"Math is Cool" Championships-2001-02

5th Grade - March 15, 2002
Individual Contest

Express all answers as reduced fractions unless stated otherwise.
Leave answers in terms of π where applicable.
Do not round any answers unless stated otherwise.
Record all answers on the green cover sheet.

1	Find the product of 5 and 17.
2	Find the sum of 129 and 420 .
3	Find the quotient of 99 and 3.
4	What is the smallest odd prime number?
5	What number is in the hundred thousands place? 42,782,153
6	True or False: 100 - 1 + 99 - 2 + 3 - 198 = 471
7	Find the difference between 12345 and 9999
8	With the toss of a single die, what is the probability of getting a 4 or a 5?
9	Round to the nearest hundreds place. 12,783,155
10	What is the remainder when 135 is divided by 8?
11	A math team has a total of 43 members. 24 of the members are girls. How many boys are on the math team?
12	For a particular backpack trip, each person must have a backpack, 2 pairs of shoes and 6 pounds of trail mix. If you have 7 backpacks, 16 pairs of shoes, and 54 pounds of trail mix, what is the most number of people you can invite on the trip assuming you supply everything?
13	A cow sleeps a total of 63 hours per 7 days. On average, how much does she sleep each day?
14	How many zeros are in the number one billion?
15	Keisha's parents give her $19 every time the Gonzaga men's basketball team wins. This year, so far, she has received $209. How many games has the basketball team won?
16	If a cat has 12 claws, how many claws would 4 cats have?
17	Yes or No: Can a triangle and square intersect 4 times?

18	A bowl has ten slips of paper in it. Each slip of paper has a different number on it from 1 to 10. Two slips of paper are drawn and the two numbers are multiplied together. What is the largest possible product of these two numbers?
19	A whole number is a perfect square if it can be expressed as the product of two identical whole numbers. For example, 9 is a perfect square since 9 = 3×3. How many perfect squares are greater than 50 and less than 99?
20	Yes or No: Can 120° be the measure of an angle in a right triangle?
21	Tealah has 16 Disney movies with an average length of 1 hour 15 minutes. How many straight hours of Disney movies could Tealah watch?
22	What is the sum of all possible remainders when a number is divided by 5?
23	Solve for x: $4^x = 1024$ Example: If $5^x = 125$, then x = ● *3*
24	Three pigs, five cows, eight turkeys and nine horses were all talking in Great Grampy Sampy's barnyard one afternoon. How many total animals in the barnyard that day could make the statement, "There are at least eight other animals of the same species as me in the barnyard today" .
25	How many prime numbers between 40 and 100 have a one's digit that is a 2?
26	Two sides of a triangle measure 7.5 feet and 14.7 feet. The perimeter is 34.5 feet. Find the measure of the third side in feet.
27	How many whole numbers from 0 to 100 have at least one digit that is a two?
28	How many counting numbers make the following statement true? 4 < x < 25
29	Two positive numbers differ by one. One number has two digits while the other number has three digits. What is the sum of the numbers?

Challenge Questions

30	4 points are chosen on the circumference of a circle. Each pair of points is then connected with a straight line. What is the maximum number of regions into which the interior of the circle can be divided?
31	Biff has an odd work schedule. He works 5 days a week: Monday, Thursday, Friday, Saturday and Sunday. In a month with 31 days, what is the minimum number of days he would work?
32	If tickets for the show cost $7.00 for adults and $5.00 for children, how many children tickets were sold if a total of 400 tickets were sold for $2300?
33	The battery in Chase's watch lasts 9,000 hours. The battery in Sarah's watch lasts one year. Assuming a year has 365 days, whose watch will last longer?
34	A ferris wheel has a diameter of 40 feet. The center of the ferris wheel is 25 feet off the ground. The ferris wheel turns at 1 revolution per 2 minutes. How far off the ground would you be 30 seconds after leaving the bottom of the ferris wheel?

35	A, B, C and D are four different weights. When they are placed on a balance scale, the following observations are made:
	    A and B exactly balance C and D
	    A and C together out weigh B and D together
	    C is lighter than D
	    Arrange the weights in order from heaviest to lightest.

36	Biff is twice as old as his brother Eho. Fourteen years ago, Biff was the same age as Eho will be seven years from now. What is Biff's present age in years?
37	What is the largest prime factor of 527?
38	If A * B = A/B + 2B/(A-B), what is 8*3? (Write as an improper fraction)
39	Tealah's prize cow weighs 800 pounds plus 1/5 of its weight. How many pounds does the cow weigh?
40	A calculator only has three keys on it. It has a 2, a 3 and a plus key. Each of the three keys is pressed exactly once, in random order. The probability of choosing each key is 1/3. After randomly pressing all three keys, followed by equals, what is the probability a five will be showing on the screen?

"Math is Cool" Championships-2001-02
5th Grade - March 15, 2002
Team Multiple Choice Contest

Some of the members of the Math Team planned a 20 mile day hike over Sacajawea Peak and Matterhorn Mountain in the Wallowa Mountain Range. Water on this particular hike will be plentiful on maintained trails and non-existent off trail. They decided to leave Hurricane Creek Trail head at 7:00 a.m.

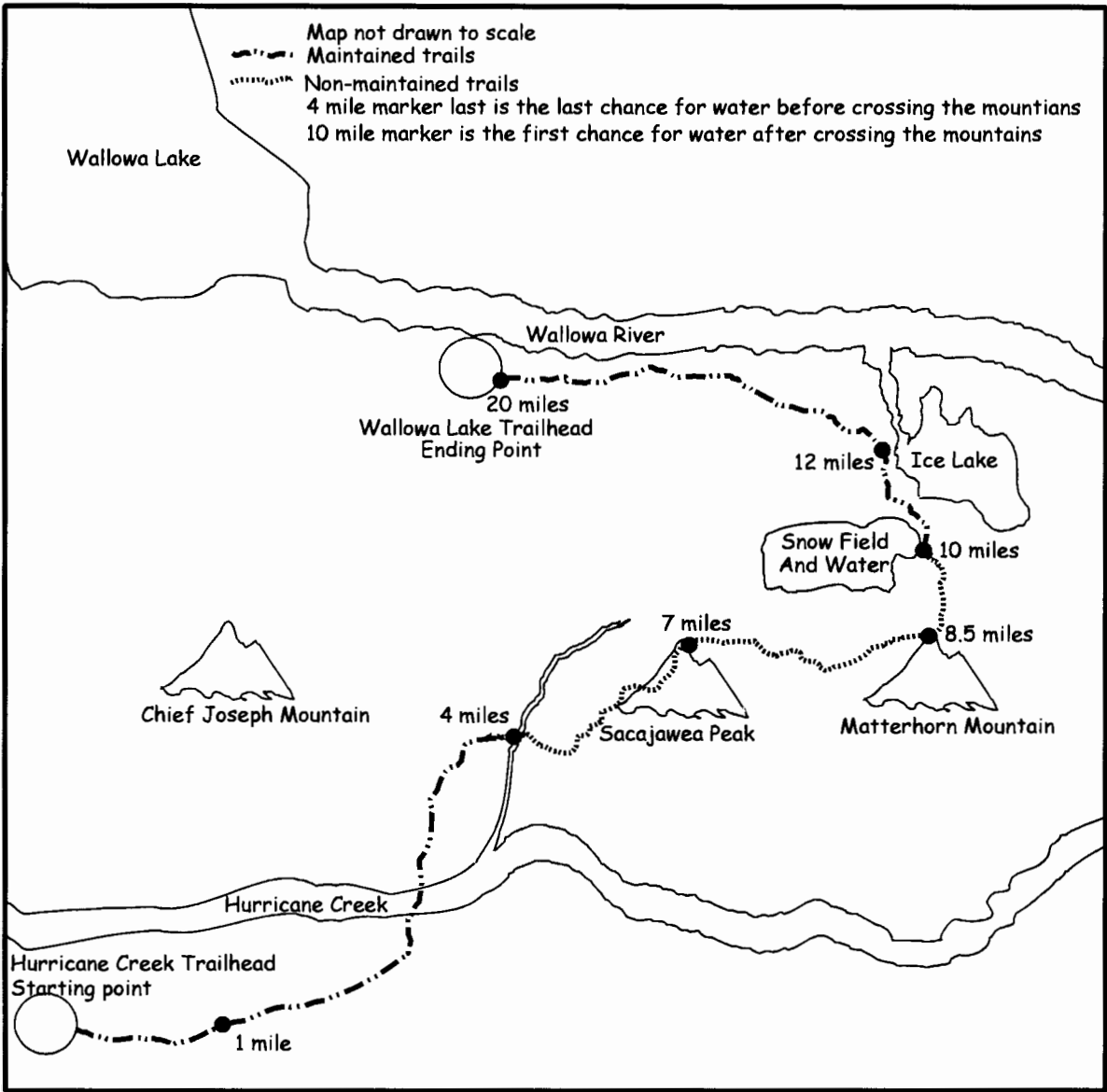| _Predictions made before the trip_	_Required rations and equipment for the trip._
Average hiking speed on maintained trails: 4 mph	Each hiker needs to pack 400 calories of snack food for each hour on the trip. (Average weight of food is 1 ounce per 100 calories)
Average hiking speed off maintained trails: 1 mph	Each hiker needs to have an overnight emergency ration of food equivalent to 1200 calories.
Average expected temperature while off maintained trails is 70°. A hiker in these conditions and temperature would expect to drink 1 quart of water every 3 hours. Assume the water is continuously consumed. (Weight of water is 32 ounces per quart)	Each hiker needs an emergency overnight kit for sleeping etc. Total weight is 3 lbs.

Pre-trip calculations

1. How many miles of the trip will be on maintained trails?   A) 11 miles B) 12 miles C) 13 miles D) 14 miles E) Answer not given
2. How many miles of the trip will be on non-maintained trails?   A) 6 miles B) 7 miles C) 8 miles D) 9 miles E) Answer not given
3. How long did the math team think the entire hike would take?   A) 8 hours B) 9.5 hours C) 10 hours D) 11.5 hours E) Answer not given
4. What is the minimum quarts of water predicted to be needed for one hiker between water holes?   A) ½ quart B) 1 quart C) 1 ½ quarts D) 2 quarts E) Answer not given
5. How many calories of snack food was predicted to be needed for the trip to Wallowa Lake Trail head, including the overnight emergency ration?   A) 4000 cal B) 5000 cal C) 6000 cal D) 7000 cal E) Answer not given
6. What was the total weight, to the nearest pound, of the minimum supplies each hiker had to carry?   A) 8 pounds B) 9 pounds C) 10 pounds D) 11 pounds E) Answer not given

Each hiker was equipped with the minimum supplies predicted for the trip. The following events occurred on the trip which drastically altered the predictions. There was a minor accident that meant the group stopped for an hour between the 4-mile marker and Sacajawea Peak to treat the victim. Assume water was still being continuously consumed at the same hiking rate while the victim was being treated. Part of the group returned, while two members continued on. At this time it was noticed that the temperature was 90°. This was 20° above the predicted temperature. For purposes of calculations assume the temperature was 90° the whole time between water holes.

Extra water consumption due temperature change	1 quart of water will last 15 minutes less per 10° temperature increase
After a hiker runs out of water in these new conditions, the average length of time before the hiker gets a leg cramp is:	1 hour
Average hiking speed off maintained trails with leg cramps	$\frac{1}{2}$ mph

7. How many miles did the two hikers need to walk with leg cramps before reaching the next water hole? A) $\frac{1}{2}$ mile   B) .8 mile   C) 1 mile   D) 1 $\frac{1}{2}$ miles   E) Answer not given
8. How much longer did it take to get from water hole to water hole than initially expected? A) 2 hours   B) 3 hours   C) 4 hours   D) 5 hours   E) Answer not given
9. What time did the two members reach Ice Lake? A) 4:00 p.m. B) 4:30 p.m C) 6:00 p.m. D) 7:45 p.m.   E) Answer not given

Map not drawn to scale
Maintained trails
Non-maintained trails
4 mile marker last is the last chance for water before crossing the mountians
10 mile marker is the first chance for water after crossing the mountains

Wallowa Lake

Wallowa River

20 miles
Wallowa Lake Trailhead
Ending Point

12 miles · Ice Lake

Snow Field
And Water

10 miles

7 miles

8.5 miles

Chief Joseph Mountain

4 miles

Sacajawea Peak

Matterhorn Mountain

Hurricane Creek

Hurricane Creek Trailhead
Starting point

1 mile

"Math is Cool" Championships-2001-02

5th Grade - March 15, 2002

Team Contest

Express all answers as reduced fractions unless stated otherwise.
Leave answers in terms of π where applicable.
Do not round any answers unless stated otherwise.
Record all answers on the colored cover sheet.

1	Evaluate 5A - 2B when A = 7 and B = 3.
2	What are the odds in favor of getting two heads with the toss of two coins?
3	Evaluate: 5^3
4	Find the next term in the sequence: 5, 7, 10, 14, 19, 25, 32, _____
5	Out of 400 students at the "Math is Cool" Championships for 5th graders, 200 will buy a candy bar, 150 will buy a t-shirt, and 20 will buy both. How many students will buy neither a candy bar nor a t-shirt?
6	Seven people are in a circle and begin counting in turn. (i.e., the first person says one, the second two, ... and they continue around). Which person (1, 2, 3, 4, 5, 6 or 7) will be the one to say 2002?
7	What number cannot be divided by itself?
8	A cord of wood has a volume of 128 cubic feet. A stack of wood, piled in a rectangular prism, is 8 feet wide and 8 feet high. How long, in feet, must the stack be if it contains two cords of wood?
9	Find the area of a rhombus with diagonals of length 6 and 4.
10	The population of Mathville increased 40% two years ago and then decreased 40% last year. The population is now 84 people. What was the population before the two changes?

Practice Relay
Person#1
What is the product of 7 and 8?

Practice Relay
Person#1
What is the product of 7 and 8?

Practice Relay
Person#1
What is the product of 7 and 8?

Practice Relay
Person#1
What is the product of 7 and 8?

Practice Relay
Person#2
What is the sum of TNYWG and 21?

Practice Relay
Person#2
What is the sum of TNYWG and 21?

Practice Relay
Person#2
What is the sum of TNYWG and 21?

Practice Relay
Person#2
What is the sum of TNYWG and 21?

Practice Relay

Person#3

What is the quotient of TNYWG and 7?

Practice Relay

Person#3

What is the quotient of TNYWG and 7?

Practice Relay

Person#3

What is the quotient of TNYWG and 7?

Practice Relay

Person#3

What is the quotient of TNYWG and 7?

Practice Relay
Person#4
What is the difference between 19 and TNYWG?

Practice Relay
Person#4
What is the difference between 19 and TNYWG?

Practice Relay
Person#4
What is the difference between 19 and TNYWG?

Practice Relay
Person#4
What is the difference between 19 and TNYWG?

Relay #1

Person#1

How many books would Joe have if he had 5 boxes with 9 books in each

Relay #1

Person#1

How many books would Joe have if he had 5 boxes with 9 books in each

Relay #1

Person#1

How many books would Joe have if he had 5 boxes with 9 books in each

Relay #1

Person#1

How many books would Joe have if he had 5 boxes with 9 books in each

Relay #1
Person#2
What is the quotient of TNYWG and (1+ 2 + 3 + 4 + 5).

Relay #1
Person#2
What is the quotient of TNYWG and (1+ 2 + 3 + 4 + 5).

Relay #1
Person#2
What is the quotient of TNYWG and (1+ 2 + 3 + 4 + 5).

Relay #1
Person#2
What is the quotient of TNYWG and (1+ 2 + 3 + 4 + 5).

Relay #1
Person#3
What is the perimeter of a square with sides of length TNYWG?

Relay #1
Person#3
What is the perimeter of a square with sides of length TNYWG?

Relay #1
Person#3
What is the perimeter of a square with sides of length TNYWG?

Relay #1
Person#3
What is the perimeter of a square with sides of length TNYWG?

Relay #1
Person#4
What is the sum of TNYWG and the perimeter of a triangle with sides of length 3, 4 and 6?

Relay #1
Person#4
What is the sum of TNYWG and the perimeter of a triangle with sides of length 3, 4 and 6?

Relay #1
Person#4
What is the sum of TNYWG and the perimeter of a triangle with sides of length 3, 4 and 6?

Relay #1
Person#4
What is the sum of TNYWG and the perimeter of a triangle with sides of length 3, 4 and 6?

Relay #2
Person#1
What is the difference between 231 and 219?

Relay #2
Person#1
What is the difference between 231 and 219?

Relay #2
Person#1
What is the difference between 231 and 219?

Relay #2
Person#1
What is the difference between 231 and 219?

Relay #2
Person#2
Chickens have 2 legs and cows have 4 legs.   How many total legs are there, if there are 5 chickens and TNYWG cows?

Relay #2
Person#2
Chickens have 2 legs and cows have 4 legs.   How many total legs are there, if there are 5 chickens and TNYWG cows?

Relay #2
Person#2
Chickens have 2 legs and cows have 4 legs.   How many total legs are there, if there are 5 chickens and TNYWG cows?

Relay #2
Person#2
Chickens have 2 legs and cows have 4 legs.   How many total legs are there, if there are 5 chickens and TNYWG cows?

Relay #2
Person#3
What is the quotient of TNYWG and the least number of clowns it would take to hold 16 ballons if each clown can hold 8 balloons?

Relay #2
Person#3
What is the quotient of TNYWG and the least number of clowns it would take to hold 16 ballons if each clown can hold 8 balloons?

Relay #2
Person#3
What is the quotient of TNYWG and the least number of clowns it would take to hold 16 ballons if each clown can hold 8 balloons?

Relay #2
Person#3
What is the quotient of TNYWG and the least number of clowns it would take to hold 16 ballons if each clown can hold 8 balloons?

Relay #2
Person#4
What is the difference between TNYWG and the product of 4 and 5?

Relay #2
Person#4
What is the difference between TNYWG and the product of 4 and 5?

Relay #2
Person#4
What is the difference between TNYWG and the product of 4 and 5?

Relay #2
Person#4
What is the difference between TNYWG and the product of 4 and 5?

"Math is Cool" Championships-2001-02

5th Grade - March 15, 2002
Mental Math Contest

Express all answers as reduced fractions in terms of radicals and π, where applicable, unless otherwise instructed.

Person #1		
1	What is the product of 3 and 7?	21
2	How many sides does a triangle have?	3[sides]
3	How many days are between March 1st and March 15th, not including the 1st and 15th ?	13 [days]
4	A clown can hold 6 balloons. What is the least number of clowns needed to hold 42 balloons?	7 [clowns]
Person #2		
1	What is the sum of 3, 7, and 10?	20
2	How many sides does a quadrilateral have?	4 [sides]
3	Joe had to wait 63 days to receive his math book? How many weeks did he wait?	9 [weeks]
4	For the purposes of this problem, a hand has 4 fingers and a thumb. Joe said that there are 8 thumbs in the room. How many fingers are in the room?	32 [fingers]
Person #3		
1	What is the quotient of 36 and 9?	4
2	Colin went shopping and bought 3 oranges, 5 apples and 4 bananas. How many pieces of fruit did he buy?	12 [pieces of fruit]
3	Biff did three math push-ups per day for three weeks to get ready for today's competition. How many math push-ups did he do to get ready for this competition?	63 [push-ups]
4	How many sides does a trapezoid have?	4 [sides]
Person #4		
1	Yes or No: Is it possible for Eho to draw an equilateral right triangle?	No
2	What is the difference between 31 and 12?	19
3	If a fly has 6 legs, how many total legs would 8 flies have?	48 [legs]
4	If a tree grows 3 feet a year and is now 45 feet tall, how many years has it been growing?	15 [years]

"Math is Cool" Championships-2001-02

5th Grade - March 15, 2002

	College Knowledge Bowl Questions #1	
1	There are 16 ounces in a pound. How many pounds are in 192 ounces?	12 [pounds]
2	The ratio of dogs to cats at an animal shelter is 3:7. There is a total of 90 cats and dogs at the shelter. How many cats are at the shelter?	63 [cats]
3	Luke, Bo and Daisy were studying for the annual "Math is Cool" Championships held at Hazard County Library. Together they solved a total of 421 questions. Luke solved 121 questions while Bo solved 95 questions. Daisy must have solved at least how many questions?	205 [problems]
4	The probability of an event occurring is 5/8. What is the odds in favor of the event occurring?	5/3 or 5 to 3
5	What is the diameter of a circle with area 49π?	14
6	Find the sum of $5\frac{2}{3}$ and $7\frac{1}{5}$ and state your answer as an improper fraction.	193/15
7	How far, in miles, will you travel in 45 minutes at 80 miles per hour?	60 [miles]
Number _8_ is an extra question. Only use it if needed.		
8	What is the square root of 121?	11

"Math is Cool" Championships-2001-02

5th Grade - March 15, 2002

	College Knowledge Bowl Questions #2	
1	You and your friend are playing a game trying to see who can guess the closest to a whole number from 1 to 1000 that a computer is randomly generating. Your friend guesses 3 first. What whole number should you guess to maximize your chance of winning?	4
2	What is the perimeter of rectangle with sides of length 4 and 7?	22
3	How many edges does a cube have?	12[edges]
4	What is the name of the geometric shape with 6-sides?	Hexagon
5	A vacuum with a 30 gallon capacity can suck up 30 gallons of water in 1 minute. It takes 30 seconds to empty the vacuum and starting sucking up water again. How many minutes would it take to empty a 1140 gallon pool of water, starting and ending with an empty vacuum?	57 [mins]
6	Which of the following pairs of numbers has the largest product? 4 and 12, 17 and 3, 9 and 6, or 12 and 5	last one 4th one 12 and 5
7	How many odd numbers are there between 20 and 50?	15 [numbers]
	Number _8_ is an extra question. Only use it if needed.	
8	Silas is 12 centimeters taller than Eric and 4 centimeters shorter than Joel. How many centimeters taller is Joel than Eric?	16 [centimeters]

"Math is Cool" Championships-2001-02

5th Grade - March 15, 2002

College Knowledge Bowl Questions #3		
1	Solve for x: 5x - 4 = 31	7
2	The sum of two numbers is 15 and their difference is 1. What is the larger of the two numbers?	8
3	What is the remainder when 821 is divided by 4?	1
4	How many positive primes can evenly divide 30?	3
5	If 5 rabbits cost $95.00, how many dollars would two rabbits cost?	[$]38
6	What is the product of 33 and 37?	1221
7	What is the length of one side of a regular octagon with perimeter 56?	7
Number 8 is an extra question. Only use it if needed.		
8	How many odd numbers are between 72 and 91, and have a digit that is a 5?	2 [numbers]

"Math is Cool" Championships -- 2001-02
5th grade - March 15, 2002

School Name_____Team #_____

Proctor Name_____Room #_____

Key

Full Name:_____

Individual Contest - Score Sheet
DO NOT WRITE IN SHADED REGIONS

1st Score

Out of 40

	Answer	1 or 0	1 or 0			Answer	1 or 0	1 or 0
1	85				21	20[hours]		
2	549				22	10		
3	33				23	5		
4	3				24	9[animals]		
5	7				25	0 or none		
6	False				26	12.3[feet]		
7	2346				27	19[numbers]		
8	1/3				28	20		
9	12,783,200				29	199		
10	7				30	8[regions]		
11	19[boys]				31	21[days]		
12	7[people]				32	250[tickets]		
13	9[hours]				33	Chase's		
14	9[zeros]				34	25[feet]		
15	11[games]				35	A>D>C>B or ADCB		
16	48[claws]				36	42[years]		
17	Yes				37	31		
18	90				38	58/15		
19	2				39	1000[lbs]		
20	No				40	1/3		

School Name_____ Team #_____

Proctor Name_____ Room #_____

Team Multiple Choice Contest-Score Sheet

1st Score

Correct responses are worth 2 points, incorrect responses are worth -1 point and no response is 0 points.

Out of 18

DO NOT WRITE IN SHADED REGIONS

	Answer	-1, 0 or 2	-1, 0 or 2
1	D		
2	A		
3	B		
4	D		
5	B		
6	C		
7	C		
8	A		
9	E		

School Name_____ Team #_____

Proctor Name_____ Room #_____

Key

Team Contest-Score Sheet

DO NOT WRITE IN SHADED REGIONS

1st Score

Out of 10

	Answer	1 or 0	1 or 0
1	29		
2	1/3		
3	125		
4	40		
5	70[students]		
6	[person]7		
7	0		
8	4[ft]		
9	12		
10	100[people]		

"Math is Cool" Championships -- 2001-02
5th grade - March 15, 2002

School Name_____ Team #_____
Proctor Name_____ Room #_____

Key

Relay Contest - Score Sheet

Practice relay
56
77
11
8
Answer for relay #1
45
3
12
25
Answer for relay #2
12
58
29
9