Kansas City Area Teachers of Mathematics
2013 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 **may** use calculators on this test (*NO* cell phone calculators).
- Use the π button on your calculator or use 3.14159.
- 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)*

<u>President's Day Trivia:</u>
In 2013, President's Day was Feb. 18th, the 3rd Monday in February.

1. George Washington, known as "The Father of Our Country", was the first President of the United States of America. He played a major role in the drafting of the Declaration of Independence signed on July 4, __?__, declaring the Colonies to be free and independent states.

   Find the answer to #1 by evaluating the following problem:
   $$2013 \div 3 \times 2 + 18 + 2 \times 208$$
   Answer: _____

2. Abraham Lincoln was our 16th President and he is known as "The Great Emancipator." Nicknamed "Honest Abe" for his honesty and fairness and coming from very humble beginnings. Abraham Lincoln is the finest example of what an individual can achieve with hard work and the ambition to learn and to lead.

   To find the answer to #2, take the answer from #1: _____ and divide it by the Presidential # of Abraham Lincoln.
   Answer: _____

3. President Obama is our 44th president. Here are some fun facts about him:
   - When he was a child he wanted to become an architect.
   - He collects comic books.
   - He loves to cook chili.

   To find the answer to #3, take the answer from #2: _____ and divide it by the Presidential # of President Obama. Round your answer to the <u>nearest hundredth.</u>
   Answer: _____

TEAM #: _____   School Name _____

Mathletics

Grade 5
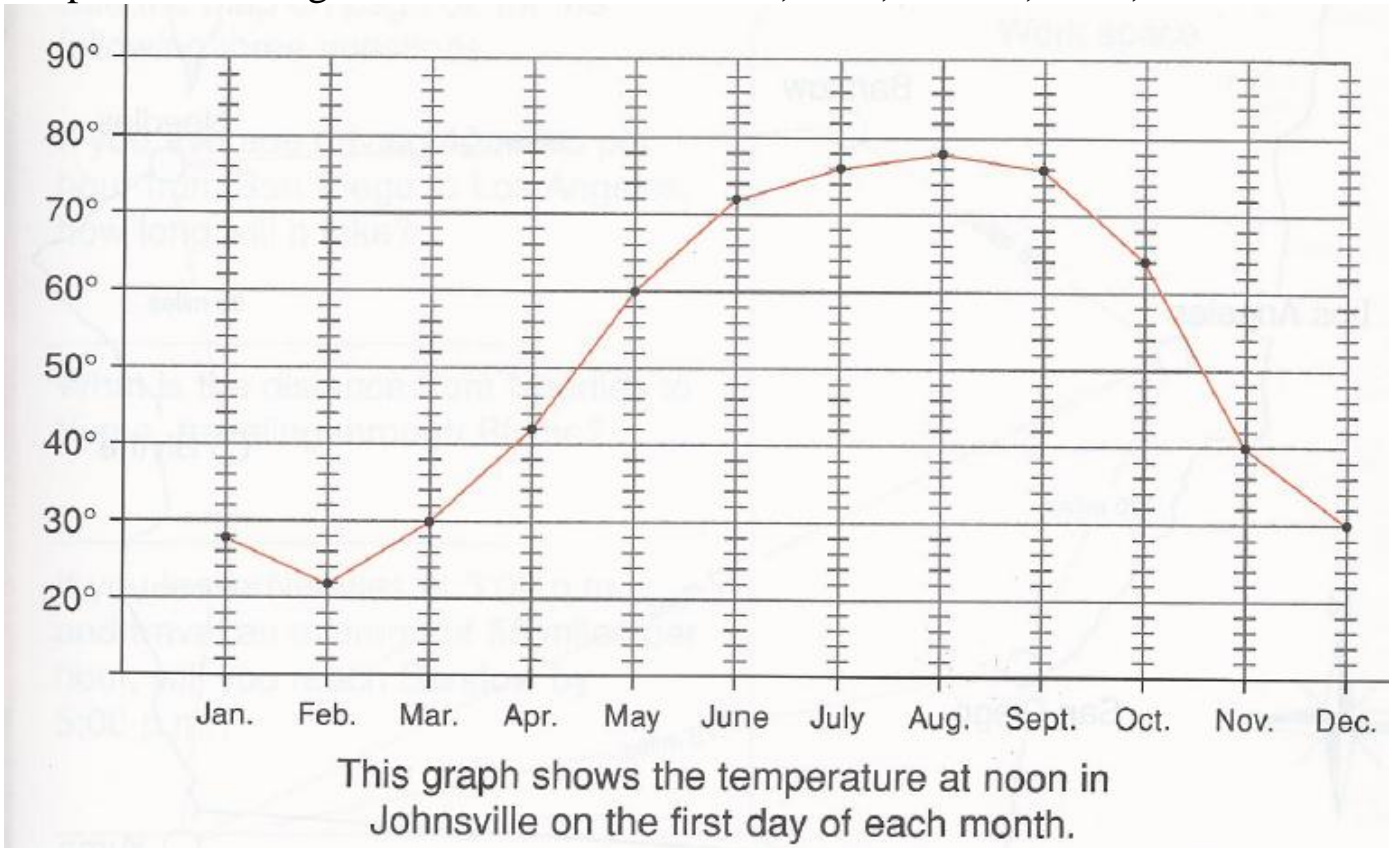
Problem # 4

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

Team Number: _____   School: _____

Problem 4 *(3 points, 3 minutes)*

What is the <u>difference</u> in average monthly temperature in Johnsville during the warmer months from **June to September** compared to the average monthly temperature during the colder months of **Jan., Feb., March, Nov., and Dec.?**

This graph shows the temperature at noon in Johnsville on the first day of each month.

Answer: _____ °

Team Number: _____   **School:** _____

Mathletics

Grade 5

Problem # 5

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

Team Number: _____   School: _____

Problem 5 *(2 minutes, 2 points)*

Kendra loaned three friends a total of $54 using whole dollars.

She loaned Phoebe $10 more than she loaned Miriam and loaned Grace twice as much as she loaned Phoebe.

How much money did Kendra loan to each of her friends?

Answers:

Phoebe: _$_____

Miriam: _$_____

Grace: _$_____

TEAM #: _____ School Name _____

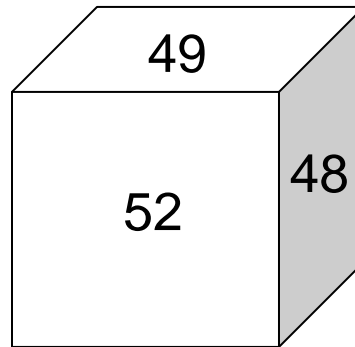**Kansas City Area Teachers of Mathematics**
2013 KCATM Contest

Mathletics

Grade 5

Problem # 6

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

Team Number: _____   School: _____

Problem 6 *(1 minute, 1 point)*

The figure shows three faces of a 6-sided cube. If the six faces of the cube are numbered consecutively, what are **two possible sums** of the three remaining sides?

Answers: _____

_____

TEAM #: _____ **School Name** _____

Mathletics

Grade 5

Problem # 7

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

Team Number: _____   School: _____

Problem 7 *(3 minutes, 3 points)*

A tricky way to find the price of a car is to "code" the license plate for each letter used. **Find the value of car.**

Walk through these steps.

a. Alan owns a pizza parlor, so he shortens the words to use on his license plate. Write out the complete words *(not the abbreviations)* from Alan's license plate on the lines below.   **PZA:**   **4:**   **EVR:**

| PZA 4 EVR | = ___ ___ ___ ___ ___ | ___ ___ ___ | ___ ___ ___ ___ |

b. Code each letter using the Code Box at the right. Find the dollar value for each letter and find the sum of the letter values for Alan's license plate.

c. The value of the license plate letters is 1/60 of the value of the car. **What is the value of Alan's car?**

> **The Code**
>
> **Each letter has the value of its <u>opposite</u> in the alphabet.**
>
> *Example:* C, the 3ʳᵈ letter, has a value of X (the 3ʳᵈ letter from the end of the alphabet), X is the 24ᵗʰ letter, so C is worth $24. The value of X, then is $3.

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

Answer: _____

TEAM #: _____ **School Name** _____

Kansas City Area Teachers of Mathematics
2013 KCATM Contest

Mathletics

Grade 5
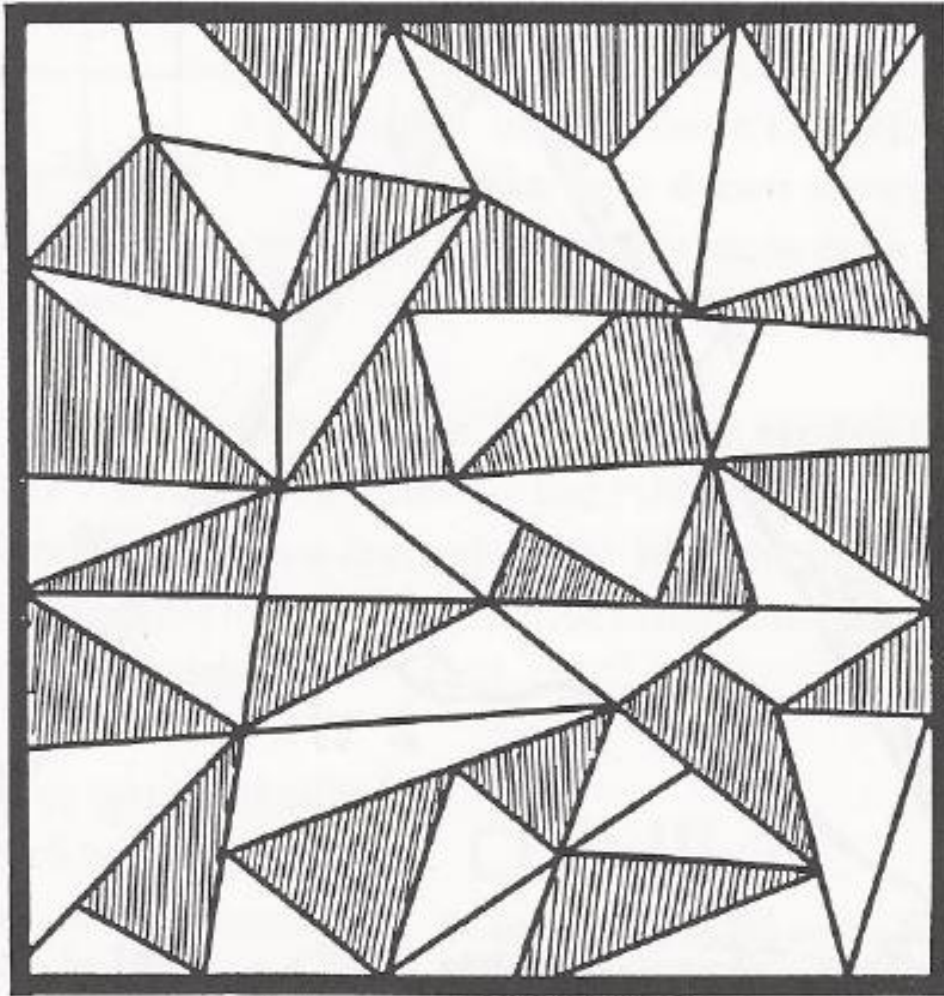
Problem # 8

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

Team Number: _____   School: _____

Problem 8 *(1 point, 1 minute)*

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

Find the concealed five pointed star.

TEAM #: _____ **School Name** _____

Mathletics
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)*

Find the TOTAL COST of shipping the items in the order form below.

When buying merchandise from a catalog or online, shipping and handling charts are often provided so that you can compute these charges.

A. AM/FM Radio   Wt. 3.1 lb.
416-5342 $29.99

B. Scooter   Wt. 9.2 lb.
614-58310 $49.99

Shipping and Handling Charges

Pounds	Zone 1	Zone 2	Zone 3
6–6.9	$3.92	$4.16	$4.56
7–7.9	$4.04	$4.26	$4.72
8–8.9	$4.16	$4.36	$4.80
9–9.9	$4.28	$4.46	$4.88
10–10.9	$4.40	$4.58	$4.96
11–11.9	$4.52	$4.70	$5.06
12–12.9	$4.64	$4.82	$5.19
13–13.9	$4.73	$4.94	$5.29
14–14.9	$4.82	$5.09	$5.42
15–15.9	$4.91	$5.24	$5.55
16–16.9	$5.00	$5.39	$5.77
17–17.9	$5.09	$5.57	$5.99

Use the information from the product descriptions above and the shipping chart to complete this order form. The package is going to Zone 3.

Item	Catalog Number	How many	Price for 1	Total Price	Shipping Weight lb
Radio	416-5342	2			
Scooter	614-58310	1			
			Total		
			Tax	$6.59	
			Shipping and Handling		
			Total Cost		

Answer: The total cost is _____.

Problem taken from <u>Math Practice Simplified: Tables and Graphs</u>, Sharon Schwartz, Essential Learning Products

Team Number: _____   **School:** _____

Mathletics

Grade 5

Problem # 10

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

Team Number: _____   School: _____

Problem 10 *(3 points, 3 minutes)*

Prime numbers have some unique properties:
- 2 is the only even prime
- No prime, other than 5, can end in 5.
- After the unit primes (2,3,5,7), all others must end in 1,3,7, or 9.

A "Goldbach number" is an even number that can be written as the sum of two primes. Leonhard Euler (1707-1783) was never able to prove Christian Goldbach's (1690-1764) conjecture, and it still remains a strong conjecture today.

Show that the Goldbach Conjecture holds true for the following even numbers. **Find ONE pair of primes that has a sum of the given even number.** *(Some may have more than one way.)* Example: $8 = 3 + 5$

ANSWERS:

a) 28 =

28 = _____

b) 30 =

30 = _____

c) 56 =

56 = _____

d) 62 =

62 = _____

e) 100 =

100 = _____

All numbers must have a correct solution for points.

Problem adapted from <u>More Joy of Mathematics</u>, Theoni Pappas, Wide World Publishing and information obtained from:
http://en.wikipedia.org/wiki/File:Goldbach_partitions_of_the_even_integers_from_4_to_28_300px.png

Team Number: _____   **School:** _____

Mathletics

Grade 5

Problem # 11

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

Team Number: _____ **School:** _____

Problem 11 *(3 points, 3 minutes)*

Mario's Italian Den makes round pizzas. Mama Maria's Pizza Kitchen makes square pizzas. Both pizzas are 1 inch thick.
- Bryant ordered a 16 inch round pizza and ate 5/6 of his pizza.
- Jesse ordered a 14 inch square pizza and ate 5/6 of his pizza.

In total volume, who ate more pizza AND by how much? *Round each volume to the nearest <u>tenth</u> before finding the difference.*

The **<u>volume</u>** of the round pizza is found by taking the area of the circle times the height. $V = \pi r^2 h$

The volume of the square pizza is the area of the square times the height.
$V = (s^2)h$

Remember to use the π button on your calculator or use 3.14159.

Bryant

d = 16 inches

Jesse

s = 14 inches

Answers:

Who ate more pizza? _____

How much more pizza did he eat? _____ cu. inches

Team Number: _____   **School:** _____

Mathletics

Grade 5

Problem # 12

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

Team Number: _____   School: _____

Problem 12 *(2 points, 2 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. $A + D = 6$
2. $D \times A = E + A$
3. $A + C = B$

	A	B	C	D	E
1					
2					
3					
4					
5					

Answers: A = _____

B = _____

C = _____

D = _____

E = _____

Team Number: _____   School: _____

Kansas City Area Teachers of Mathematics
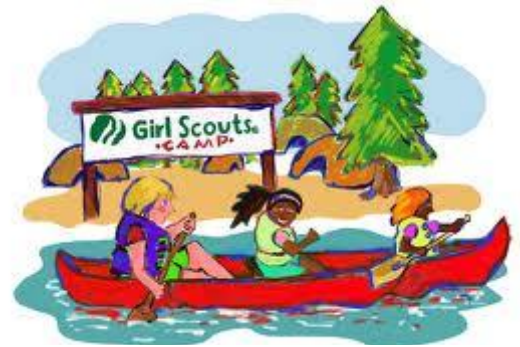**2013 KCATM Contest**

Mathletics

Grade 5

Problem # 13

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

Team Number: _____   School: _____

Problem 13 *(2 points, 2 minutes)*

Backpack Weigh-In

Elena, Joe, Owen, Samantha and Tuck have weighed their backpacks.
- Elena's backpack weighs the most.
- Owen's backpack weighs 0.45 pounds less than Joe's backpack.
- Samantha's lunch weighs 1.5 lbs. With that lunch out of the backpack, the backpack weighs 16.55 lbs.
- Tuck's backpack weighs more than Owen's.

How much does each person's backpack weigh? Use this chart to help.

	18.05	18.90	19.35	19.50	19.80
Elena					
Joe					
Owen					
Samantha					
Tuck					

19.5 lb   18.05 lb

19.8 lb   19.35 lb   18.9 lb

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

Answers: Elena = _____ lbs.

Joe = _____ lbs.

Owen = _____ lbs.

Samantha = _____ lbs.

Tuck = _____ lbs.

Team Number: _____   School: _____

Kansas City Area Teachers of Mathematics
2013 KCATM Contest

Mathletics
Grade 5

Problem # 14

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

Team Number: _____   School: _____
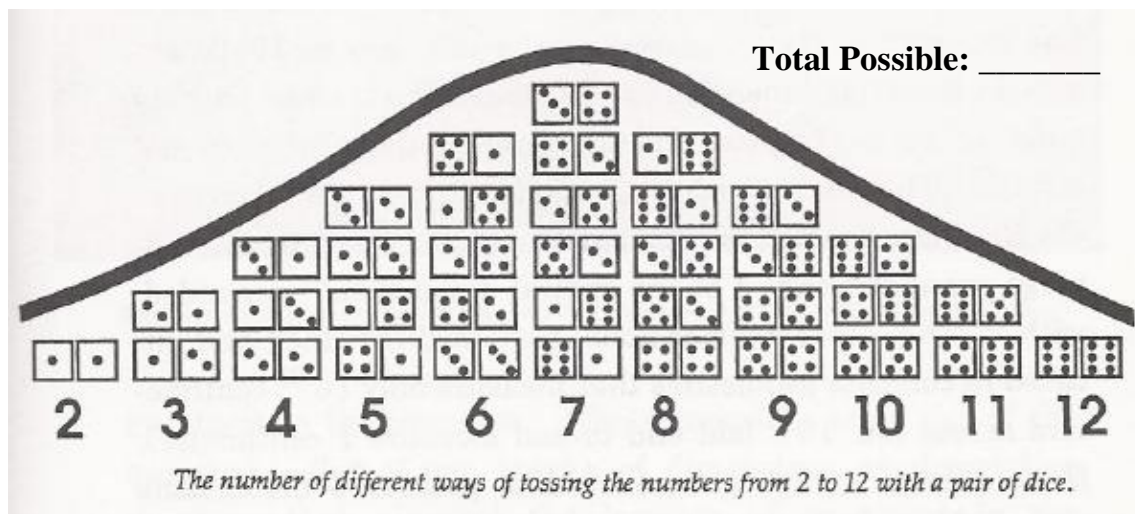
Problem 14 *(3 points, 3 minutes)*

Among 40 Girl Scouts in one troop at Camp Ellwood, some of the girls had mishaps:

- 14 fell into the lake
- 13 came down with poison ivy
- 16 were lost on the orientation hike
- 3 girls had poison ivy **and** fell into the lake
- 5 girls fell into the lake **and** got lost
- 8 girls came down with poison ivy **and** were also lost.
- 2 girls experienced **all three** mishaps

How many of the Girl Scouts in this troop escaped with NONE of these mishaps?
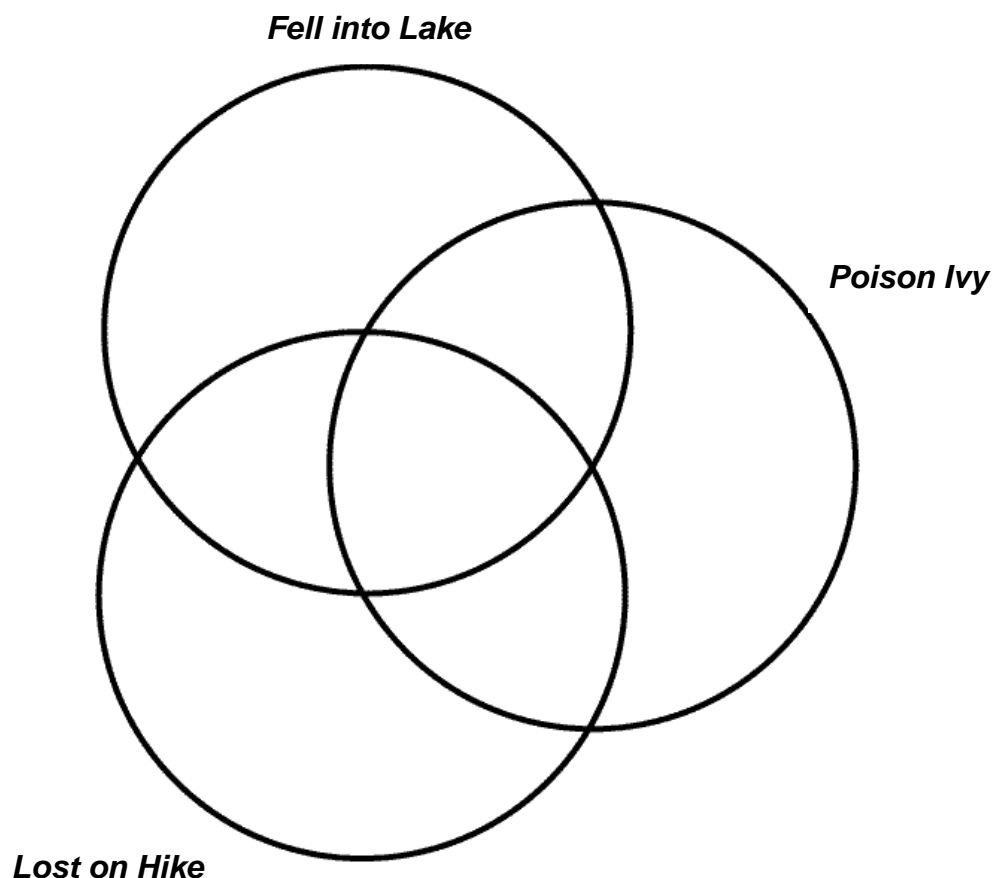
Fell into Lake

Poison Ivy

Lost on Hike

Answer: _____

Team Number: _____   School: _____

Mathletics
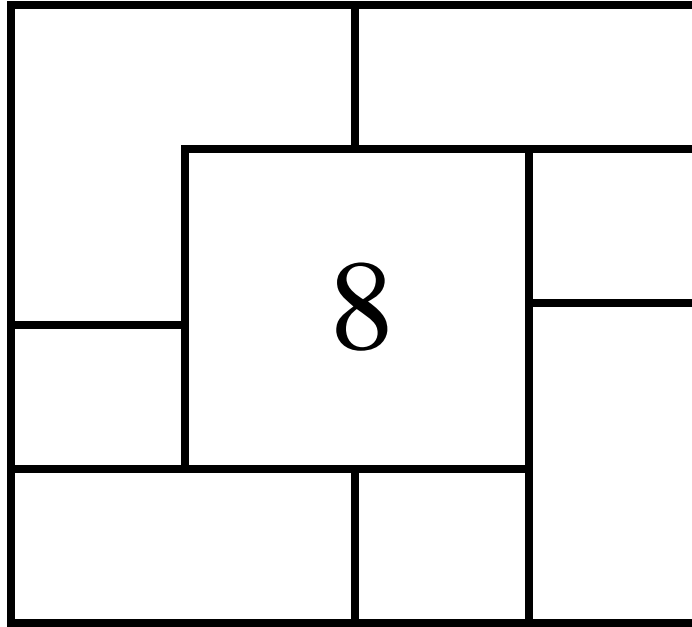
Grade 5

Problem # 15

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

Team Number: _____   School: _____

Problem 15 (2 points, 2 minutes)

Total Possible: _____

The number of different ways of tossing the numbers from 2 to 12 with a pair of dice.

Use the figure to answer the following three questions.
Write the answers in simplified fraction form.

a. Find the **sum most likely to happen**, then find the **probability** (in fraction form) of getting that sum when throwing a pair of dice.

b. What is the probability of having a **sum of 11** on the dice?

c. What is the probability of having a **sum of 2** on the dice?

Answers: a. _____

b. _____

c. _____

Must have all values correct in simplified fraction form.
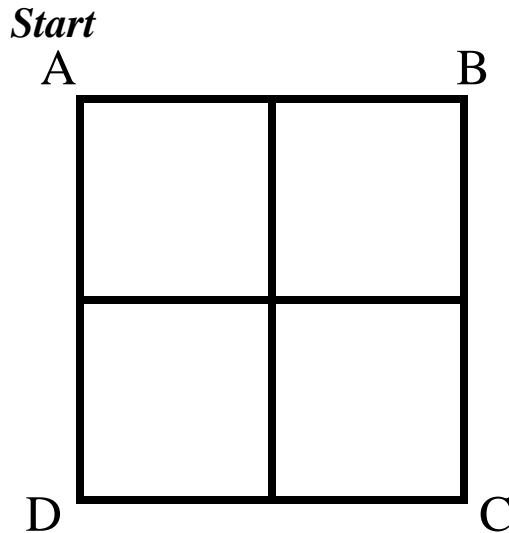
Team Number: _____   **School:** _____

Mathletics
Grade 5

Problem # 16

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

Team Number: _____   School: _____

Problem 16 *(1 point, 1 minute)*

Eight congruent squares are layered one on top of the other. If the square numbered 8 was the last one to be placed, determine the order in which the other 7 squares were placed to end up with the arrangement pictured above.

Answer*(above):* **Place the numbers 1-7 in the partial squares above**.
Your team must have all squares identified in the correct order to receive points.

Team Number: _____   School: _____

Mathletics
Grade 5

Problem # 16

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

Team Number: _____   School: _____

(3 points, 3 minutes)

Two mice are racing around the edges of a square whose sides are 2 feet in length. They start at the same vertex (corner) and both go in a clockwise direction. One mouse travels at a constant rate of 1 foot per second, and the second mouse travels at a constant rate of 2 feet per second. After 22 seconds, how far apart will the mice be from each other?

Start

Answer: _____feet

Team Number: _____   **School:** _____
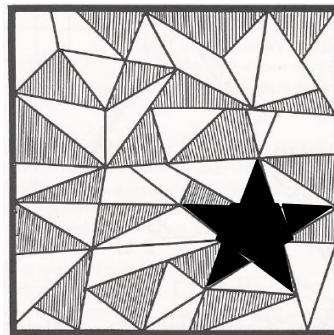
Mathletics

Grade 5

Answer Key

1. 1776
2. 111
3. 2.52
4. 45.5°   (Avg. Winter Months = 75.5; Avg. cold months = 30)
5. Phoebe = $16; Miriam = $6; Grace = $32
6. 154 and 148
7. $9,420
8. (see figure at right)
9. $122.11
10. a) 28 = 11 + 17
             5 + 23
    b) 30 = 13 + 17
             7 + 23
    c) 56 = 19 + 37
            43 + 13
    d) 62 = 19 + 43
    e) 100 = 3 + 97   (Must have ONE pair for each a-e)
            11 + 89
            17 + 83
            29 + 71
            41 + 59
            47 + 53
11. Bryant ate more by 4.2 cu. in. or 4.3 cu. inches.

Find the concealed five pointed star.

Bryant ate $(3.14)(8^2)$ x 5/6 x 1 in. = 167.6 cu. in.

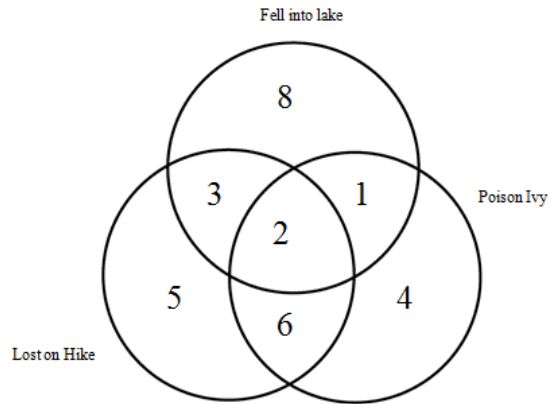Jesse ate 14^2 x 5/6 x 1 in. = 163.3 cu. in.

12. A=1, B=3, C=2, D=5, E=4

13. Elena: 19.8 lb

Joe: 19.35 lb

Owen: 18.9 lb

Samantha: 18.05 lb

Tuck: 19.5 lb

14. 11 people had NO mishap.

(see figure at right)

Fell into lake

8

3   1   Poison Ivy

2

5   4

6

Lost on Hike

15. a) 1/6   b) 1/9   c) 1/36

16. (see figure at right)

7   1

2

8

6

3

5   4

17. 2 ft.

Both start at A.

Mouse A goes 22 ft./8 = 2 r 6

Ends at D.

Mouse B goes 44 ft./8 = 5 r 4

Ends at C, therefore they are 2 ft. apart.