Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Individual Test

Student Name: _____ Team #: _____
School Name: _____

Problems 1-20		2 pts each	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
	Subtotal		

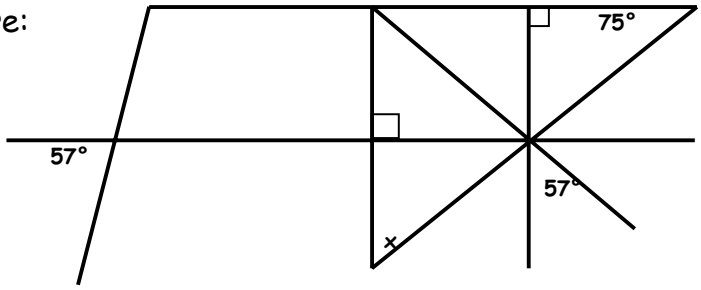
Problems 21-30		3 pts each	
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
	Subtotal		

TOTAL		

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Individual Test

written by Andrew Reusch, Aaron Smith, and Micaiah Michaela

Put all answers on the colored answer sheet. All fraction answers must be reduced.

	Problems 1 through 20 are worth 2 points each
1	What is 150 x 19?
2	Calculate 1,426 + 2,936.
3	What is $\frac{3}{4}$ + 1.25?
4	What is (5x2- 10)/21?
5	What is the perimeter of a square with area 9?
6	Anna is very fidgety, and cannot sit through a whole movie. If she goes to see a 3 hour movie, but only sits through 6/12 of it, how many minutes did she spend watching the movie?
7	Evaluate: 6!
8	John has sixteen cookies. If Andrew eats half of John's cookies, and Anna eats half of the cookies John has left after Andrew eats some, how many cookies does John have left?
9	What is the area of a right triangle with a hypotenuse of length 15 and one leg of length 12?
10	In 17 years, Reusch will be 34 and six years older than twice Anna's current age. How old is Anna?
11	If a fair die is rolled, what is the probability that the face-up number is greater than 4?
12	Find x in the following figure: 
13	Fill in the blank in this sequence: 1, 7, 13, 19, __, 31.
14	One day, Aaron decides to swim laps around the perimeter of a 25 by 12 yard pool. If he wants to swim as close to a mile (1650 yards) as he can while doing only complete laps, how many laps should he do?

15	Devin has 48 hours in which he must write an English paper, which takes six hours. However, he is hopelessly addicted to Warcraft, which slows down his brain. If every game he plays adds one hour to the time it takes him to write the paper, how many games can he play before he must write his paper, assuming each game takes an hour?
16	How many times would I write a 7 if I were to number a 300-page book?
17	Katie refuses to play Frisbee if it rains. And she will not play Frisbee without Tom. The weatherman forecasts a 10% chance of rain on Tuesday, but Tom says he is only 90% sure he can come on Tuesday. What is the probability, in percent, that she will play Frisbee on Tuesday with Tom?
18	On what day is Aaron's birthday this year if his birth date is August 21st?
19	My E string currently plays at 1322 Hz. If I can only adjust it either 3 Hz or 8 Hz per try, what is the least number of tries it will take me to make the string play a true E, which plays at 1335 Hz?
20	What is the volume of a cube with side length 5 feet?
	Problems 21 through 30 are worth 3 points each
21	Rachel is about to go on a 5 hour plane ride. However, there is no center aisle for her to stretch her legs, which makes her mad. If she must sit next to Jack, how many ways can the math team of 6 people be arranged in one row?
22	There are 4 bits in 1 nibble, 4 nibbles in 1 word, and 4 words in 1 qword. How many bits are in a qword?
23	If I have a triangle with sides of length 5 and 9, what is the shortest possible integer length of the third side?
24	iD Games marked every copy of Quake II down 90% after Quake III was released. Devin was ecstatic, and set out with exactly $22, which he believed would cover exactly the cost of the game plus 10% sales tax. However, the evil store managers raised the game's price by 25% to make more money, leaving Devin $5.50 short of the real cost of the game. How much did Quake II cost (including sales tax) before Quake III came out?
25	How many diagonals can be drawn in a pentagon?
26	I can make 7 cubic yards of concrete in an hour. Jones can make 2 cubic yards in 2 hours. How many minutes will it take us working together to make 35 cubic yards of concrete?

27	Each time Steve loses a senior engineer, he throws a chair through his window, smashing the window and sending the chair crashing down on the sidewalk below. He then yells in the general direction of Mountain View, CA for one minute, causing a 10 min. distraction. Steve's window is repaired once at the end of each day. Each time the window smashes, he causes 1 more minute of distraction. If on Jan 1st, Steve loses one senior engineer, Jan. 2nd he loses 2, Jan 3rd he loses 3, and so on, how many minutes of distraction will he have caused by Jan 10th?
28	Anna fights with Robert whenever he beats her on a test. If the probability that Robert wins is 1/2, what is the probability that Anna will fight with Robert at least 3 times over the course of 4 tests?
29	Catherine has just arrived at the line for Harry Potter and the Half-Blood Prince, and it is currently 42nd in line. Each person arrived exactly 7 minutes after the one in front in them. If there are only 100 copies of the book and it takes 3 minutes to purchase a book, how many minutes ago should Catherine have arrived to finish buying the book 15 minutes after the store begins handing out books?
30	During one year, 364 errors occur. At the beginning of the 44th week of that year, only 193 errors had occurred since the beginning of the year. What is the average number of errors that occur per week for the remainder of the year?

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Individual Test

Student Name: _____**KEY**_____ Team #: _**KEY**_

School Name: _____

Problems 1-20		2 pts each	
1	2850		
2	4362		
3	2		
4	0		
5	12 [units]		
6	90 [minutes]		
7	720		
8	4 [cookies]		
9	54 [u^2]		
10	14 [years]		
11	1/3		
12	15 [°]		
13	25		
14	22 [laps]		
15	21 [games]		
16	60 [times]		
17	81 [%]		
18	Monday		
19	3 [tries]		
20	125 [ft^3]		
	Subtotal		

Problems 21-30		3 pts each	
21	240 [ways]		
22	64 [bits]		
23	5 [units]		
24	[$]220		
25	5 [diagonals]		
26	262.5 or 525/2 [min]		
27	560 [min]		
28	5/16		
29	259 [min]		
30	19		
	Subtotal		

TOTAL		

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Algebra Test

School Name: _____ Team #: _____

Problems 1-5			2 pts each	
1				
2				
3				
4				
5				
	Subtotal			

Problems 6-10			3 pts each	
6				
7				
8				
9				
10				
	Subtotal			

TOTAL		

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Algebra Test
written by Constance Spoor

Put all answers on the colored answer sheet. All fraction answers must be reduced.

	Problems 1 through 5 are worth 2 points each
1	If a=g=b=e=3 and l=r=5, what is (a)(l)(g)(e)(b)(r)(a)?
2	Find c if 2c/7=4
3	The sum of two numbers is 14 and the difference is 2. What is the product of the two numbers?
4	Evaluate (.25)(3c-24) when c=8.
5	If there are 29 knuts to a sickle and 17 sickles to a galleon, how many knuts are there in a galleon?
	Problems 6 through 10 are worth 3 points each
6	x+2y=6 x-2y=4 What is x/y?
7	64 people are standing, one per square on a giant 8x8 chess board. Instead of fighting, each person shakes with each of their neighbors, horizontally, vertically or diagonally. How many handshakes take place?
8	Find the next number in the sequence: 1, 3, 7, 13, 21, 31, 43, ___
9	Out of a group of students, 16 take French, 9 are in band, and 3 are in both classes. If 5 students don't take either class, how many total students are there in the group.
10	In 1990, there are 50 spiders in the Forbidden Forest. If the number of spiders quadruples every 5 years, how many spiders were there in 2005?

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Algebra Test

School Name: ___**KEY**_____ Team #: **KEY**

Problems 1-5		2 pts each	
1	6075		
2	14		
3	48		
4	0		
5	493 [knuts]		
	Subtotal		

Problems 6-10		3 pts each	
6	10		
7	210 [handshakes]		
8	57		
9	27 [students]		
10	3200 [spiders]		
	Subtotal		

TOTAL		

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Geometry Test

School Name: _____ Team #: _____

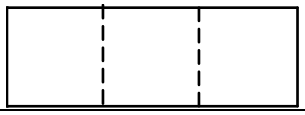
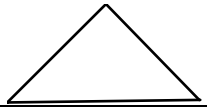
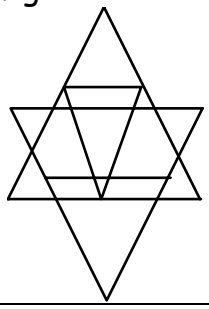
Problems 1-5			2 pts each	
1				
2				
3				
4				
5				
	Subtotal			

Problems 6-10			3 pts each	
6				
7				
8				
9				
10				
	Subtotal			

TOTAL		

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Geometry Test
written by Samantha Mulanex and Anh Le

Put all answers on the colored answer sheet. All fraction answers must be reduced

	Problems 1 through 5 are worth 2 points each
1	There are two trees right next to each other. One tree is 20ft. tall and has a 50ft shadow and the other is 8 ft. tall. How long is the shadow of the second tree?
2	If the perimeter of each square is 12 cm., what is the perimeter of the figure below? 
3	What is the length of the base of the figure below, if the height is 11 in. and the area is 110 in^2? 
4	How many lines of symmetry does a regular hexagon have?
5	A box is 7 in. tall, 10 in. wide and 8.5 in. deep. What is the total surface area of the box (including the top and bottom)?
	Problems 6 through 10 are worth 3 points each
6	Tommy was feeding the animals at the zoo whose cages are all in a line on a hill. He started at the monkey's cage; then he walked down the hill 3 cages to feed the birds. The birds are in the first cage in the zoo. Then Tommy went up the hill 7 cages to feed the seals. From there he went down the hill 5 cages to feed the bears. Next he went up the hill 8 cages to the elephants. They are in the last cage in the zoo. How many cages ate there in the zoo?
7	How many triangles are in the figure below? 

8	Five flags are spaced evenly around a track. It took a runner 50 seconds to get from the first flag to the third flag. If the runner continues at the same speed, how many seconds will it take her to get completely around the track?
9	A rectangular packing box is 6 ft. wide, 3 ft. deep, and 2 ft. in height. Jewelry boxes are to be packed within this box. If the jewelry boxes are 1 ft. wide, 6 inches deep and 6 inches high, what is the maximum number that can fit in the packing box?
10	Jackie went fishing. On the first cast she hooked a trout 80 feet from the boat. Each time she reeled in 10 feet of line the trout would take out 5 feet. How many times did she have to reel in to get the fish to the boat?

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Geometry Test

School Name: ___**KEY**_____ Team #: **KEY**

Problems 1-5			2 pts each	
1	20 [ft]			
2	24 [cm]			
3	20 [in]			
4	6 [cages]			
5	429 [sq in]			
	Subtotal			

Problems 6-10			3 pts each	
6	11 [cages]			
7	17 [triangles]			
8	125 [seconds]			
9	144 [boxes]			
10	15			
	Subtotal			

TOTAL		

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: _____ Team #: _____

Round	**1**	**2**	**3**	**4**	**5**
Question #					
Points	0 or 3	0 or 4	0 or 5	0 or 6	0 or 7
				Total	

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: _____ Team #: _____

Round	**1**	**2**	**3**	**4**	**5**
Question #					
Points	0 or 3	0 or 4	0 or 5	0 or 6	0 or 7
				Total	

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: _____ Team #: _____

Round # 1

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: _____ Team #: _____

Round # 1

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: _____ Team #: _____

Round # 2

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: _____ Team #: _____

Round # 2

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: _____ Team #: _____

Round # 3

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: _____ Team #: _____

Round # 3

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: _____ Team #: _____

Round # 4

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: _____ Team #: _____

Round # 4

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: _____ Team #: _____

Round # 5

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: _____ Team #: _____

Round # 5

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round
written by Trevor Thompson

Put all answers on the colored answer sheet. All fraction answers must be reduced. The first answer submitted is worth 3 points, the second 4 points, ..., and the fifth answer is worth 7 points. You may turn in your answers in any order but each question may only be answered once!

1	Evaluate and place these numbers in increasing order: 7!/5!, 34, 123/3, -41, 0
2	The equation y = 2x – 4 describes a line. Find the sum of the slope of the line and the x intercept of the line.
3	Angela, Bonnie, Carol, Debbie, and Ellie are all at a tea party with their teddy bears. If they all put their bears into a pile in the center of the room, there are 7 bears in the pile. Since they all brought at least one teddy bear, what's the greatest number of bears that Ellie could have brought to the tea party?
4	$2 \times 4 + 6 \div 2$ = ? What is the positive difference when this problem is solved using the normal order of operations and when this question is solved if the order of operations is reversed?
5	What is the remainder when 107 is divided by 17?

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team Pressure Round

School Name: ___**KEY**_____ Team #: **KEY**

1	-41, 0, 34, 41, 42
2	4
3	3
4	1
5	5

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team "Who Wants to be a Mathematician"

School Name: _____ Team #: _____

Problems 1-4		1 pt each		
1				
2				
3				
4				
Problems 5-8		2 pts each		
5				
6				
7				
8				
Problems 9-11		3 pts each		
9				
10				
11				
Problem 12		4 pts		
12				

TOTAL	

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
"Who Wants to be a Mathematician"
written by Catherine Tart

Put all answers on the colored answer sheet. Answers left blank will not be scored; any wrong answer will result in no further answer being scored. Be careful, check your work and don't guess!

	Problems 1 through 4 are worth 1 point each
1	Evaluate: $3^2 + 4(8-7) \div 2$ A) 11 B) 5 C) 8 D) 10
2	Doc (one of the seven dwarves) has forgotten what kind of rings the princesses ordered! He knows that Cinderella, Snow White, and Sleeping Beauty all ordered exactly one ring and no one ordered the same ring. Cinderella is allergic to silver and hates diamonds. Snow White loves only sapphires and rubies. Sleeping Beauty won't wear anything but silver. What did Cinderella order? A) Silver and sapphire B) Diamond and rubies C) Gold and sapphire D) Rubies and silver
3	Harry has 8 chocolate frogs, 4 Drooble's Best Blowing Gum, and 7 licorice wands. How many pieces of candy does he have all together? A) 17 B) 18 C) 20 D) 19
4	A triangle has exactly 2 congruent angles and 2 congruent sides. What type of triangle is this? A) Equilateral B) Scalene C) Isosceles D) Special
	Problems 5 through 8 are worth 2 points each
5	A rectangle has a perimeter of 222 and a length of 77. What is the rectangle's width? A) 145 B) 34 C) 45 D) 68
6	How many ways are there to arrange the letters in the word NARNIA? A) 180 B) 60 C) 10 D) 90
7	Evaluate: $\frac{3}{4}$ divided by $\frac{7}{8}$. A) 7/6 B) 6/7 C) 7/9 D) 24/28
8	A triangle has a base of 3 and a height of 8. A square has a side length of 5. What is the positive difference between their areas?? A) 1 B) 15 C) 14 D) 13

	Problems 9 through 11 are worth 3 point each
9	Obi-Wan zapped 1/9 of a group of stormtroopers. He later caught up and blasted 3/8 of the remaining stormtroopers. After that, 5 stormtroopers were captured by Ewoks. In the end 60 got away. How many stormtroopers were there originally? A) 117 B) 120 C) 121 D) 118
10	If A and B are digits for which: 4 A x B 6 2 5 8 8 6 1 1 1 8 Then A + B = A) 9 B) 8 C) 5 D) 6
11	Anna's sock drawer has 2 pairs of rainbow toe socks, 3 blue pairs, 4 hot pink pairs, and 1 lone neon green sock. Catherine sneaks in when it is dark with the intent of stealing one rainbow sock. What is the probability she draws it on her first try? A) 1/5 B) 2/9 C) 2/10 D) 4/19
	Problem 12 is worth 4 points
12	What is the sum of the solutions to the equation: $x^2 - 7x + 12 = 0$? A) 12 B) 5 C) 7 D) 6

Mount Rainier Math Invitational
Fifth Grade – February 10, 2006
Team "Who Wants to be a Mathematician"

School Name: _____**KEY**_____ Team #: _**KEY**_

Problems 1-4			1 pt each		
1	A				
2	C				
3	D				
4	C				
Problems 5-8			2 pts each		
5	B				
6	A				
7	B				
8	D				
Problems 9-11			3 pts each		
9	A				
10	C				
11	D				
Problem 12			4 pts		
12	C				

TOTAL	

Mount Rainer Math Invitational
February 10, 2006
Fifth Grade Puzzle Answers

1) Trying to work this problem direct could lead to double counting. The easiest way to do this problem is to count the number of numbers with no 0's, namely (9)(9)(9)=729, and subtract this from the number of 3-digit numbers: (9)(10)(10)=900 to get the answer of **171**.

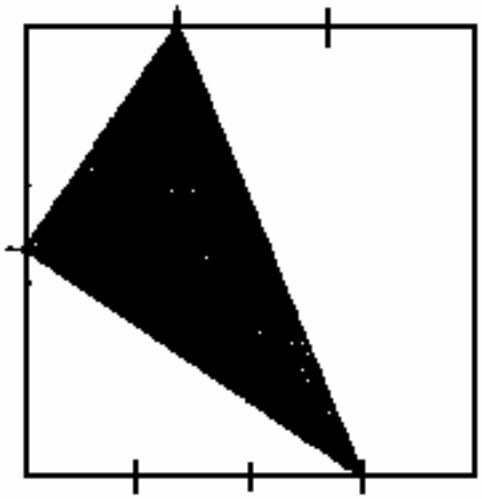
2) Take each side of the square to be length 12 so that all the lengths are integers and the total area is 144. The shaded area can be found by subtracting the area of the two right triangles and the trapezoid from the square. The shaded area is 144 – (1/2)(4)(6) – (1/2)(6)(9) – (1/2)(12)(8+3) = 144 – 12 – 27 – 66=144-105=39. The answer is **39/144**.

3) Each side of the hexagon is 1/2 the length of the side of the triangle. The hexagon can be divided into 6 triangles each (1/4) the area of the separate triangle. The area of the hexagon is then (6)(1/4)(2) = **3**.

Mount Rainer Math Invitational
February 10, 2006
Fifth Grade Puzzles

1) How many 3-digit positive whole numbers contain the digit zero?

2) We divided the sides of a square into different numbers of equal sections. As the diagram shows, we connected three divider points. What **fraction** of the area of the square is the area of the shaded triangle?



3) A regular triangle and a regular hexagon have the same perimeter. The area of the triangle is 2. What is the area of the hexagon?