

**Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
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		
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Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Individual Test

written by Andrew Reusch, Anna Cunningham and Ryan Prentice

Put all answers on the colored answer sheet. All fraction answers must be reduced. You should leave appropriate answers in terms of π .

Problems 1 through 20 are worth 2 points each	
1	What is $\frac{1}{7} + \frac{1}{3}$?
2	How many sides does a hexagon have?
3	Find the next number in the sequence: 12, 3, $\frac{3}{4}$, $\frac{3}{16}$, _____
4	What is the number of square inches in a square foot?
5	Evaluate: $(5\sqrt{16})$
6	Find the average of the following numbers; 14, 48, 92, 77, 109.
7	Evaluate: $4 - 1 \times 2 + 5 \div 2$
8	What is the probability of rolling a prime number on a fair, 6-sided die?
9	Round 57.49375 to the nearest hundredth.
10	Anna can swim three times as fast as Andrew can. Andrew is overweight and can only swim two feet per second. How many yards per second can Anna swim?
11	Find 32% of 156.
12	What is the area of a circle with circumference 36π cm.?
13	How many ways can Anna pick out an outfit for Grub if she has five different shirts, six different pairs pants and twenty different pairs of socks, assuming an outfit consists of a shirt, a pair of pants, and a pair of socks?
14	Joe and Phil invested stock in a company together. In total, they invested \$375. If Joe invested 40% of the money, how much did Phil invest in the stock company?
15	Solve for x: $12x + 15 = 75$
16	What is the least common multiple of 24 and 16?
17	Convert $\frac{347}{1388}$ into a decimal.
18	How many hours are in 5.5 days?

19	A triangle has a height of 3 and an area of 6. If the length of the base is doubled, what is the area of the new triangle?
20	A frog is at the bottom of a well, and is trying to get up. The well is 35 feet deep. Every day, the frog tries to get to the top by jumping up the wall 3 feet. Then he needs to rest for the rest of the day and night, sliding back down one foot in the process. How many days will it take for the frog to reach the top?
Problems 21 through 30 are worth 3 points each	
21	Kate is twice as old as Long. Four years ago, Kate was three times as old as Long. How old will Long be in 5 years?
22	Tim has won 60% of the 40 chess games he has played. How many more games does he have to win in a row to have won 68% of all his chess games?
23	Find x in the following figure: <div style="text-align: center;"> </div>
24	If there are three red socks, two blue socks, seven yellow socks, five green socks and thirteen purple socks in a drawer, how many socks must Anna take out before she can be sure that she will have two purple socks?
25	Ryan, a super-fast runner dude, can run a 4-minute mile. His brother Justin can only run a 10-minute mile. If Justin gets a 7-mile head start, how far ahead will Ryan be after 2 hours?
26	Three numbers add up to 141. The difference between the smallest number and the middle number is 25. The difference between the smallest number and the largest number is 47. What is the smallest number?
27	If Anna is very angry with Ryan (so that there must be at least one person in between them), how many ways can you seat them along with three other people (five total) in a row at a movie theatre?
28	Solve for x : $3x\left(1 + \frac{1}{12}\right) = \frac{1}{16}$
29	I am thinking of a two-digit number. When I reverse the digits, I get 18 less than the original number. When I add the two numbers I get 88. What is my original number?
30	I turn to a random page in a book and multiply the two page numbers which I see. Their product is 210. What is the smaller of the two page numbers?

**Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
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
Fifth Grade - April 1, 2005
Team Algebra Test
 written by Rachel Haller and Lauren Hughs

Put all answers on the colored answer sheet. All fraction answers must be reduced. You should leave appropriate answers in terms of π .

	Problems 1 through 5 are worth 2 points each
1	If $a=2$, $b=3$ and $c=-1$, what is $b^2 - ac$?
2	I have 7 yellow socks, 13 green socks and 27 aqua socks in a dark drawer. How many socks do I have to randomly choose to ensure a pair?
3	It's Spring Break! Neff has a choice of going to Salt Lake City, Cancún, Miami, Las Vegas, or Maui. If he isn't going to Salt Lake City, what is the probability he goes to Maui if he randomly selects where he is going?
4	It is 300 miles from Seattle to Spokane. If I drive 50mph going to Spokane and 60mph coming home, what was my average speed?
5	Alan makes punch for a party. If one serving of punch needs one cup of pineapple juice, one cup of 7up and four cups of "Alan's special mix," how many cups of "Alan's special mix" are in three servings?
	Problems 6 through 10 are worth 3 points each
6	What is $x-1$, if $3x+2 = x+3$?
7	If Lauren has to babysit from 6pm to 11pm and she gets paid \$4.25 per hour, how much will she make with a one-time \$4 bonus?
8	Constance likes to dance and play Halo. If she dances for 45 minutes and plays Halo for 15 minutes, then does that over and over again, for how long does she play Halo in a 24 hour period, assuming she doesn't sleep?
9	What is the 47 th number in the sequence: 5, 8, 11, 14, ...?
10	Every pirate has one wooden leg. On a ship there are pirates and parrots. If there are seven heads and ten living legs, how many pirates are there?

Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Algebra Test

School Name: **KEY**

Team #: **KEY**

Problems 1-5		2 pts each	
1	11		
2	4 [socks]		
3	$\frac{1}{4}$, .25, or 25%		
4	600/11 or 54 6/11 [mph]		
5	12 [cups]		
Subtotal			

Problems 6-10		3 pts each	
6	-1/2		
7	\$25.25		
8	6 [hours]		
9	143		
10	4 [pirates]		
Subtotal			

TOTAL		
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Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Geometry Test

School Name: _____ Team #: _____

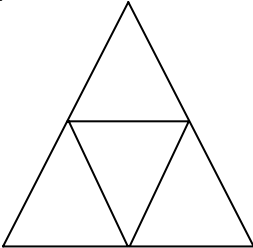
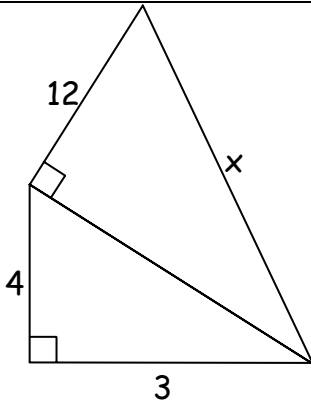
Problems 1-5		2 pts each	
1			
2			
3			
4			
5			
Subtotal			

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

TOTAL		
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Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Geometry Test
 written by Robert Cunningham and John Thomson

Put all answers on the colored answer sheet. All fraction answers must be reduced. You should leave appropriate answers in terms of π or as square roots.

Problems 1 through 5 are worth 2 points each	
1	If the perimeter of a regular dodecagon is 60 what is the length of each side?
2	How many triangles of any size are in this figure? <div style="text-align: center;">  </div>
3	What is the height of a pop can with a volume of 12π and a radius of 2?
4	What is the length of a diagonal of a cube with side length of 5?
5	Jean wants to make a new bathroom, but to comply with the latest health standards, she has to cover every wall and the floor with 2 in. by 2 in. tiles. If the room is a cube with a height 10 ft. and she wants a door of dimensions 3 ft. by 7 ft., how many tiles will she need?
Problems 6 through 10 are worth 3 points each	
6	If a circle is inscribed inside a square of area 4, what is the area of the circle?
7	Find x <div style="text-align: center;">  </div>

8	Sally is making a circular pool. Around the pool, she wants a three foot wide path. If the pool is to be 30 feet wide, what will the area of the path be in square feet?
9	What is the distance between these two points in the plane? (5,2) and (12,26)
10	Spongebob can whip up 100 Crabby Patties in an hour and each patty has a radius of 2 inches and a height of 3 inches. Unfortunately for the customers at the Crusty Crab, Spongebob can't resist the taste of the crabby patties himself and eats 5 in an hour. Assuming that a Crabby Patty is cylindrical, what is the total volume of Crabby Patties that get to the customers in an hour?

Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Geometry Test

School Name: KEY

Team #: KEY

Problems 1-5		2 pts each	
1	5		
2	5		
3	3		
4	$5\sqrt{3}$ or $\sqrt{75}$		
5	17244		
Subtotal			

Problems 6-10		3 pts each	
6	π		
7	13		
8	99π		
9	25		
10	1140π		
Subtotal			

TOTAL		
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**Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
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 - April 1, 2005
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 - April 1, 2005
Team Pressure Round

School Name: _____ Team #: _____

Round # 1

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Pressure Round

School Name: _____ Team #: _____

Round # 1

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Pressure Round

School Name: _____ Team #: _____

Round # 2

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Pressure Round

School Name: _____ Team #: _____

Round # 2

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Pressure Round

School Name: _____ Team #: _____

Round # 3

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Pressure Round

School Name: _____ Team #: _____

Round # 3

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Pressure Round

School Name: _____ Team #: _____

Round # 4

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Pressure Round

School Name: _____ Team #: _____

Round # 4

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Pressure Round

School Name: _____ Team #: _____

Round # 5

Question #	Answer

Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Pressure Round

School Name: _____ Team #: _____

Round # 5

Question #	Answer

Mount Rainier Math Invitational

Fifth Grade - April 1, 2005

Team Pressure Round

written by Catherine Tart and Chanel Fuchigami

Put all answers on the colored answer sheet. All fraction answers must be reduced. You should leave appropriate answers in terms of π . 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 can only be answered once!

1	What is $\frac{10!}{7!}$?
2	Spongebob can blow 7 crabby-patty shaped bubbles in 6 minutes. Patrick can blow one crabby-patty bubble in 10 minutes. Sandy can blow 10 crabby-patty bubbles in 30 minutes. If all three continue blowing bubbles at the same rate, how many bubbles would they blow in an hour?
3	What is the quotient when 2005 is divided by 5?
4	Chanel, Catherine, Trevor, Gina, Constance, Eric, Chris, Anna, and Andrew are all at a lumberjack competition. After participating in a FIERCE competition, they all say goodbye to each other with a handshake. If everyone gave everyone else a handshake, not including themselves and with no repeats, how many handshakes took place after the competition?
5	What is $5 + 15 \div 5 + 4 \times 2$?

Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team Pressure Round

School Name: KEY

Team #: KEY

1	720
2	96
3	401
4	36
5	16

**Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
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
Fifth Grade - April 1, 2005
"Who Wants to be a Mathematician"
 written by Constance Spoor, Catherine Tart

Put all answers on the colored answer sheet. Any wrong answer will result in the loss of all points after the last "safe" zones - after questions 4 and 8. If you do not know an answer, you may safely skip the question by answering "LL" to at most two questions. You do not receive credit for a "LL" but it does not count as a wrong answer.

Problems 1 through 4 are worth 1 point each	
1	Evaluate: $4+3(2/3)(3/2)$ A) $1/223$ B) $43023/32$ C) $17/36$ D) 7
2	Rebecca has just started learning a new instrument. For her band class, she must learn 12 scales. If Rebecca takes 30 minutes to learn one scale and practices scales for 2 hours each week, how many weeks will it take her to learn all twelve scales? A) 6 B) 12 C) 3 D) 2
3	A triangle whose sides are equal to each other and whose angles are equal to each other is called: A) right B) equilateral C) scalene D) perfect
4	A rectangle has an area of 32 and a length of 4. What is the width? A)16 B)8 C)4 D)2
Problems 5 through 8 are worth 2 points each	
5	How many different ways are there to arrange the word SOCCER? A)720 B)180 C)270 D)360
6	Darth Vader invaded a colony of grapes. Darth Vader took 15 grapes from each bunch. If each bunch had 45 grapes, and there were 32 bunches, how many grapes survived the gruesome attack? A)250 B)1092 C)950 D)960
7	A circle has an area of 121π . What is the diameter? A)11 B)33 C)121 D)22
8	$\frac{12!}{6!(2!)^2} =$ A)1 B)1/2 C)332640 D)720

Problems 9 through 11 are worth 3 point each	
9	<p>Alice has 64 cookies. The Queen of Hearts took half of them. Shortly after encountering the Queen, the Mad Hatter took $\frac{1}{4}$ of what was left.</p> <p>After that the caterpillar took $\frac{2}{3}$ of what Alice had left. How many cookies did Alice have left?</p> <p>A) 10 B) 12 C) 8 D) 9</p>
10	<p>King Aragon is rebuilding his castle. He enlists 30 elves to help and each elf brings 20 humans. Finally, each human hires 5 dwarves to work. Including himself, how many are working on Aragon's castle?</p> <p>A)3631 B)56 C)301 D)606</p>
11	<p>Floean Fortescue is trying to figure out a recent ice cream order. He knows that Hermione, Harry and Ron all ordered different things and no one bought two ice creams. Chocolate frogs make Hermione queasy. Ron doesn't like peanut butter. Harry's favorite dessert is treacle tart. Hermione adores raspberries. Finally, Ron hates caramel. What did Ron order?</p> <p>A) Raspberry and peanut butter nuts B) Chocolate Frog and caramel swirl C) Vanilla and treacle tart sundae D) Butterbeer float</p>
Problem 12 is worth 4 points	
12	<p>At what point does the line $3x=8y+16$ intercept $4y-7x=11$?</p> <p>A)(4,7) B)($\frac{-38}{11}, \frac{-145}{44}$) C)(34, $\frac{-195}{43}$) D)($\frac{38}{11}, 7$)</p>

**Mount Rainier Math Invitational
Fifth Grade - April 1, 2005
Team "Who Wants to be a Mathematician"**

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

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

TOTAL	
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Mount Rainier Math Invitational
April 1, 2005
Fifth Grade Puzzle Answers

- 1) The squares are 1. The circles and triangles are 2 each. The left side of the main beam is then 16 so that a triangle and 3-pointed star add to eight. The 3-pointed star is then **6**.

- 2) One arrangement is to have the distances between adjacent cities be: **1, 3, 6, 8, 5, 2**.

- 3) There is 1 way the red ball can be drawn first.
There are 5 ways the red ball can be drawn second.
There are $5 \times 4 = 20$ ways the red ball can be third.
There are $5 \times 4 \times 3 = 60$ ways the red ball can be fourth.
There are $5 \times 4 \times 3 \times 2 = 120$ ways the red ball can be fifth.
There are also 120 ways the red ball can be sixth.
Total = **326** ways total.