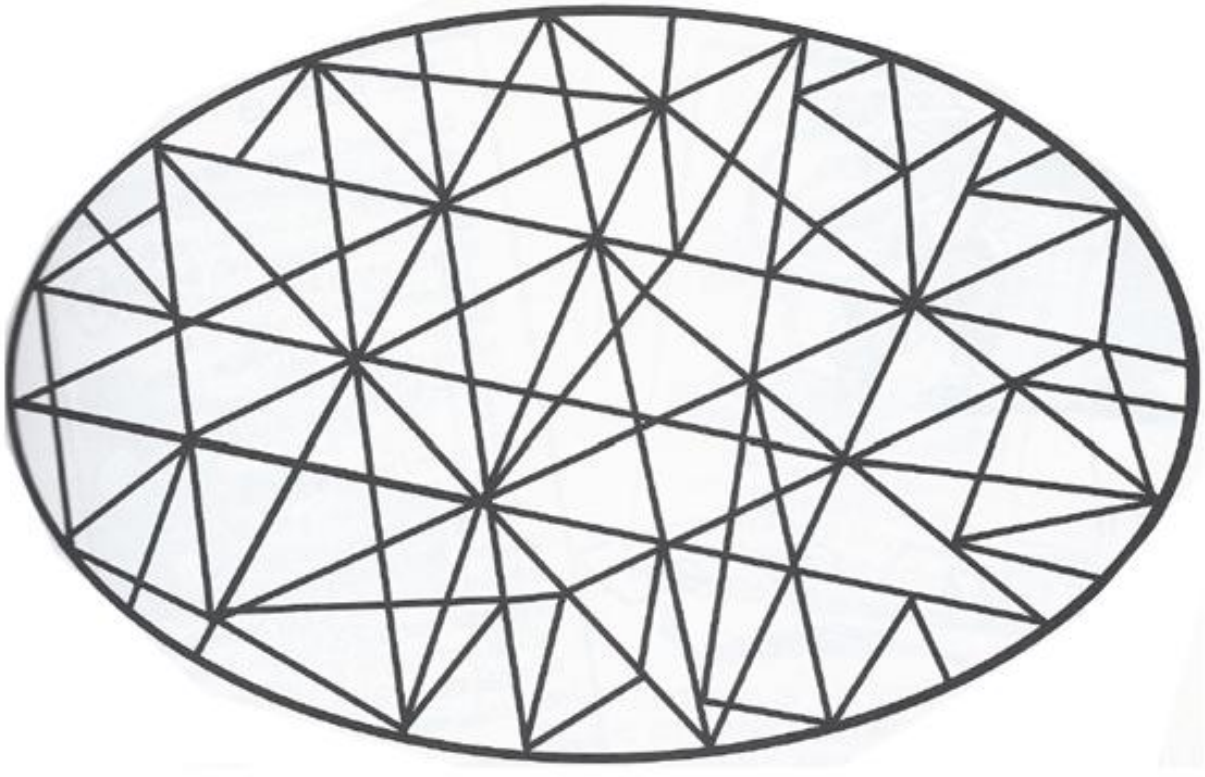
Team Number: _____ School: _____

Problem 10 *(2 points, 2 minutes)*



Find the **ONE regular pentagram** in this picture.

Shade in your ANSWER.



problem adapted from Math Conundrums, Marjorie Frank, Incentive Publications

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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)*

If you lay pennies side-by-side in a straight line so that they are touching each other, **what is the value, in dollars, of a mile-long row of pennies? Circumference Formula: C = π d** *(pi* x *diameter)*

Facts:

- A penny measures ¾ inch in diameter.
- 12 inches = 1 foot
- 5280 feet = 1 mile
- 100 pennies = $1

…(one mile)

¾ inch

Answer: $ _____

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Problem # 12

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

Team Number: _____ School: _____

Problem 12 *(3 points, 3 minutes)*

The sum of the children's ages was 24. Find their ages using the clues below:

- Sam was one-third Patrick's age.
- Oscar was three times Carlie's age.
- Two years later, Oscar was twice Carlie's age.
- Patrick was twice Oscar's age.
- Four years later, Sam was half Patrick's age.

ANSWERS:

Sam:_____

Carlie: _____

Oscar: _____

Patrick: _____

TEAM #: _____ School Name _____

problem adapted from Math Conundrums, Marjorie Frank, Incentive Publications

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Problem # 13

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

Team Number: _____ School: _____

Problem 13 *(1 point, 1 minute)*

Use the dice faces shown to help you decide what numbers are on opposite sides of any die.

ANSWER:

Opposite side of 1 is: _____

Opposite side of 2 is: _____

Opposite side of 3 is: _____

TEAM #: _____ School Name _____

problem adapted from Math Conundrums, Marjorie Frank, Incentive Publications

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Problem # 14

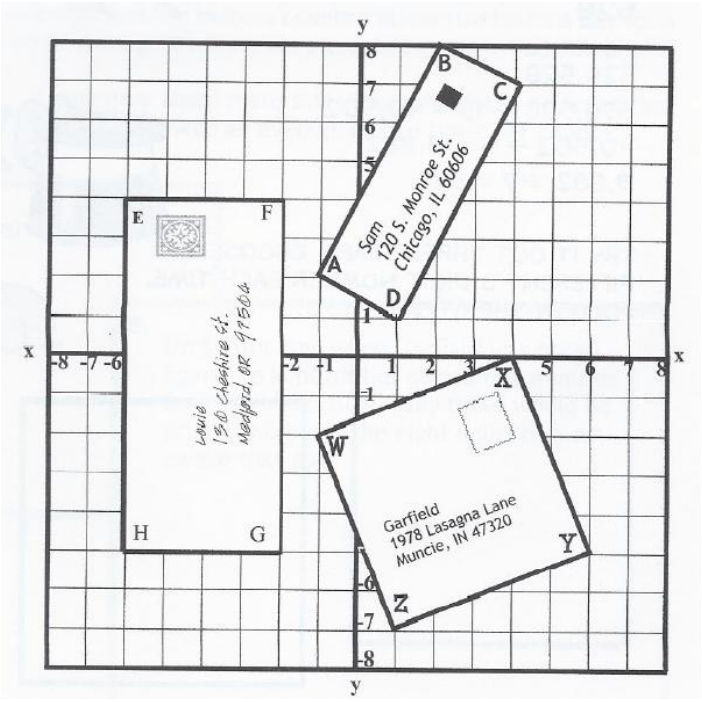
Do NOT turn the page until you are told to do so.

Team Number: _____ School: _____

Problem 14 *(3 points, 3 minutes)*

Just as a postal employee approached the mailbox, a strong gust of wind sent 3 letters flying to the ground, which landed as shown in the graph below. Each letter was moved again by a second gust of wind.

a. The wind flipped the letter to Louie across $\overline{FG}$. Where was the corner H after the flip (reflection)? ***(H')***
b. The wind rotated the letter to Sam clockwise 180^{o} around corner D. Where did corner A end up after the rotation? ***(A')***
c. The wind slid the letter to Garfield along the ground and moved it three spaces right and two spaces up. Where did corner Z move to after the slide (translation)? ***(Z')***



ANSWERS:

H': (___,___)

A': (___,___)

Z': (___,___)

TEAM #: _____ School Name _____

Problem adapted from Math Conundrums, Marjorie Frank, Incentive Publications

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Problem # 15

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

Team Number: _____ School: _____

Problem 15 (3 points, 3 minutes)

What is the **total cost** of a meal for Omar and his brother, Ramon, at the La Casita Restaurant. ***Include a 7% tax and a 15% tip (only on the food cost).*** Round your answer to the nearest cent.
Daily special: The chicken dinner is $2 less than the price stated.

- Omar ordered Arroz con Pollo and apple pie.
- Ramon ordered the steak dinner and one serving of Flan.

LA CASITA MENU				
Arroz con Polo (chicken with rice)	$9.50		Flan (Custard)	$2.50
Bistec (steak)	$13.50		Cake	$3.00
Bean Burritos	$5.00		Apple Pie	$3.20
All dinners served with salad				

Answer: $ _____

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Problem adapted from Math Detective Beginning, Terri Hustad, The Critical Thinking Company

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Problem # 16

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Team Number: _____ School: _____

Problem 16 *(3 points, 3 minutes)*

Work the sequence of number puzzles to find the separate answers. <u>ALL answers must be correct</u> to earn points.

#1: The first number is how many months are in a year plus the number of states in the U.S.A, times the number of planets (Don't count Pluto!) in our Solar System.

#2: The number of tires on a car, plus the number of colors on a traffic light, minus the number of letters of the word "street".

#3: The number of prime numbers from 0-100. A prime is a number greater than 1 that has only one as a factor.

Examples: 2 = 2 x 1, 17 = 17 x 1

1	(2)	3	4	5	6	7	8	9	10
11	12	13	14	15	16	(17)	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

ANSWERS:

#1: _____

#2: _____

#3: _____

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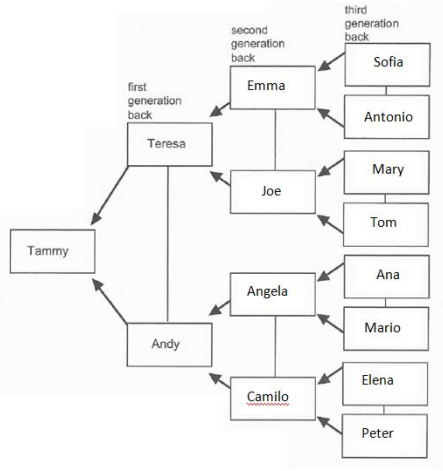
Answer Key

1. $290.29
2. 8 gallons
3. $122.00

4. (3 min) Ans. Peter; 32



5.

Bread for 24 Rolls
___1___ lbs. ___8___ oz. of flour
__3/4 or 0.75____ pt. of warm milk
___3___ tsp. of dried yeast
___6___ oz. butter
1 egg
__3____ Tbsp. poppy seeds

6. **Eighteen**:

one whole composite block (1,2,3,4,5,6); six separate blocks (1) (2) (3) (4) (5) (6); three horizontal pairs (1 & 4) (2 & 5) (3 & 6); four vertical pairs (1 & 2) (2 & 3) (4 & 5) (5 & 6); two vertical triplets (1,2,3) (4,5,6); two large blocks (1,4,2 & 5) (2,5,3 & 6)

7. 18 people can get on the bus

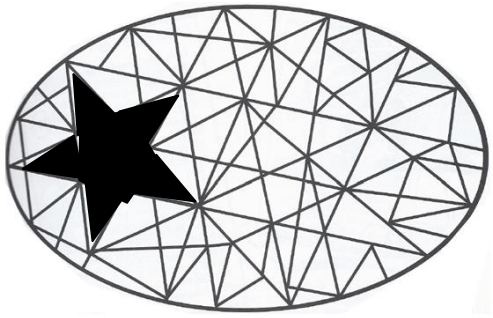
8. 19 dogs, 29 chickens

19 dogs with 4 legs each = 19*4 = 76 legs
+ 29 chickens with 2 legs each = 29*2 = 58 legs
---
48 animals total 134 legs total

Algebra: c + d = 48 (1)
2c + 4d = 134 (2)

9. Solution: A=5; B=1; C=4; D=2; E=3

10.



11. $844.80

12. **Sam – 4, Oscar – 6, Carlie – 2, Patrick – 12**

13. opp. 1 = 6, opp. 2 = 5,opp. 3 = 4
Opposite sides always add to “7”:

14. Ans. (2,-5), (3,0), (4,-5)

15. $32.57
Omar’ meal: $10.70 and Ramon’s meal: $16.00 tip: $4, tax: $1.87

16. (all answers must be correct)
496 *(12+50) * 8*
1
25