

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
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			

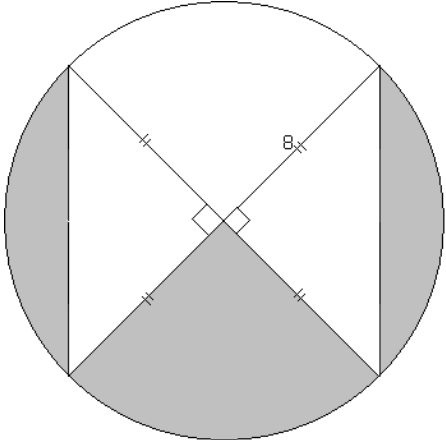
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**Mount Rainier Math Invitational**  
**Sixth Grade - January 23, 2009**  
**Individual Test**

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

<b>Problems 1 through 20 are worth 2 points each</b>	
1	Evaluate: $\left(\frac{3}{8} + \frac{1}{8}\right)$
2	Kelsey has 5 shirts, 3 pairs of jeans, and 2 pairs of boots. How many outfits can she make if an outfit consists of one shirt, one pair of jeans, and one pair of boots?
3	Ignoring units, what is the numerical sum of the area and the perimeter of a square with a side length of 4?
4	Tim likes to garden. His rectangular garden has an area of 80 square feet. $\frac{1}{4}$ of his garden is tulips, $\frac{1}{8}$ is roses, $\frac{3}{8}$ is potatoes, and $\frac{1}{4}$ is corn. How many square feet of the garden has flowers if potatoes and corn are not considered as flowers?
5	A duck has two legs and one head. A sheep has four legs and one head. If Stacey counts 24 legs and 7 heads outside her bedroom window, how many sheep did she see?
6	What is the probability of drawing a jack and then a queen out of a standard deck of 52 cards?
7	When Tim is angry, his eyebrows make the angle $x$ , where $x$ is: $\frac{2^0 \times 5 \times 2 \times 6 \times \frac{360}{6}}{5 \times 2^3}$ . Is the angle acute, obtuse, or right?
8	How many $2 \times 2$ squares fit into a $8 \times 12$ rectangle?
9	Solve for $x$ : $3x + 17 = 50$ .
10	Fleur owns a flower boutique. A complete bouquet consists of 3 roses, 4 daisies, and 2 cabbages. If Fleur has 60 roses, 76 daisies, and 32 cabbages in stock, how many complete bouquets can she make?
11	True or false: $3 + 5 > 2 + 7$ ?
12	Kayleigh has a jar containing 3 blue marbles, 5 yellow marbles, and 12 puce marbles. If she randomly picks a marble from the jar, what is the probability that it will be yellow?
13	What is the sum of the integers between 1 and 20, inclusive?
14	Spencer earns 100 dollars for every eye exam he gives. He wants to save up enough money for a \$10,000 car. What is the least amount of eye exams will he have to give?

15	Evaluate the sum of the following sequence: -3, -2, -1, 0, 1, 2, 3, 4, 5
16	How many diagonals can be drawn in a regular decagon?
17	A triangle has an area of 72 and base of 12. What is the height of the triangle?
18	Simba, Nala, Timon, and Pumbaa are watching the "Lion King." They just finished eating $\frac{2}{3}$ of their food when Scar crashes their party and eats $\frac{1}{2}$ of their remaining food. What fraction of the food is left?
19	What is the difference between the areas of a circle with radius 15 and a circle with radius 9?
20	What is the surface area of a rectangular prism with side lengths 4, 5, and 10?
	<b>Problems 21 through 30 are worth 3 points each (Congratulations. Pat yourself on the back when you get to this point.)</b>
21	Evaluate: $\frac{1}{17} + \frac{2}{3} \times \frac{9}{16} \times \frac{24}{27} \times \frac{33}{34}$
22	Matt and Moth are crocheting sweaters for their cats. Matt can crochet a sweater in five minutes. Moth can crochet a sweater in four minutes. If Matt and Moth work together to crochet 81 sweaters, how long (in hours) would it take?
23	How many ways can the word CUIDADO be rearranged?
24	There are six fish in a pond. Moth eats five of them (RAW). If two of the fish are radioactive, what is the probability that Moth ate at least one contaminated fish?
25	My refrigerator is running. It runs at a constant speed of 48 miles/hour. If my refrigerator starts running from my house at 2:00 pm, and I don't notice that it's missing until 3:00pm, at what time will I catch it (assuming that I take the same path it does and I run at a constant speed of 60 miles/hour)?
26	Every time a cat washes its hands, Qayleigx throws 2 waters bottles off a cliff. For every time Qayleigx throws a water bottle off a cliff, Stacey stomps her foot 2 times. For every time Stacey stomps her foot, Buerta visits 3 U.S. state capitols. If Buerta visits 48 state capitols, how many times did a cat wash its hands?
27	What is the shortest distance between the line $3x+4y=12$ and the origin?
28	There are 6 weeks until swim season starts. To prepare for swim season, Berta swims one mile a day for the first week. She swims two miles a day for the second week, three miles a day for the third week, and so on. How many total laps did she swim (during the six weeks) if there are 32 laps in a mile?

29	Spencer and Jon are having a contest. They take turns flipping a fair coin until one of them gets a "head" and that person is declared the winner. If Spencer goes first, what is the probability that he will eventually win?
30	<p>What is the area of the shaded region?</p> 

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Individual Test**

Student Name: KEY

Team #: KEY

School Name: \_\_\_\_\_

Problems 1-20		2 pts each	
1	$\frac{1}{2}$		
2	30		
3	32		
4	30 [sq. ft.]		
5	5		
6	$\frac{4}{663}$		
7	right		
8	24		
9	11		
10	16		
11	False		
12	$\frac{1}{4}$ or 25%		
13	210		
14	100		
15	9		
16	35		
17	12		
18	$\frac{1}{6}$		
19	$144\pi$		
20	220		
Subtotal			

Problems 21-30		3 pts each	
21	$\frac{13}{34}$		
22	3		
23	2520		
24	1 (or 100%)		
25	7:00pm		
26	4		
27	$12/5$		
28	4704		
29	$2/3$		
30	$48\pi - 64$		
Subtotal			

TOTAL		
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**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
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		
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**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Algebra Test**

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

<b>Problems 1 through 5 are worth 2 points each</b>	
1	Complete the arithmetic sequence: 4, 11, 18, __, __
2	Hermione has a favorite number. If you take this number, multiply it by 6 then add the product to 48 you get 150. What is Hermione's favorite number?
3	What is the least common multiple of 4, 5, and 12?
4	Suhmiin has a fish tank filled with 25 fish. If all but 5 die, how many fish are left in the fish tank?
5	Which is larger: $3^4$ or $4^3$ ?
<b>Problems 6 through 10 are worth 3 points each</b>	
6	If $a=2, d=12, v=5, r=3$ and $k=1$ , what is $\frac{(a)(a)(r)(d)(v)(a)(r)(k)}{(d)(a)(r)(k)}$ ?
7	In March Ken gave Barbie a bracelet with 60 rubies. Unfortunately the bracelet was poorly manufactured and every month 3 rubies fall off! If Barbie now has 42 rubies on her bracelet, what month is it?
8	A \$20 sweater is on sale for 20% off. If Kayleigh only has \$10.24 in her piggy bank, how much should she ask her mother for if she only needs enough money to pay for the sweater? (Exclude tax.)
9	Find the sum of all positive integers less than 50 that are multiples of 3.
10	Tim leaves Seattle at 2:00pm going to Chicago in a plane traveling 200mph. Mary leaves Chicago at 3:00pm going to Seattle in a plane traveling 300mph. If it is 2000 miles between Seattle and Chicago, how far has Tim traveled when the planes pass each other?

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Algebra Test**

School Name: KEY

Team #: KEY

Problems 1-5		2 pts each	
1	25, 32		
2	17		
3	60		
4	5		
5	$3^4$		
Subtotal			

Problems 6-10		3 pts each	
6	60		
7	September		
8	\$5.76		
9	408		
10	920 [miles]		
Subtotal			

TOTAL		
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**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
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		
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**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Geometry Test**

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

<b>Problems 1 through 5 are worth 2 points each</b>	
1	What is the y-intercept of the line that goes through the points (6,5) and (-3,2)? Use (a,b) notation.
2	What is the perimeter of a regular hexagon with side length 7?
3	There is a tap dancing dolphin on my shoulder. He hops off and tap dances along the perimeter of my rectangular rug. My rug is 6' x 10' and the tap dancing dolphin dances at a constant rate of 60 steps per 4 feet. How many steps does the dolphin take?
4	What is the surface area of a cube with a side length of 6?
5	If Circle Q has an area of $25\pi$ , what is the area of the trapezoid GWKZ? <div style="text-align: center; margin-top: 10px;"> </div>
<b>Problems 6 through 10 are worth 3 points each</b>	
6	I have six sticks. They have lengths of 1, 2, 3, 4, 5, and 6. How many distinct triangles can I form? I can reuse the sticks to make a different triangle.
7	Stacey is baking cookies. She gives the cookie dough she doesn't use to Bertha for her to eat. If she has a rectangular sheet of cookie dough that is 4 feet by 8 feet and uses a circular cookies cutter of radius one foot, how much, in square feet, of the cookie dough does Bertha eat?
8	Kelsey the caveman is decorating her cave. She begins to draw a gigantic ice cream cone, using an isosceles triangle with side lengths 10, 10 and 12 and a semi circle of diameter 12. What is the area of her drawing?
9	What is the sum of the interior angles of a nonagon?
10	What is the area of an isosceles right triangle with a hypotenuse of 7?

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Geometry Test**

School Name: KEY

Team #: KEY

Problems 1-5		2 pts each	
1	(0,3)		
2	42		
3	480		
4	216 (units <sup>2</sup> )		
5	32 (units <sup>2</sup> )		
Subtotal			

Problems 6-10		3 pts each	
6	7		
7	$32 - 8\pi$ (sq.feet)		
8	$48 + 18\pi$ (units <sup>2</sup> )		
9	1260(°)		
10	$\frac{49}{4}$ (units <sup>2</sup> )		
Subtotal			

TOTAL		
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**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round**

School Name: \_\_\_\_\_ Team #: \_\_\_\_\_

<b>Round</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Question #</b>					
<b>Points</b>	0 or 3	0 or 4	0 or 5	0 or 6	0 or 7
				<b>Total</b>	

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round**

School Name: \_\_\_\_\_ Team #: \_\_\_\_\_

<b>Round</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Question #</b>					
<b>Points</b>	0 or 3	0 or 4	0 or 5	0 or 6	0 or 7
				<b>Total</b>	

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round**

School Name: \_\_\_\_\_ Team #: \_\_\_\_\_

## Round # 1

Question #	Answer

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round**

School Name: \_\_\_\_\_ Team #: \_\_\_\_\_

## Round # 1

Question #	Answer

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round**

School Name: \_\_\_\_\_ Team #: \_\_\_\_\_

## Round # 2

Question #	Answer

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round**

School Name: \_\_\_\_\_ Team #: \_\_\_\_\_

## Round # 2

Question #	Answer

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round**

School Name: \_\_\_\_\_ Team #: \_\_\_\_\_

## Round # 3

Question #	Answer

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round**

School Name: \_\_\_\_\_ Team #: \_\_\_\_\_

## Round # 3

Question #	Answer

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round**

School Name: \_\_\_\_\_ Team #: \_\_\_\_\_

## Round # 4

Question #	Answer

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round**

School Name: \_\_\_\_\_ Team #: \_\_\_\_\_

## Round # 4

Question #	Answer

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round**

School Name: \_\_\_\_\_ Team #: \_\_\_\_\_

## Round # 5

Question #	Answer

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round**

School Name: \_\_\_\_\_ Team #: \_\_\_\_\_

## Round # 5

Question #	Answer

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
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	<p>Arrange from least to greatest:</p> <p>A) 2      B) <math>\frac{16}{5}</math>      C) <math>\pi</math>      D) 5      E) <math>-\frac{37}{3}</math></p>
2	<p>There are 13 apples on the table. Your friend takes two, eats one, then puts one back onto the table. You take five, eat two, and put two apples back onto the table. How many apples do you have?</p>
3	<p>If <math>a = 10</math>, <math>b = 15</math>, and <math>c = 5</math>, evaluate:</p> $\left(\frac{ab+bc}{ab}\right)\left(\frac{ac+bc}{ac}\right)\left(\frac{ab+ac}{bc}\right)\left(\frac{a-b+c}{abc}\right)$
4	<p>Let <math>A =</math> the number of prime numbers between 1 and 50, and <math>B =</math> the sum of <math>\sqrt{169}</math> and <math>\sqrt{144}</math>. What is <math>A + B</math>?</p>
5	<p>A store sells lime sodas for \$2.50 per can and cherry sodas for \$3.00 per can. If I have \$75 and buy 12 cans of lime soda, how many cans of cherry soda can I get with the rest of my money?</p>

Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team Pressure Round

School Name: KEY

Team #: KEY

1	E, A, C, B, D
2	1
3	0
4	40
5	15

**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
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	
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**Mount Rainier Math Invitational**  
**Sixth Grade - January 23, 2009**  
**"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 losing the value of the question. Be careful, check your work and don't guess!

<b>Problems 1 through 4 are worth 1 point each</b>	
1	Matt is running from the law and needs to get to his hideout. If he is 4 km away from his hideout and the cops, traveling 90 mph, are 6 km away, what is $2 + 5$ ? A) 6                      B) 7                      C) 3                      D) 20 km/h
2	The math team needs 20 recruits before the new year. If, by December, they have 8 new recruits how many must they recruit in the month of December? A) 12                      B) 8                      C) 20                      D) 2
3	Stacey has 14 jackets and 1 sweatshirt in her closet, what is the probability that she randomly draws a sweatshirt out? A) $\frac{1}{14}$ B) 1                      C) $\frac{1}{15}$ D) $\frac{14}{15}$
4	Evaluate: $3 - 4 \times 2 + 7$ A) 5                      B) -9                      C) 8                      D) 2
<b>Problems 5 through 8 are worth 2 points each</b>	
5	Matt has invented a new device called the Doublenator! It can double any number any number of times or (if you want) it can half any number any number of times. If you told the Doublenator! to double 3 two times, it would say 12, likewise, if you told the Doublenator! to half 12 two times, it would say 3. If the Doublenator! said "1" to Matt after Matt told it to half a number 10 times, what was the number? A) 24                      B) 1024                      C) 2048                      D) 10
6	I have \$100 in my pocket. My friend Bertha borrows \$12. Stacey takes \$25 from my pocket as I'm lending Bertha the money. I pay back my mom twice as much money as the amount Stacey took. Bertha pays me back $\frac{3}{4}$ of the amount that she borrowed from me. After all of these transactions, how much money do I have in my pocket? A) \$13                      B) \$34                      C) \$8                      D) \$22

7	How many 2 in. x 2 in. x 2 in. cubes does it take to build a 10 ft x 10 ft x 10 ft cube? A) 125                      B) 1,500                      C) 216,000                      D) 512,000
8	Two identical unit (1x1) squares are each cut. One square is cut into four identical triangles, and the other is cut into four identical squares. What is the difference in area of one triangle piece and one square piece? A) 1                      B) $\frac{1}{4}$ C) $\frac{1}{16}$ D) 0
<b>Problems 9 through 11 are worth 3 point each</b>	
9	Bert and Ernie are tired of living together. Bert kicks Ernie out so Ernie has to find an apartment to live in for 3 months (his mother will take him in afterwards). If he finds two apartments, one with a down payment of \$300 and a monthly rate of \$150 and another with a down payment of \$400 and a monthly rate of \$100. How much money will he save if moves into the second apartment? A) 25                      B) 100                      C) 200                      D) 50
10	Kelsey and Hillary own a farm of dancing radioactive slugs. They can river dance, break dance, belly dance, or any combination of the three. There are 25 slugs that can river dance, 22 that can break dance, and 21 that can belly dance. There are 5 slugs that can river and break dance, 7 that can break and belly dance, 11 that can river and belly dance, and 3 that can do all three. How many slugs do Kelsey and Hillary own if all the slugs do at least one dance? A) 94                      B) 68                      C) 48                      D) 39
11	Eight friends are running a relay race. Bertha receives the baton from Stacey. Ryan has the baton before Trevor, but after Matt. Eric gives the baton to Trung, only after receiving it from Ryan. Bertha does not have the baton before Trung. No one passes the baton to Anna. Bertha passes the baton to Trevor, who finishes the race with it. In which order did Ryan receive the baton? A) 2nd                      B) 3rd                      C) 4th                      D) 5th
<b>Problem 12 is worth 4 points</b>	
12	Bertha is playing a game with three six sided die (by herself - she has a lack of friends), where her score is the sum of the numbers shown on the three dice. What is the probability of getting a score of 10 on her first roll? A) $\frac{1}{2}$ B) $\frac{1}{8}$ C) $\frac{3}{16}$ D) $\frac{1}{32}$



**Mount Rainier Math Invitational  
Sixth Grade - January 23, 2009  
Team "Who Wants to be a Mathematician"**

School Name:     **KEY**     Team #:     **KEY**    

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

TOTAL	
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