Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Individual Test

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

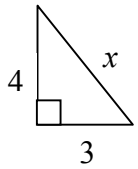
Problems 1-20		2 pts each	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
	Subtotal		

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

TOTAL		

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Individual Test

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

	Problems 1 through 20 are worth 2 points each
1	Evaluate: 170 x 59
2	What is the next term in the sequence 1, 9, 25, 49, 81,…?
3	What is the perimeter of a regular hexagon with sides two less than six?
4	What is 7!?
5	On what day is Kelsey's birthday this year if her birthday is May 5th?
6	What is the sum of the first ten squares?
7	What is the angle between the hour and the minute hand at six o'clock?
8	Berta is shorter than Kelsey, who is shorter than Abbdule. Stacey is taller than Berta. Stacey has a cat. Abbdule is 2' 2" taller than Berta, who is 3" shorter than Kelsey, who is an inch shorter than Stacey. If Abbdule is 7' 2", how tall is Stacey, in inches?
9	 What is the <u>name</u> of the side with length x?
10	What is the length of x in the triangle from question 9?
11	Jonne, Jakob, and Jinngul went to a store that sells three different types of spaghetti sauce. They want to get the most sauce for their money. The Heimer sauce is $2 for 15.5 fl oz, the Schmidt sauce is $6 for 30 fl oz, and the Barbossa is $3 for 18 fl oz. How much would it cost for them to buy two jars of sauce with a 10% off coupon before tax?
12	What percent of 300 is 57?
13	What is the slope of the line containing the points (4, 2) and (7, 8)?
14	If An is holding a book with 734 pages and opens it a random, what is the probability that she will open it to a page whose digits add up to 16?
15	Abbdule, Buurdah, Kelsey, and Stacey are jumping rope with two other people turning the rope. Abbdule jumps every time, Buurdah every other, Kelsey every third, and Stacey every fourth. If they all jump together on the first spin, how many times will Abbdule have to jump before they all jump together again?
16	Solve for x: $4x + 2x + x + \frac{1}{2}x + \frac{1}{3}x + \frac{1}{6}x = \frac{2^6}{2^2}$

17	Hillary bakes a plate of macaroons. Berduhh eats half of the macaroons, then Zoey (Kelsey's dog) eats a fourth of the remaining macaroons. Finally, Octagonne (Berduhh's pet spider) eats 10 of the macaroons. Unfortunately, Hillary only has two macaroons left. How many did she originally bake?
18	How many diagonals does an octagon have?
19	What is the sum of the first 23 odd numbers?
20	Kelsey is hungry, so she decides to see what is in her fridge, where there are plenty of sandwich ingredients, so she is going to make a sandwich. There are 2 types of bread, 3 types of meat, 4 types of cheese, and 5 types of vegetables. How many distinct sandwiches can Kelsey make and eat if a sandwich consists of one type of bread, one type of meat, and one type of cheese?
	Problems 21 through 30 are worth 3 points each
21	What is the surface area of a cube with side length 3!?
22	Two pandas named Biff and Bob have to eat bamboo all day. Biff eats ten stalks a minute and Bob eats twelve every two minutes. How long will it take for them to eat a small forest of 180 stalks of bamboo together?
23	There are four distinct circles sewn on a piece of velvet. What is the maximum number of points where at least two of the circles intersect?
24	What is the sum of the exterior angles of a nonagon?
25	A right triangle has a leg of 1.5 and the other leg is the square of 2. What is the area?
26	How many times does seven evenly go into 43,104,685,924,027?
27	Evaluate 3@5 if a@b = $\frac{ab + 2a + b + (b-a)^2}{(a+b)(a-b)}$
28	Andrew receives a box of 16 marbles in the mail. He ordered 3 clear marbles, 6 yellow marbles, 2 blue marbles, and 5 red marbles. He likes yellow best. What is the probability he pulls 1 yellow marble and then 1 clear marble without replacement?
29	What is the sum of $\sqrt{169}$ and $\sqrt{625}$?
30	Oliver is playing a game where there are 10 ping pong balls each under a paper cup. If he picks one of the 6 cups with a silver ball, he gets a dollar. If he picks the cup with the gold bald ball, he gets 5 dollars. For each of the 3 purple balls he'd get a quarter. If he picks 2 different cups (without replacement), how likely is it that he will earn more than 5 dollars?

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Individual Test

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

School Name: _____

Problems 1-20		2 pts each	
1	10,030		
2	121		
3	24		
4	5040		
5	Monday		
6	385		
7	180 [°]		
8	64 [inches]		
9	hypotenuse		
10	5		
11	$3.60		
12	19		
13	2		
14	45/734		
15	12		
16	2		
17	32		
18	20		
19	529		
20	24		
	Subtotal		

Problems 21-30		3 pts each	
21	216		
22	11.25 minutes		
23	12		
24	360		
25	3		
26	6,157,812,274,861		
27	-15/8		
28	3/40		
29	38		
30	1/5		
	Subtotal		

TOTAL		

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
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
Sixth Grade – February 1, 2008
Team Algebra Test

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

	Problems 1 through 5 are worth 2 points each
1	Gemma is 10 years old. Max will be half Gemma's age four years from now. How old is Max now?
2	What comes next in this sequence? 1, 1, 2, 3, 5, 8…
3	If 10y=1 and 10x=1 what is the value of x+y?
4	What is the 40^{th} term of the sequence: 16, 20, 24, 38, 32… ?
5	Eric's favorite number is 3 more than the result of multiplying the number of integers from 10 to 20 inclusive by the number of sides in a pentagon. What is his favorite number?
	Problems 6 through 10 are worth 3 points each
6	Solve for x: $3x(x-1)+9 = x^2 + 2(x^2 + 3)$
7	Trevor has received math test score of 82, 91, 92 and 68. What must Trevor's minimum score be on his next test in order for him to have a 5 test average of at least 80?
8	The ratio of boys to girls at a party is 4:5. If there are 24 boys, how many people are at the party?
9	If the Iggy the interesting iguana travels at 4 miles per hour how far will he travel between 7:30am and 2:15pm? Consider Iggy stops at the Rainbow Cafe for lunch from 11:45am to 12:15pm.
10	There are 21 animals in one section of a zoo. If all the animals are bears, wolves, or eagles and all 21 animals combined have 74 legs then how many eagles are there?

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Algebra Test

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

Problems 1-5		2 pts each	
1	3		
2	13		
3	1/5		
4	172		
5	58		
	Subtotal		

Problems 6-10		3 pts each	
6	1		
7	67		
8	54		
9	25		
10	5		
	Subtotal		

TOTAL		

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Geometry Test

School Name: _____ Team #: _____

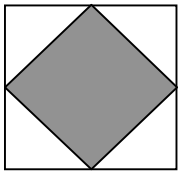
Problems 1-5			2 pts each	
1				
2				
3				
4				
5				
	Subtotal			

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

TOTAL		

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Geometry Test

Put all answers on the colored answer sheet. All fraction answers must be reduced. Leave answers in terms of π.

	Problems 1 through 5 are worth 2 points each
1	How many sides does a dodecagon have?
2	A circle with diameter 8 is cut into fourths. What is the area of one of these fourths?
3	A right triangle has a hypotenuse 13 and one leg of 12. What is the area of the triangle?
4	What is the total surface area of a cube with side length of 12?
5	What is the distance between the points (-4,5) and (4,8)?
	Problems 6 through 10 are worth 3 points each
6	 4 What is the area of the shaded region formed by connecting the midpoints of the square with side lengths of 4?
7	How many rectangles can be formed in a chessboard of 4 units by 4 units?
8	How many triangles with integer side lengths are possible if one side length is 4 and the other is 6?
9	A circle with diameter 8 is cut into fourths. What is the perimeter of one of these fourths (include the arc)?
10	When the diagonals are drawn in a regular hexagon, how many individual sub-regions are created?

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Geometry Test

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

Problems 1-5		2 pts each	
1	12		
2	4π		
3	30		
4	864		
5	$\sqrt{73}$		
	Subtotal		

Problems 6-10		3 pts each	
6	8		
7	100		
8	7		
9	$8+2\pi$		
10	24		
	Subtotal		

TOTAL		

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
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
Sixth Grade – February 1, 2008
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
Sixth Grade – February 1, 2008
Team Pressure Round

School Name: _____ Team #: _____

Round # 1

Question #	Answer

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Pressure Round

School Name: _____ Team #: _____

Round # 1

Question #	Answer

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Pressure Round

School Name: _____ Team #: _____

Round # 2

Question #	Answer

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Pressure Round

School Name: _____ Team #: _____

Round # 2

Question #	Answer

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Pressure Round

School Name: _____ Team #: _____

Round # 3

Question #	Answer

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Pressure Round

School Name: _____ Team #: _____

Round # 3

Question #	Answer

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Pressure Round

School Name: _____ Team #: _____

Round # 4

Question #	Answer

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Pressure Round

School Name: _____ Team #: _____

Round # 4

Question #	Answer

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Pressure Round

School Name: _____ Team #: _____

Round # 5

Question #	Answer

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Pressure Round

School Name: _____ Team #: _____

Round # 5

Question #	Answer

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Pressure Round

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: $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \ldots + \frac{1}{8}$
2	If a @ b equals $\frac{ab + a(b+2a) - b + a^2 + (a+b)^2}{2}$, what is $\frac{3@4}{6}$?
3	Stacey has three pairs of pants, four shirts, and x pairs of socks. How many pairs of socks does Stacey have if she has 12 outfits? (An outfit is made of a shirt, a pair of pants, and a pair of socks)
4	A regular hexagon ABCDEF is inscribed in circle Q, what is the area of the region inside the circle but outside the hexagon if each sid is 6?
5	What is the sum of the first ten prime numbers?

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team Pressure Round

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

1	$2\frac{201}{280}$
2	48
3	1
4	$36\pi - 54\sqrt{3}$
5	129

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team "Who Wants to be a Mathematician"

School Name: _____ Team #: _____

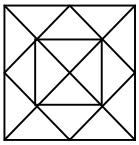
Problems 1-4			1 pt each		
1					
2					
3					
4					
Problems 5-8			2 pts each		
5					
6					
7					
8					
Problems 9-11			3 pts each		
9					
10					
11					
Problem 12			4 pts		
12					

TOTAL	

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
"Who Wants to be a Mathematician"

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	Anna has 5 apples, Catherine has 3, Matt has 2, and Ryan has 10. If they share the apples so that everyone gets an equal amount how many letters are in the word "fidgety?" A) 15 B) 5 C) 4 D) 7
2	A pentagon has how many sides? A) 2 B) 5 C) 7 D) 8
3	How many degrees are in one angle of an equilateral triangle? A) 180 B) 90 C) 60 D) 45
4	If Ryry is 2 years old and Mattie is 12, in how many years will Mattie be twice as old as Ryry? A) -8 B) 4 C) 8 D) 10
	Problems 5 through 8 are worth 2 points each
5	What is the least common denominator of $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, and\ \frac{1}{5}$. A) 30 B) 60 C) 120 D) None of these answers
6	A card is drawn at random from a standard 52 card deck. What is the probability that it has a prime number? A) $\frac{1}{2}$ B) $\frac{1}{52}$ C) $\frac{4}{13}$ D) $\frac{7}{15}$
7	Matt and Ryan are racing to finish the 7^{th} Harry Potter book first before the other spoils the ending for the other. Matt reads 100 pages per hour while Ryan reads 201 pages per hour, but Ryan does not start until Matt has finished half of the book. Who finished the book first, if the book has 1000 pages? A) Matt B) Ryan C) Anna D) Both
8	How many ways can I rearrange the letters in the word "Easy" ? A) 24 B) 120 C) 720 D) None of the answers

	Problems 9 through 11 are worth 3 point each
9	If question 8 was easy, then how many ways can I rearrange the letters in the word "Easier" ? A) 360 B) 361 C) 362 D) 720
10	Take the number of letters in "Mathematician" and square it, then add 1. Next divide by 10 and multiply by 6. Now half it, square it and sum up the resulting number's digits. It should look familiar. What is this number? A) 10 B) 13 C) 6 D) 9
11	Evaluate: 999999999+88888888+7777777+666666+55555+4444+333+22+1 A) 109739385 B) 108739365 C) 107739365 D) 106739365
	Problem 12 is worth 4 points
12	How many triangles are in this figure?  A) 36 B) 32 C) 28 D) 24

Mount Rainier Math Invitational
Sixth Grade – February 1, 2008
Team "Who Wants to be a Mathematician"

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

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

TOTAL	

Mount Rainer Math Invitational
February 1, 2008
Puzzle Answers

1)

2)

3)

Mount Rainer Math Invitational
February 1, 2008
Puzzles

Name: _____

School: _____

1)

2)

3)