Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
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		

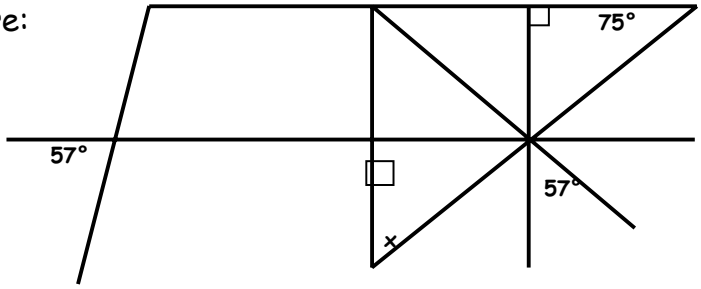
TOTAL		

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Individual Test

Written by Stacey Luong and Trevor Thompson

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

	Problems 1 through 20 are worth 2 points each
1	Find the next two numbers in the sequence: 5, 10, 15, 20, __, __?
2	How many sides does an octagon have?
3	What is the greatest common factor of 56 and 63?
4	What is the difference of the 10^{th} odd number and the 6^{th} even number?
5	What is 1/3 + 1/6?
6	Evaluate (5 + 6 / 2 -4) x 5
7	What is the sum of the first 10 odd numbers?
8	Solve for x: 15x+25=85
9	A triangle has a length of 10 cm and a height of 5 cm, what is the area?
10	What is the probability of drawing an ace out of a standard card deck of 52 cards?
11	How many hours are in 3 days?
12	How many feet are in 29 yards?
13	Mike is in band, after playing the clarinet for 2 years he decides to learn to play the trombone. He will start practicing 10 minutes a day and add 3 more minutes to his practice each day. What will his total practice time be by the end of the week?
14	Find the mean of the following numbers: 12, 6, 14, 5, 8
15	Cindy can run 4 feet per second. Cindy is slow, so Bob can run 6 times faster than Cindy. How many yards per seconds can Bob run?
16	Ron is three times as old as Jim. 5 years ago, Ron was 5 times as old as Jim. How old will Jim be in 7 years?
17	What is x, when 4x-6=46?
18	Convert 0.45 to a fraction, and simplify.
19	What is the perimeter of a square with area 729?
20	What is half of the area of a rectangle with a width of 2 + 6 x 2 and a length of 100 – 5 x 2?

	Problems 21 through 30 are worth 3 points each
21	How many cubic inches are in the volume of a cube with a side length of 2 inches?
22	Multiply the numbers: 7.52 x 6.8 Express your answer as a decimal.
23	If you have a triangle with a base of 12 and a height of 9 and you double all the dimensions in making a new triangle, what is the total area of both triangles?
24	How many feet are there in 19 miles?
25	How many diagonals can be drawn in a regular octagon?
26	Find x in the following figure: 
27	Julio was born Tuesday, August 6, 1996, what day of the week will his second birthday fall on, if there are no leap years?
28	You have 8 Trevors, 3 Constances, and 4 Erics in a jar, if drawn randomly, what are the chances that a Constance will not be drawn?
29	Using the vertices in a regular octagon, how many triangles can be drawn?
30	If there are 8 ashes to 2 grays and 1 gray to 3 fabrics, how many ashes are there in 9 fabrics?

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Individual Test

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

School Name: _____

Problems 1-20		2 pts each	
1	25, 30		
2	8		
3	7		
4	7		
5	$\frac{1}{2}$		
6	20		
7	100		
8	4		
9	25 sq. cm [or cm^2]		
10	1/13		
11	72 [hours]		
12	87 [feet]		
13	133 [minutes]		
14	9		
15	8 [yards]		
16	17 [years old]		
17	13		
18	9/20		
19	108		
20	630 sq. units [or un^2]		
	Subtotal		

Problems 21-30		3 pts each	
21	8		
22	51.136		
23	270		
24	100320		
25	20		
26	15°		
27	Thursday		
28	4/5		
29	56		
30	12		
	Subtotal		

TOTAL		

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
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 9, 2007
Team Algebra Test

Written by Written by An Nguyen & Trevor Thompson

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

	Problems 1 through 5 are worth 2 points each
1	What is the value of x given that 5x + 6 = 36?
2	If z = 8, x = 6, and y = 4, what is xz + zy + yx?
3	John and Michael's ages both add up to 43. If John's age is 4 more than twice that of Michael's age, how old is John?
4	If 36 apples are in 3 bags of apples how many apples are in each bag?
5	If I drove for 8 hours and the ratio of my time speeding to my time driving the speed limit was 3 : 1, how many seconds did I speed?
	Problems 6 through 10 are worth 3 points each
6	A farmer has only perfectly normal chickens and pigs. If there are exactly 13 heads and 40 legs, how many pigs are there?
7	Solve for y: y = (-2/3)x + 4, when x = 16.
8	The sum of 2 numbers is 63 and the difference is 7 what are the 2 numbers?
9	At Mount Rainier Elementary 20 students attend the school. 8 students are taking P.E., 6 students are taking Lunch, and 4 are taking both how many are taking neither?
10	If there are 5 Creams to 1 Ice and 4 Ices to 3 Cones, then how many creams are there in 6 Cones?

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Algebra Test

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

Problems 1-5		2 pts each	
1	6		
2	104		
3	30 [years old]		
4	12		
5	21600 [seconds]		
	Subtotal		

Problems 6-10		3 pts each	
6	7 [pigs]		
7	-20/3 or -6 2/3		
8	28 and 35		
9	10		
10	40		
	Subtotal		

TOTAL		

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Geometry Test
Written by Trevor Thompson

School Name: _____ Team #: _____

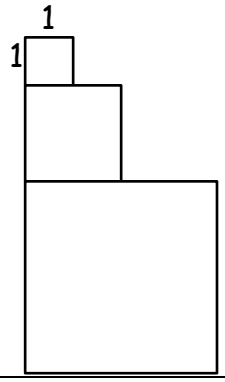
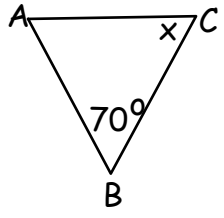
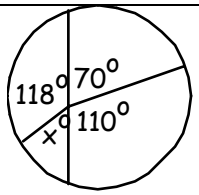
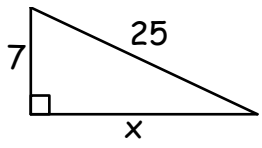
Problems 1-5			2 pts each	
1				
2				
3				
4				
5				
	Subtotal			

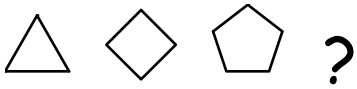
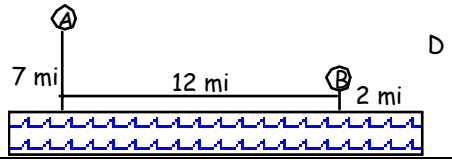
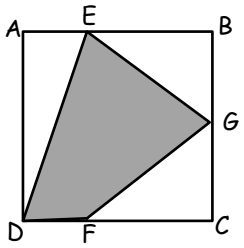
Problems 6-10			3 pts each	
6				
7				
8				
9				
10				
	Subtotal			

TOTAL		

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Geometry Test
Written by Trevor Thompson

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 each square has a side length double of the one above it, what is the total area of the three squares?
2	 If AB = BC then what is the value of x in degrees?
3	What is the degree of one of the angles made by 2 perpendicular lines?
4	 What is the degree measure of x?
5	Find x? 

	Problems 6 through 10 are worth 3 points each
6	What shape comes next? 
7	If the radius of a circle is 2 centimeters, what is the diameter in kilometers? Express your answer as a decimal.
8	A box is 1 yard long, 1 foot wide and 6 inches tall; how many cubic inches of water will it hold when it is filled?
9	Harry Potter is at point A and wants to visit his friend Ron at point B. If he wants to go by the river first, what is the shortest distance he can travel? It is 7 miles from A straight down to the river and B is 2 miles from the river. Harry just needs to stop by the river at one point before visiting Ron. 
10	In square ABCD, CG=GB, BE=2EA, and DF=EA; what fraction of the square is shaded? 

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Geometry Test

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

Problems 1-5			2 pts each	
1	21			
2	55°			
3	90°			
4	62°			
5	24			
	Subtotal			

Problems 6-10			3 pts each	
6	Hexagon			
7	.00004 [km]			
8	2592 [cu inches]			
9	15 [mi]			
10	1/2			
	Subtotal			

TOTAL		

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
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 9, 2007
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 9, 2007
Team Pressure Round

School Name: _____ Team #: _____

Round # 1

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Pressure Round

School Name: _____ Team #: _____

Round # 1

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Pressure Round

School Name: _____ Team #: _____

Round # 2

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Pressure Round

School Name: _____ Team #: _____

Round # 2

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Pressure Round

School Name: _____ Team #: _____

Round # 3

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Pressure Round

School Name: _____ Team #: _____

Round # 3

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Pressure Round

School Name: _____ Team #: _____

Round # 4

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Pressure Round

School Name: _____ Team #: _____

Round # 4

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Pressure Round

School Name: _____ Team #: _____

Round # 5

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Pressure Round

School Name: _____ Team #: _____

Round # 5

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Pressure Round
Written by Andrew Reusch

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 Sixth answer is worth 7 points. You may turn in your answers in any order but each question may only be answered once!

1	What is the sum of the first 15 nonegative integers?
2	Anna and Catherine are in a shopping race. Anna can buy 5 items in 10 minutes, but Catherine can only buy 4 items in 20 minutes. Anna needs to buy 20 presents for her friends. Catherine only needs to buy 10, as she has already bought 10 presents. Given that they start at the same time, state the winner and by how many minutes she won.
3	James is failing Calculus. He has 65% of the 200 points available in class, but unlike regular classes, the IB Henchmen have decreed that a passing grade can only be achieved by obtaining 75% of the points in the class. His teacher is about to hold the final exam for the class, which is worth 300 points. What is the minimum number of points he can score on this exam in order to pass the class after taking the exam?
4	Evaluate: 3*(4-2)^2/((5+6/3+1)/4)+30
5	What is the diagonal length from one vertex to the opposite vertex of a square with side length 2?

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team Pressure Round

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

1	105
2	Anna by 10 min.
3	245
4	36
5	$2\sqrt{2}$

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
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 9, 2007
"Who Wants to be a Mathematician"
Written by Eric Janke

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 1 + 2 + (3 – 4) A) 10 B) 2 C) 4 D) None of these answers
2	How many integers are there between 10 and 20 including 10 and 20? A) 10 B) 9 C) 12 D) 11
3	Reduce the fraction: 51/17 A) 3 B) 17/51 C) 34/51 D) 11/17
4	What is the total area of 2 triangles with base 2 and height 5? A) 5 B) 10 C) 14 D) 20
	Problems 5 through 8 are worth 2 points each
5	What is the sum of the first 20 integers (the numbers from 1 to 20)? A) 220 B) 200 C) 195 D) None of these answers
6	If I add 2 to my favorite number then divide it by 4 I get 3.75. What is my favorite number? A) 5.75 B) 10 C) 13 D) None of these answers
7	What is the sum of the first three even primes and the first five odd primes? A) 39 B) 45 C) 41 D) Not possible
8	On the planet Blorgland there is a very unusual system of currency. All the money is composed of three kinds of coins: blorsks, blobbles, and blooblemorts. 13 blorsks equals 2 blobbels and 24 blorsks equals 1 blooblemort. John is carrying change in his pocket worth 28 blorsk. What is the minimum number of coins John could be carrying if he has at least 3 blorsks in his pocket? A) 5 B) 4 C) 6 D) 3

	Problems 9 through 11 are worth 3 point each
9	Every Tuesday Bill drives from City A to City B and back again. His average speed from City A to City B is 50mph and his average speed for the whole trip is 40mph. What is his average speed on the portion of his trip from City B to City A? A) 45mph B) 30mph C) 33⅓mph D) 60mph
10	I have a figure with four sides, four right angles, and the length of all four sides is four. Which of these could describe this figure? A) Rhombus B) Rectangle C) Parallelogram D) All of the above
11	Eric built some snowmen and Trevor destroyed most of them. He tipped some, crushed some and melted others with a blowtorch in that order. Each snowman could have been destroyed in one, two or three ways or left alone. A total of 16 were tipped and melted and 9 were crushed and melted. Note that some of the 16 could have also been crushed and some of the 9 could have been tipped. 8 were only crushed and 6 were only tipped over. A total of 23 were at some point melted and a total of 35 were at some point tipped over or crushed. If 7 are destroyed in all three ways and 11 are left unharmed, how many snowmen did Eric build? A) 79 B) 115 C) 51 D) 62
	Problem 12 is worth 4 points
12	What is the next term in this sequence? 60, 90, 108, 120, $128\frac{5}{7}$, ___ A) 130 B) 133 C) 135 D) 140

Mount Rainier Math Invitational
Fifth Grade – February 9, 2007
Team "Who Wants to be a Mathematician"

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

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

TOTAL	

#12 Measure of interior angle of regular n-gon.

Mount Rainer Math Invitational
February 9, 2007
Fifth Grade Puzzle Answers

1) $1.19
   Method one: work from the top and go down making sure not to make exact change for a dollar:
   25¢*3 = 75 (or a half dollar and 25¢)
   10¢*4 = 40
   5¢*0 = 0 (we can't add any without making a dollar)
   1¢*4 = 4
   Total = 119
   Method two: working up
   1¢*4 = 4 (5¢ or more will mess this up
   10¢*9 = 90; 25¢*1 = 25 ; Total = 119

2) Imagine a 24 km course. Archimedes takes 6 hours, Gauss takes 4 and Pascal takes 3 hours. Therefore they took 13 hours to go 24x3=72 km. Their average speed was 72/13 kph.

3) Achilles is maintaining a constant speed, so if he runs the first half in 10 minutes, he will finish in 20.

Mount Rainer Math Invitational
February 9, 2007
Fifth Grade Puzzles

Name: _____
School: _____

1) What is the greatest amount of change, including pennies, nickels, dimes, quarters and half-dollars, that can be had without being able to make change for an exact dollar?

2) Archimedes, Gauss and Pascal are running a relay race together. Archimedes walks his lap around the large track at 4 kilometers per hour (kph). Gauss jogs his lap at 6 kph and Pascal runs his laps at 8 kph. What was their average speed?

3) Achilles is running a race. He runs half way in 10 minutes. He runs half again as far in half as much time. This process repeats: always half as far in half as much time. How many minutes does it take Achilles to finish the race?