Kansas City Area Teachers of Mathematics
2016 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 Greatest Common Factor of 12, 42, and 60.

Answer: _____

2. Identify the pattern and find the **10^{th} term** in the sequence.

1, 3, 6, 10, 15, ___, ___, ___, ___, _____
10^{th}

Answer: _____

3. The sum of your answers in #1 and #2 (_____ + _____) is the amount of money you have to spend at the store on a pair of shoes. The price of the shoes is $45 and you get 20% off that price. You must pay 8.725% tax on the sale price. **What do you have left of the amount of money you had to spend?**

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)*

Your parents are taking your older sister to visit a college, so they got a full tank of gas before leaving home. Before the drive, the car's odometer read 35,698 miles. When your family arrived at the college, the odometer read 35,934 miles. Your parents purchased 12.4 gallons of gas to fill the tank. **How many <u>miles per gallon</u> did your parent's car get on the trip to visit the college?** Round your answer to the nearest whole number.

Answer: _____mpg

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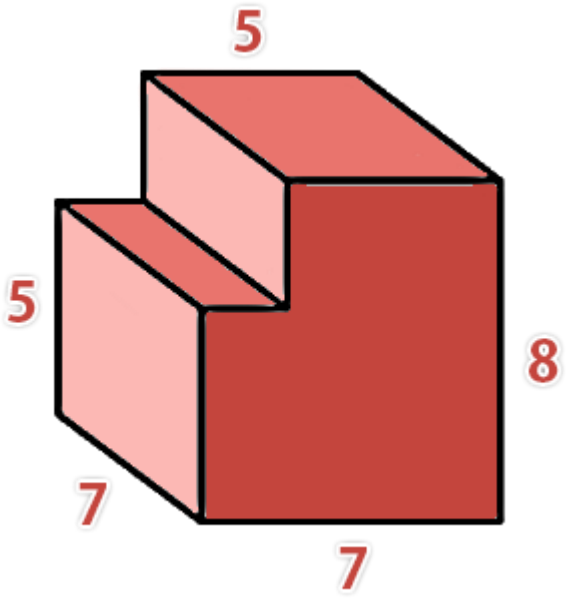
Problem # 5

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

Team Number: _____ School: _____

Problem 5 *(3 minutes, 3 points)*

Find the **volume** of the rectangular composite shape below:



Volume: _____ in^3

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Problem # 6

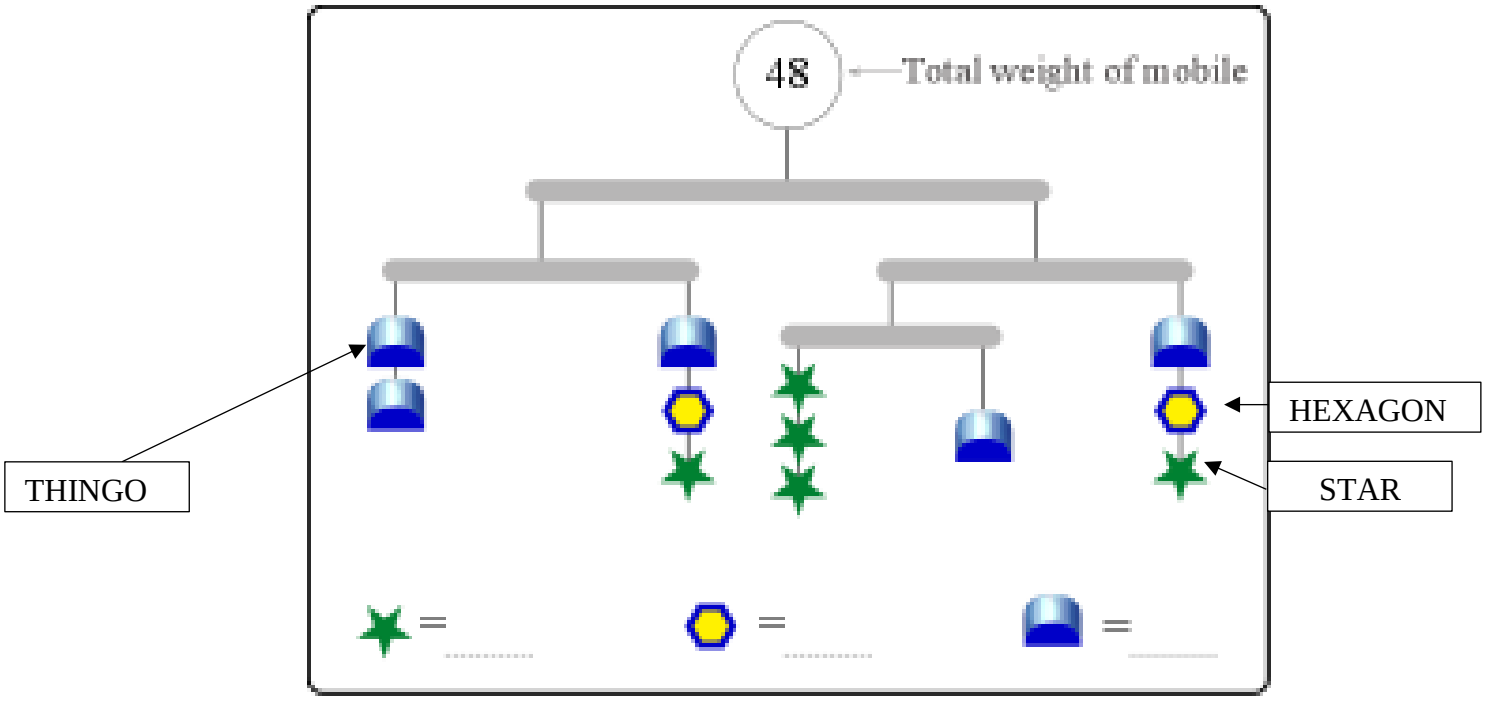
Do NOT turn the page until you are told to do so.

Team Number: _____ School: _____

Problem 6 *(3 minutes, 3 points)*

Find the value of each shape.

http://thinkmath.edc.org/resource/mobile-puzzles



Answers:

THINGO : _____

HEXAGON : _____

STAR : _____

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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)*

Find the value of the expression when x = -2, y = 5, and z = 8

$$\frac{xy^2}{z} \div \frac{y}{z}$$

Answer: _____

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Problem # 8

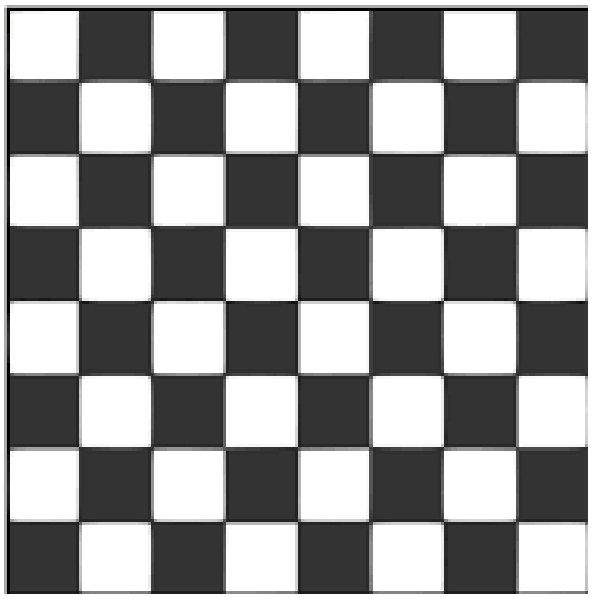
Do NOT turn the page until you are told to do so.

Team Number: _____ School: _____

Problem 8 *(3 points, 3 minutes)*

How many **<u>total squares</u>** are there on a chess board?

Hint: Don't forget to consider different sizes of squares.



Answer: _____

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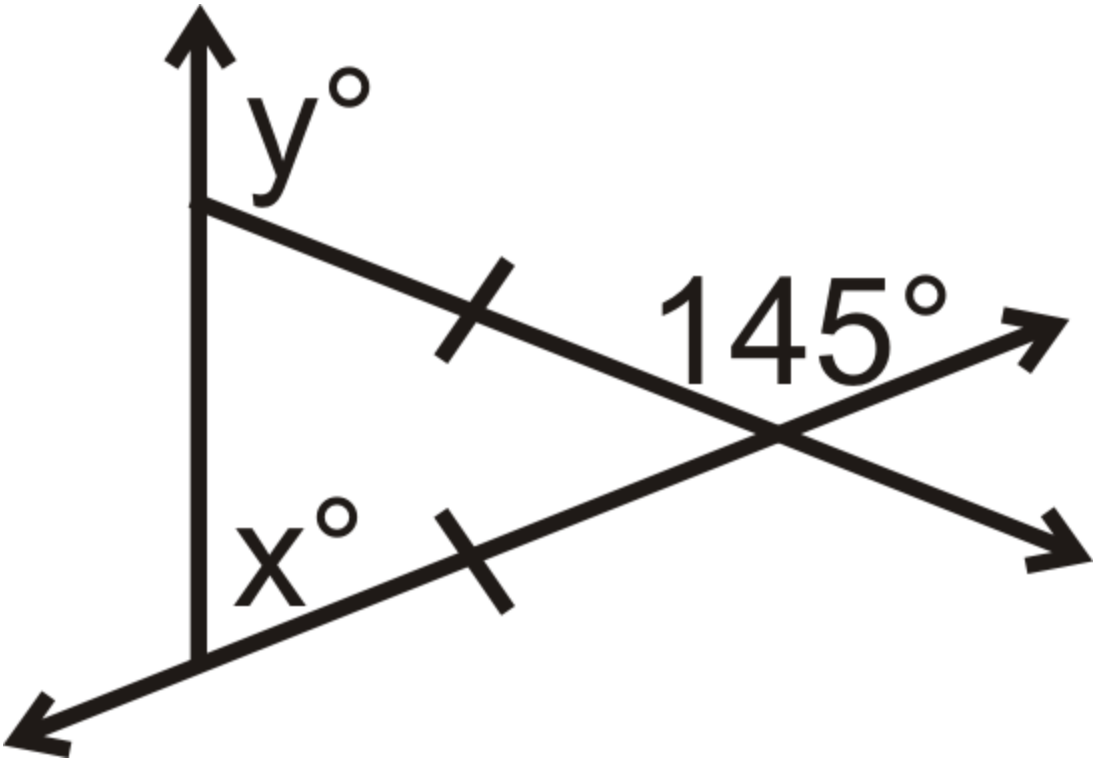
Problem # 9

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

Team Number: _____ School: _____

Problem 9 *(2 points, 2 minutes)*

Find the angle measures of x and y in the diagram below.



x^o = _____

y^o = _____

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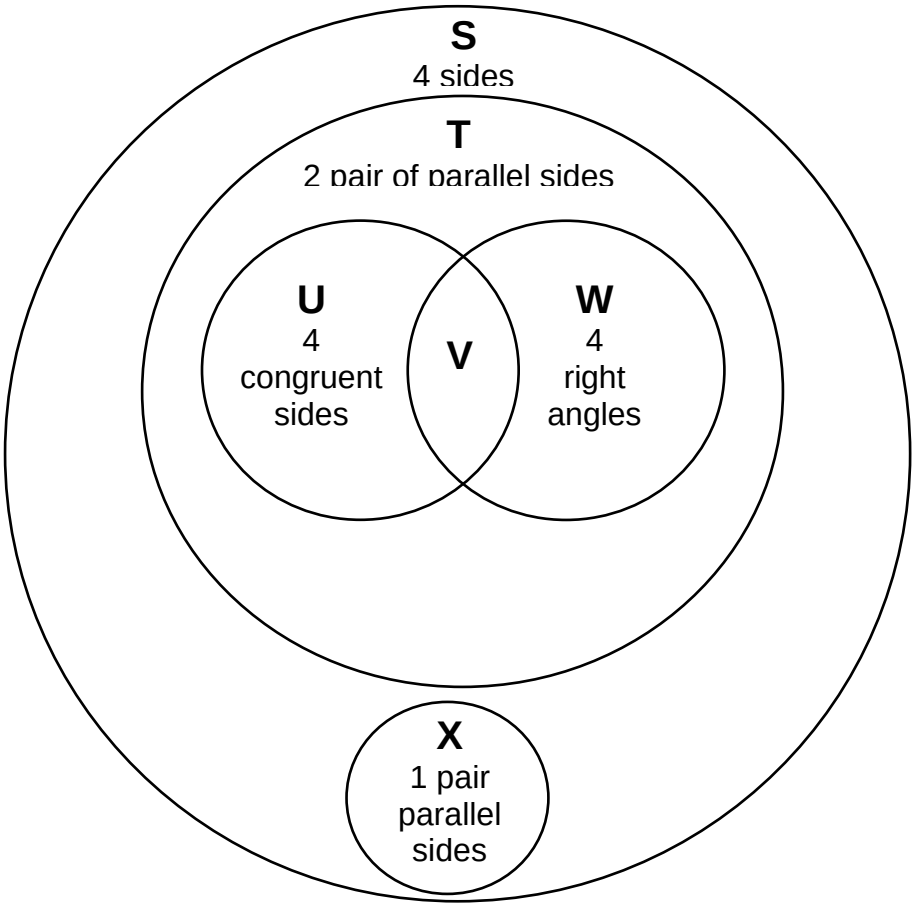
Problem # 10

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

Team Number: _____ School: _____

Problem 10 *(2 points, 2 minutes)*

Determine **which statement** is true when placed correctly in the Venn Diagram using the geometric properties of the figures.



A. S = Quadrilateral; T = Parallelogram; U = Square; V = Rhombus; W = Rectangle; X = Trapezoid

B. S = Quadrilateral; T= Rectangle; U = Square; V = Rhombus; W = Rectangle; X = Trapezoid

C. S = Quadrilateral; T = Rectangle; U = Parallelogram; V = Square; W = Rectangle; X = Trapezoid

D. S = Quadrilateral; T = Parallelogram; U = Rhombus; V = Square; W = Rectangle; X = Trapezoid

Answer: ____

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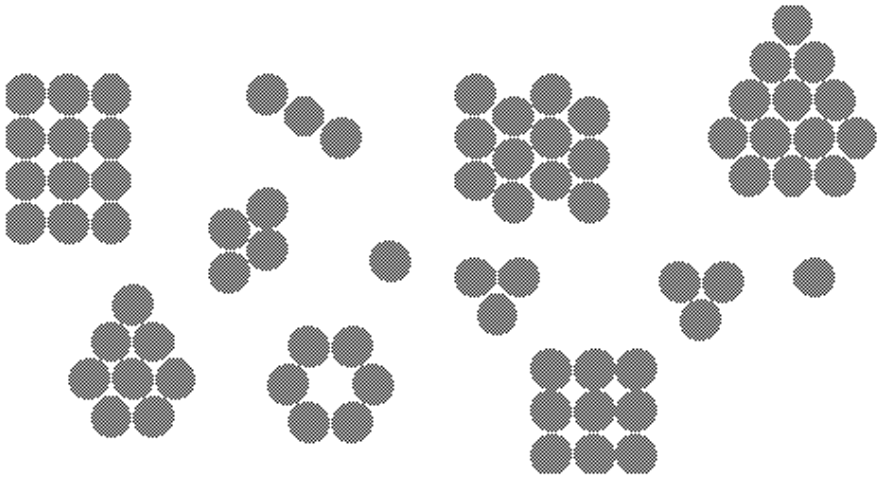
Problem # 11

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

Team Number: _____ School: _____

Problem 11 *(2 points, 2 minutes)*
http://www.mathsisfun.com/puzzles/birthday-smarties.html

The Birthday Cake has all gone but there are twelve piles of Smarties left. Each pile is held together by icing so can't be split up. Most of the guests have gone, but Hungry Horace and his two friends want to share out the Smarties equally.



Can you share out the piles so that everybody gets 25 Smarties each?

Answer – Show your groups of 25 above **OR** list the sums of the number groups.

Answer with number groups: _____

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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)*
https://www.eduplace.com/kids/mhm/brain/gr5/ch08/bt_05_08_q.html

Pie Pieces

What kind of pie did each person choose? What fraction of the total pie did each person eat? Simplify the fractions in the answer.

Question

Blueberry Apple Peach Chocolate

Mrs. Hopkins made four different pies for the fair. Each pie was the same size. At the fair, she cut the blueberry pie into 6 equal slices, the apple pie into 5 equal slices, the peach pie into 3 equal slices, and the chocolate pie into 4 equal slices.

Alyssa, Dalton, Rowan, and Shane each bought one slice of pie but ate only a portion of that slice. Each chose a different kind of pie.

- Alyssa bought the largest slice available and ate $\frac{1}{4}$ of it.
- Dalton bought the smallest slice available and ate $\frac{3}{4}$ of it.
- The slice Rowan bought was bigger than the slice Shane bought. Rowan ate $\frac{1}{2}$ of his slice.
- Shane ate $\frac{2}{3}$ of his slice.

Alyssa: _____; _____
Dalton: _____; _____
Rowan: _____; _____
Shane: _____; _____

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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)***
https://curriculum.wiki.dublinschools.net/MA.5.OA.1

Put grouping symbols ( ), [ ], and/or { } around the correct groupings to make this expression <u>equal to 32</u>.

2 x 3 + 5 – 9 + 5 x 23 – 18 = 32

Trial #1: 2 x 3 + 5 – 9 + 5 x 23 – 18 = _____

Trial #2: 2 x 3 + 5 – 9 + 5 x 23 – 18 = _____

Trial #3: 2 x 3 + 5 – 9 + 5 x 23 – 18 = _____

Trial #4: 2 x 3 + 5 – 9 + 5 x 23 – 18 = _____

Trial #5: 2 x 3 + 5 – 9 + 5 x 23 – 18 = _____

<u>Put your grouping symbols in your final answer:</u>

Answer: 2 x 3 + 5 – 9 + 5 x 23 – 18 = 32

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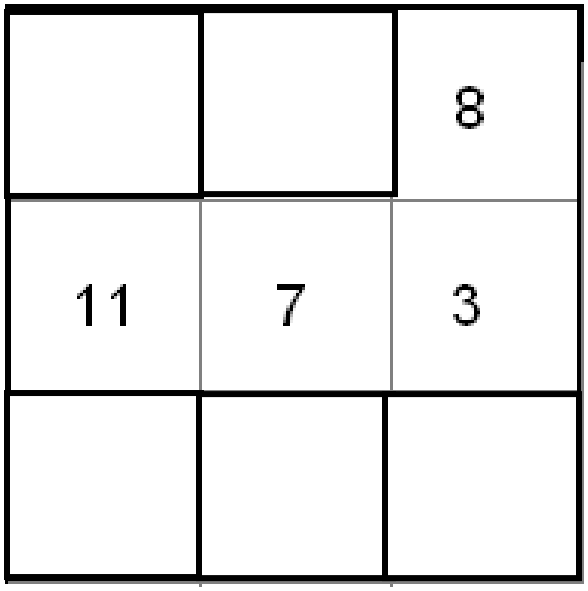
Problem # 14

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

Team Number: _____ School: _____

Problem 14 *(2 points, 2 minutes)*

The magic number is 21 in the square below. The smallest number of the consecutive numbers is 4. All of the columns, rows, and diagonals must add to be the same number, the MAGIC number! Complete the magic square.



Answer: Give answer in the square above.

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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)
https://www.khanacademy.org/math/cc-fifth-grade-math/cc-5th-measurement-topic/cc-5th-unit-word-problems/v/unit-conversion-word-problem

On Judy's way home from school yesterday, she ran half the distance. Then she skipped for one fourth of the remaining distance and walked the rest of the way home. She walked a total of 360 feet.

What is the distance between school and Judy's home in yards?

School Home

Answer: _____ yards

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Problem # 16

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

Team Number: _____ School: _____

Problem 16 *(3 points, 3 minutes)*
https://www.ixl.com/math/grade-5/stem-and-leaf-plots

A pet store owner had her staff count the number of fish in each tank.

Fish per tank

Stem	Leaf
1	6 7 8
2	1 2 4 7 9
3	2
4	1 4 7
5	4 4
6	1 1 3 5
7	1 3

To read a stem and leaf plot, the stem is the first digit and the leaf is the second digit. Ex.: 1 | 6 is 16

What is the mean, median, and range of the number of fish in each tank?

Mean: _____

Median: _____

Range: _____

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Problem # 17

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

Team Number: _____ School: _____

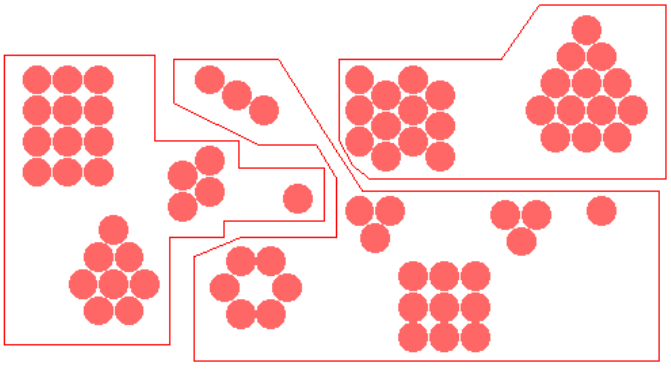
Problem 17 *(2 points, 2 minutes)*
https://learnzillion.com/lesson_plans/789-solve-real-world-problems-involving-the-volume-of-rectangular-prisms-by-using-a-formula

The truck for LearnZillion Moving Company has interior dimensions of 187 inches by 89 inches by 77 inches. The dimensions of the storage boxes are 24 inches by 14 inches by 27 inches. If LearnZillion Moving Company needs to move 200 storage boxes, determine **how many trucks will be needed.**

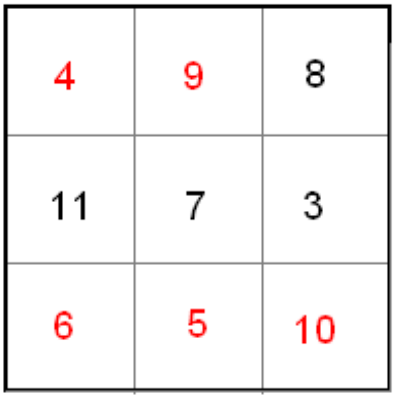
Answer: _____

TEAM #: _____ **School Name** _____

Grade 5 – Mathletics Answer Key

#	PTS	Solutions
1	1	6
2	1	55
3	1	$15.86
4	2	19
5	3	350 in^3
6	3	Thingo = 6 Hexagon = 4 Star = 2
7	1	-10
8	3	204
9	2	$x^o = 72.5^o$ $y^o = 107.5^o$
10	2	D
11	2	**POSSIBLE ANSWERS:** Our Solution: The diagram below shows one way to group the Smarties so that Horace and his friends get 25 each.  Another way would be: 12+9+3+1, 12+13 and 4+1+3+3+8+6.

12	**3**	# Pie Pieces ## Solution Alyssa bought a slice of peach pie and ate $\frac{1}{12}$ of the pie. Dalton bought a slice of blueberry pie and ate $\frac{1}{8}$ of the pie. Rowan bought a slice of chocolate pie and ate $\frac{1}{8}$ of the pie. Shane bought a slice of apple pie and ate $\frac{2}{15}$ of the pie. ## Explanation  Blueberry Apple Peach Chocolate **Dalton** $\frac{1}{6} \times \frac{3}{4} = \frac{3}{24} = \frac{1}{8}$ **Shane** $\frac{1}{5} \times \frac{2}{3} = \frac{2}{15}$ **Alyssa** $\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$ **Rowan** $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ **Step 1** Use the clues to find the kind of pie that each person chose. Make a chart to keep track of the information. **Step 2** Use the clues to write a number sentence showing the fraction of the pie that each person ate. **Step 3** Solve. | Student | Size of Slice | Kind of Pie | Fraction of Slice Eaten | Number sentence showing fraction of pie eaten | Fraction of Pie Eaten | | --- | --- | --- | --- | --- | --- | | **Alyssa** | $\frac{1}{3}$ | Peach | $\frac{1}{4}$ | $\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$ | $\frac{1}{12}$ | | **Dalton** | $\frac{1}{6}$ | Blueberry | $\frac{3}{4}$ | $\frac{1}{6} \times \frac{3}{4} = \frac{3}{24} = \frac{1}{8}$ | $\frac{1}{8}$ | | **Rowan** | $\frac{1}{4}$ | Chocolate | $\frac{1}{2}$ | $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ | $\frac{1}{8}$ | | **Shane** | $\frac{1}{5}$ | Apple | $\frac{2}{3}$ | $\frac{2}{3} \times \frac{1}{5} = \frac{2}{15}$ | $\frac{2}{15}$ |
13	**3**	{[2 x (3+5)] – 9} + [5 x (23-18)] Answer: 32 **[2 x (3 + 5) – 9] + [5 x (23 – 18)]**

<table>
<tr><td>14</td><td>2</td><td> 
</td></tr>
<tr><td>15</td><td>2</td><td>320 yards</td></tr>
<tr><td>16</td><td>3</td><td>Mean = 42
Median = 45.5
Mode = 57</td></tr>
<tr><td>17</td><td>2</td><td>2 trucks
Task Solution
Dimensions of interior of truck
187 in x 89 in x 77 in
Dimensions of storage boxes
24 in x 14 in x 27 in
Volume of interior of truck
V= lwh
V= (187 in)(89 in)(77 in)
V= 1,281,511 in^3
Volume of storage boxes
V= lwh
V= (24 in)(14 in)(27 in)
V= 9,072 in^3
1,281,511 in^3 ÷ 9,072 in^3 = 141.26 in^3 = 141 boxes in one truck
They will need two trucks to move 200 boxes.</td></tr>
<tr><td></td><td>36</td><td>TOTAL POINTS</td></tr>
</table>