"Math is Cool" Championships – 2016-17
February 3, 2017

Total Correct

KEY

STUDENT NAME: _____ **School Name:** _____

Proctor Name: _____ Team #: _____ Room #: _____

6th Grade Individual Contest – Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1	333333		
2	0		
3	4		
4	21		
5	93		
6	70		
7	2 x 3 x 7 [any order]		
8	21 [swedish fish]		
9	160 [in²]		
10	2 [ways]		
11	8		
12	51/52		
13	10/15		
14	40 [miles]		
15	180		

1-15 TOTAL:

	Answer	1 or 0	1 or 0
16	6		
17	[0].0625		
18	32 [units]		
19	1110		
20	$1\frac{15}{16}$		
21	21 [apples]		
22	10		
23	17 [km]		
24	10800		
25	18x + 24y		
26	3/2		
27	30 [%]		
28	61		
29	306 [cm]		
30	70 [km]		

16-30 TOTAL:

	Answer	1 or 0	1 or 0
31	3/8		
32	29 [ways]		
33	3/4 [units²]		
34	87 [4-digit numbers]		
35	16/663		
36	7 [triangles]		
37	5 [data sets]		
38	201 [meters]		
39	1.73 x 10¹⁶		
40	2/81		

31-40 TOTAL:

6th Grade

"Math is Cool" Championships – 2016-17
February 3, 2017

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Proctor Name: _____   Team #: _____   Room #: _____

6th Grade Individual Contest – Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
1-15 TOTAL:			

	Answer	1 or 0	1 or 0
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
16-30 TOTAL:			

	Answer	1 or 0	1 or 0
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
31-40 TOTAL:			

6th Grade

Total Correct

"Math is Cool" Championships – 2016-17
Sponsored by:
February 3, 2017
6th Grade Mental Math Contest

Follow along as your proctor reads these instructions to you. Your Mental Math score sheet is on the back.

GENERAL INSTRUCTIONS applying to all tests:

- *Good sportsmanship is expected throughout the competition by <u>all</u> involved. Bad sportsmanship may result in disqualification.*
- *Calculators or any other aids may not be used on any portion of this contest.*
- *Unless stated otherwise:*
  - *For problems dealing with money, a decimal answer should be given.*
  - *Express all rational, non-integer answers as reduced common fractions.*
- *For fifth and sixth grade, all fractions and ratios must be reduced.*
- *Counting or natural numbers refer to the numbers 1,2,3,4 and so on and do NOT include 0.*
- *Units are not necessary unless it is a problem that deals with time and, in that case, am or pm is needed. However, if you choose to use units, they must be correct.*
- *Leave all answers in terms of π where applicable.*
- *Do not round any answers unless stated otherwise.*
- *Record all answers on the colored cover sheets in the answer column only.*
- *Make sure all answer sheets have all the information filled out at the top of the sheet.*
- *Tests will be scored as a 0 if answers are not recorded correctly on the answer sheets.*
- *Blank answer sheets and answer sheets with no name will also be scored as a 0.*

Mental Math – 30 sec per question

8 problems read orally to everyone - Approximately 8% of Individual Score - 25% of team score

*You may NOT be seated next to anyone from your school. If you are MOVE NOW to avoid being disqualified! When it is time to begin, the proctor will read the first question twice. You may not do any writing or talking while arriving at a solution. Once you have a solution, record it on the sheet in front of you. **You may not change or cross out answers once you have written an answer down. If there are eraser marks, write-overs, or crossed-out answers, they will be marked wrong.** Once all students have laid their pencils on the desk, another question will be asked. If a student doesn't lay his/her pencil down, the maximum wait time is 30 seconds after completion of the second reading of the question before another question is asked. You may continue to work on a problem while the next question is being read. The value of each question is a one or zero. Each student will be asked the same eight questions. Individual scores used to determine individual placing will be determined by the sum of the Mental Math score and the Individual Test score for each individual. In addition, the top three Mental Math scores from one team will be totaled and doubled and will contribute to 25% of the team score.*

"Math is Cool" Championships – 2016-17
Sponsored by:
6th Grade – February 3, 2017
Mental Math Contest

Mental Math – 30 sec per question

8 problems read orally to everyone - Approximately 8% of Individual Score - 25% of team score

You may NOT be seated next to anyone from your school. If you are MOVE NOW to avoid being disqualified! When it is time to begin, the proctor will read the first question twice. You may not do any writing or talking while arriving at a solution. Once you have a solution, record it on the sheet in front of you. **You may not change or cross out answers once you have written an answer down. If there are eraser marks, write-overs, or crossed-out answers, they will be marked wrong.** *Once all students have laid their pencils on the desk, another question will be asked. If a student doesn't lay his/her pencil down, the maximum wait time is 30 seconds after completion of the second reading of the question before another question is asked. You may continue to work on a problem while the next question is being read. The value of each question is a one or zero. Each student will be asked the same eight questions. Individual scores used to determine individual placing will be determined by the sum of the Mental Math score and the Individual Test score for each individual. In addition, the top three Mental Math scores from one team will be totaled and doubled and will contribute to 25% of the team score.*

#	Problem
1	When writing the numbers from one to twenty in a list, how many times will the digit 'two' be written?
2	How many different ways are there to put the four letters A, B, B, and B, in order?
3	What is the number of seconds that elapse from one forty-nine a.m. to one fifty-six a.m.?
4	As a decimal, what is the mean of the numbers from one to six?
5	What is one-fourth of one-ninth of seventy-two?
6	What is the largest three-digit multiple of thirty-two?
7	Labron makes eleven of his first fifteen free throws. How many of his next five does he need to make in order for his free-throw-made percentage to be seventy-five percent?
8	Rectangle A and Rectangle B are similar. The area of Rectangle A is ten square inches and the area of Rectangle B is ninety square inches. The longest side of Rectangle A is five inches. What is the number of inches in the shortest side of Rectangle B?

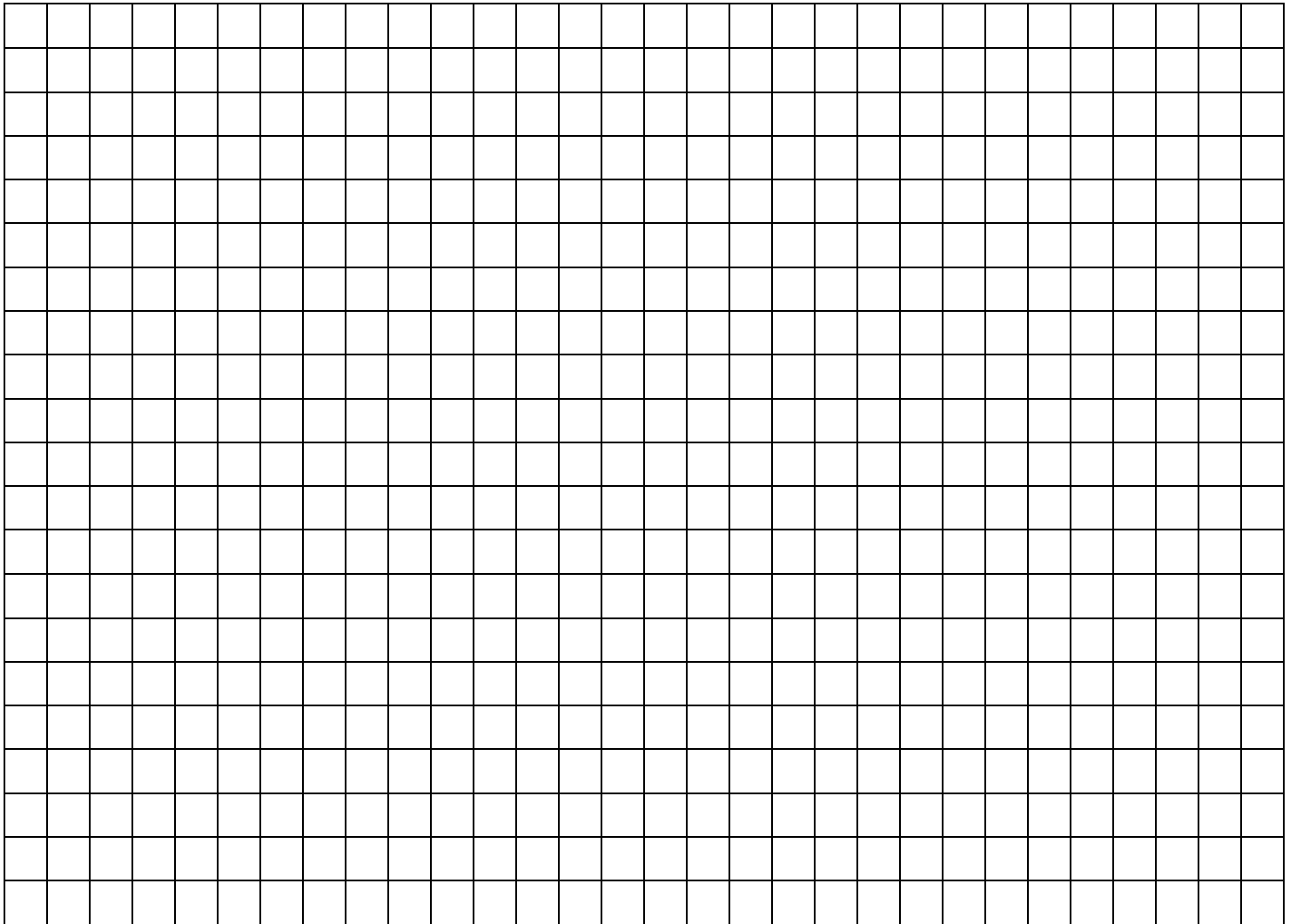# "Math is Cool" Championships – 2016-17

Sponsored by:

February 3, 2017

Individual Contest – 6th Grade

Tear this cover sheet and scratch paper off and fill out the top of the colored answer sheet prior to the start of the test. The graph below is for your use, if needed.

INDIVIDUAL TEST - 35 minutes

You may NOT be seated next to anyone from your school. If you are MOVE NOW to avoid being disqualified! When you are prompted to begin, tear off the colored sheet and begin testing. Make sure your name and school are recorded on the answer sheet. The raw score will be 2 points for correct answers to problems 1-30 and 3 points for 31-40. Record your answers on the score sheet. No talking during the test. You will be given a 5 minute time warning.
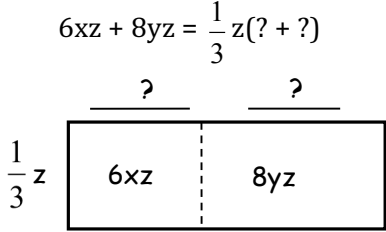
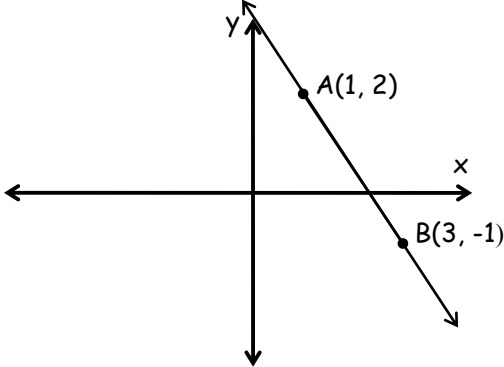# "Math is Cool" Championships – 2016-17
Sponsored by:
6th Grade – February 3, 2017
Individual Contest

Record all answers on the colored cover sheet.

	Questions 1-30: 2 points each
1	Evaluate: 1001 x 333
2	If a □ b = 2a - 3b, what is the value of 12 □ 8?
3	What is the remainder when 100 is divided by 12?
4	Evaluate: 3(32 - 25)
5	What number is 9 less than 102?
6	Evaluate: $a^2 - 3a$, if a = 10
7	The prime factorization if 10 is 2 x 5. What is the prime factorization of 42?
8	Melissa eats one swedish fish, then gives one to her brother. She eats one more and then gives two to her brother. She eats one more, then gives three to her brother. She continues this pattern of eating one and then giving her brother one more than she gave him the previous time. At the moment she eats her 7th swedish fish, how many total swedish fish will she have given her brother?
9	The sides of an 8 inch by 5 inch rectangle are doubled. What is the number of square inches in the area of the new rectangle?
10	The letters C, A, and T can be arranged in six different ways. What is the number of ways they can be arranged such that the letter T is the middle letter?
11	Evaluate: $\dfrac{1}{10}$ x $\dfrac{1000}{8}$ x $\dfrac{64}{100}$
12	One card is drawn from a well-shuffled standard deck. As a reduced common fraction, what is the probability that it is any card other than the queen of spades?
13	The fractions $\dfrac{2}{3}$, $\dfrac{4}{6}$, and $\dfrac{6}{9}$ are equivalent to each other. What is a 4th fraction that is also equivalent to these three fractions, whose numerator is 10?
14	A car drives at an average rate of 32 miles per hour. What is the number of miles traveled by the car in 1 hour and 15 minutes?
15	What is the sum of the whole numbers between 15 and 25, not including 15 or 25?
16	What is the median of the first six prime numbers?
17	Given that: $\dfrac{1}{2}$ = 0.5, $\dfrac{1}{4}$ = 0.25, and $\dfrac{1}{8}$ = 0.125, what is the decimal representation of $\dfrac{1}{16}$?
18	A square has side lengths which are single-digit whole numbers. What is the number of units in the positive difference between the perimeters of the largest and smallest squares which satisfy this condition? To get the positive difference, subtract the smaller perimeter from the larger perimeter.
19	What is the least common multiple of 222 and 555?
20	As a mixed number in lowest terms, what number is halfway between $1\dfrac{5}{8}$ and $2\dfrac{1}{4}$?

21	If three apples cost the same as 2 oranges and 8 oranges cost the same as 16 bananas, what is the number of apples that cost the same as 28 bananas?
22	A positive number has a remainder of 1 when divided by 3, a remainder of 2 when divided by 4, and a remainder of 4 when divided by 6. What is the smallest positive number to satisfy these conditions?
23	Demelza walks 8 kilometers north, then turns and walks 15 kilometers east. At this point, what is the number of kilometers in the distance back to her starting point?
24	What is the smallest possible value of the number whose prime factorization is $a^2 \times b^3 \times c^4$, where a, b, and c are prime numbers?
25	In the given equation, the binomial 6xz + 8yz, is one representation of the area of the rectangle. A second representation of the area of the rectangle is $\frac{1}{3}z$(? + ?). What is the binomial that goes inside the parentheses? $$6xz + 8yz = \frac{1}{3}z(? + ?)$$ $$\begin{array}{c} \quad \underline{?} \qquad \underline{?} \\ \frac{1}{3}z \; \boxed{\; 6xz \;\vdots\; 8yz \;} \end{array}$$
26	Line $\overleftrightarrow{AB}$ is reflected over the y-axis. As a reduced common fraction, what is the slope of $\overleftrightarrow{A'B'}$?
27	The probability that it will snow this Wednesday is 60%. On any given day when it snows, the probability that Virgil will go skiing is 50%. As a percent, what is the probability that Virgil will go skiing this Wednesday?
28	Let a and b be positive 2-digit numbers such that a + b = 160. What is the smallest possible value of a?
29	A ball is dropped from a height of 162 centimeters. It bounces and rises back up to one-third of the height from which it was dropped. Then it falls and bounces up to one-third of the height of the previous bounce. Then it falls to the floor and Kuba traps it against the floor with his foot so that it stops moving. What is the number of centimeters in the total distance traveled by the ball, from the moment it was dropped?
30	A bicycle tire has a radius of 35 centimeters. What is the number of kilometers traveled by the bicycle if the tire rotates $\frac{100000}{\pi}$ times during a ride?

Challenge Questions: 3 points each

31 A pinball machine drops a ball into the top chute and it falls randomly through the chutes below it. Assume an equal probability of falling to the right or to the left at the bottom of any given chute. As a reduced common fraction, what is the probability that the ball will end up in position C?
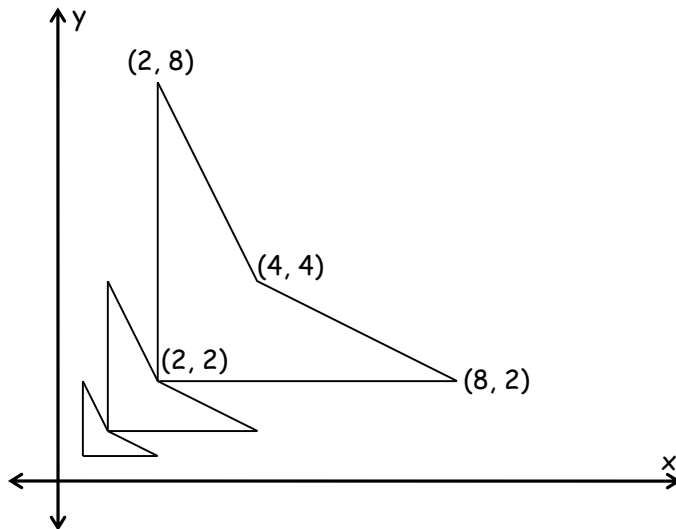

A   B   C   D   E
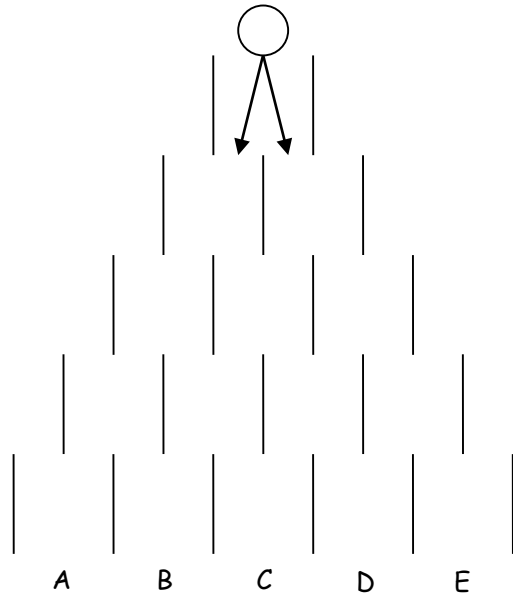
32 What is the number of ways to make 1 dollar with nickels, dimes, quarters, or some of each? For example, 10 dimes = 1 dollar, 5 nickels and 3 quarters = 1 dollar, and 2 nickels, 4 dimes and 2 quarters = 1 dollar.

33 The 2nd largest quadrilateral in the figure below is a dilation of the largest quadrilateral by a scale factor of $\frac{1}{2}$. The 3rd largest quadrilateral is a dilation of the 2nd largest quadrilateral also by a scale factor of $\frac{1}{2}$. As a reduced common fraction, what is the number of square units in the area of the 3rd largest quadrilateral?

(2, 8)

(4, 4)

(2, 2)

(8, 2)

34	A 4-digit number can be represented by the letters abcd. This can be split into the two 2-digit numbers ab and cd. For example, if abcd represents the number 2017, then ab is the 2-digit number 20 and cd is the 2-digit number 17. What is the number of 4-digit numbers having the property that ab – cd = 3? In order for ab and cd to be 2-digit numbers, neither the value of a nor the value of c may be zero.
35	Two cards are drawn at random from a standard deck. As a reduced common fraction, what is the probability that their face values add to five? For this problem, consider a Jack to have a face value of 11, a Queen to have a face value of 12, a King to have a face value of 13, and an Ace to have a face value of 1.
36	Eduardo has a set of 6 sticks and each one has a length of a distinct whole number of inches from 1 to 6 inches. What is the number of distinct triangles that he can make by connecting the ends of any three of the sticks?
37	A data set consists of eleven distinct positive whole numbers and has a mean of 12. The smallest number is 6 and the largest number is 18. What is the number of distinct data sets that satisfy the given conditions?
38	Usain and Andre are training on a 360-meter oval track. They both start at the same place at the same time. Usain runs clockwise and Andre runs counterclockwise around the track. When they meet, they stop, change directions and run backwards toward where they started from. When they meet the 2nd time, they stop and resume running clockwise and counterclockwise respectively until they meet for a 3rd time. Usain runs 185 meters in 30 seconds prior to their 1st meeting. Between their 1st meeting and their 2nd meeting, Andre runs 190 meters. Between their 2nd meeting and their 3rd meeting, each runs 1 meter per second slower than he did prior to their 1st meeting. What is the number of meters in the distance from the original starting point along Usain's clockwise path to his position at the 3rd meeting?
39	The number 172 has the property that when you add the left two digits together the sum is 8 and when you add the right two digits together the sum is 9. Several more digits may be added on to the right of 172 to make a very large number, following a rule that from left to right, the 1st and 2nd digits have a sum of 8, the 2nd and 3rd digits have a sum of 9, the 3rd and 4th digits have a sum of 8, the 4th and 5th digits have a sum of 9, and so on. Eventually, it will only be possible to continue this rule by adding on a negative digit. In scientific notation, with the decimal part rounded to the nearest hundredth, what is the largest number beginning with 172 on the left that can be created following this rule that does not include any negative digits?
40	Let M equal a positive 2-digit number and let N equal a positive 3-digit number. The operation M r_+ N rounds both M and N to the nearest hundred and adds them together. For example, if M = 49 and N = 250, then M r_+ N = 300. What is the probability that M r_+ N = 100?

"Math is Cool" Championships – 2016-17

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6th Grade – February 3, 2017

Team Multiple Choice Contest

For questions 1-4: Examine the following base-10 numbers:

$234 = 2 \times 10^2 + 3 \times 10^1 + 4 \times 10^0$
$60175 = 6 \times 10^4 + 0 \times 10^3 + 1 \times 10^2 + 7 \times 10^1 + 5 \times 10^0$

These same clusters of digits can be used to represent numbers in other bases, such as base-8. For example:

$234_8 = 2 \times 8^2 + 3 \times 8^1 + 4 \times 8^0$
$60175_8 = 6 \times 8^4 + 0 \times 8^3 + 1 \times 8^2 + 7 \times 8^1 + 5 \times 8^0$

For bases other than ten, the base is indicated with a subscripted numeral. The ten digits from 0 through 9 are used to make base-10 numbers, the nine digits from 0 through 8 are used to make base-9 numbers, the eight digits from 0 through 7 are used to make base-8 numbers, and so on.

1

What is the smallest possible positive value of n in the base-n number 234_n?

A) 4 B) 5 C) 6 D) 7 E) 8

2

What is the base-10 value of the base-6 number 234_6?

A) 34 B) 40 C) 94 D) 234 E) 574

3

How many two-digit base-5 numbers are there?

A) 20 B) 25 C) 30 D) 40 E) 60

4

The mean of the first n consecutive positive base-7 numbers is 6. What is the base-10 value of n?

A) 7 B) 8 C) 9 D) 10 E) 11

For questions 5-7: In the game of Neko Atsume you can entice cats to come and visit by putting virtual food in their bowls and leaving virtual toys out for them to play with in your virtual yard. You must purchase these items with silver fish or gold fish. When you begin the game you have 300 silver fish and 10 gold fish. When cats come to visit they will usually bring you gifts of silver fish, gold fish, or other cute items. Below is a table of some of the cats one may encounter in the game and some of their favorite toys, places to hang out, or food, and the cost of each item in silver fish (s.f.) or gold fish (g.f.).

SNOWBALL	PICKLES
Bureau with Pot 950 s.f.	Bureau with Pot 950 s.f.
Orange Cube 320 s.f.	Giant Cushion 25 g.f.
Giant Cushion 25 g.f.	Ping Pong Ball 50 s. f.
MARSHMALLOW	TUBBS
Termari Ball 25 g.f.	Frisky Bitz 30 s.f.
Silk Crepe Pillow 20 g.f.	Ritzy Bitz 3 g.f.
Cat Metropolis 50 g.f.	Sashimi 5 g.f.
CHAIRMAN MEOW	SEÑOR DON GATO
Earthenware Pot 20 g.f.	Mister Mouse 140 s.f.
Sunken Fireplace 70 g.f.	
JOE DIMEOWGIO	
Baseball 90 s.f.	

5	You can exchange 10 gold fish for 250 silver fish. After buying Mister Mouse for SEÑOR DON GATO and the Baseball for JOE DIMEOWGIO with your initial 300 silver fish and your 10 gold fish, what can you buy for SNOWBALL if you exchange your gold fish for silver fish? A) Bureau with Pot B) Orange Cube C) Giant Cushion D) Giant Cushion and Orange Cube E) Answer not given
6	The exchange rate mentioned in problem 5 is a one-way exchange rate for getting silver fish. In order to get 10 gold fish, you must exchange 500 silver fish. It is not possible to exchange silver fish for any amount of gold fish other than 10 at any given time. What is the total number of silver fish needed to spend or exchange in order to buy all three of PICKLES favorite items? A) 1625 s.f. B) 1750 s.f. C) 2250 s.f. D) 2500 s.f. E) 3475 s.f.
7	In terms of average price in silver fish, and using the 10 g.f. to 500 s.f. exchange rate, which cat is attracted by the most expensive items? A) SNOWBALL B) PICKLES C) MARSHMALLOW D) TUBBS E) CHAIRMAN MEOW

For questions 8-10: A median of a triangle is a segment whose endpoints are a vertex of the triangle and the midpoint of the side opposite that vertex. For example, in the figure below BD = CD, so $\overline{AD}$ is a median of ΔABC.

An altitude of a triangle, also known as the height, is a segment whose endpoints are a vertex of the triangle and a point on the side opposite that vertex such that the altitude meets the side at a 90° angle. For example, $\overline{AE}$ is an altitude of ΔABC.
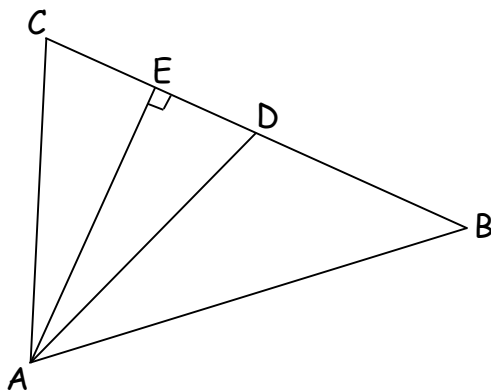
The formula for the area of a triangle is A = $\frac{bh}{2}$, where b is the length of one side of the triangle, or the base of the triangle, and h is the length of the altitude, or height, of the triangle. The base and altitude must meet at a 90° angle.
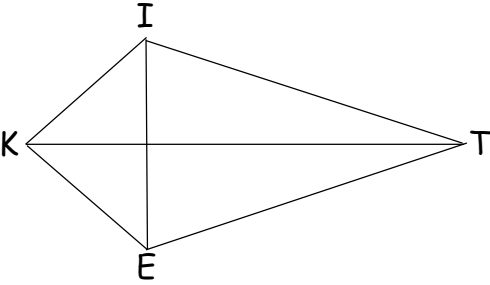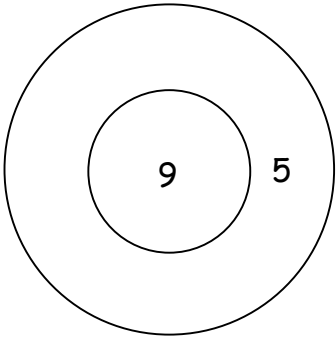
8	If AE = 8 cm and BC = 12 cm, what is the area of ΔABC? A) 24 cm² B) 32 cm² C) 48 cm² D) 72 cm² E) 96 cm²
9	If AE = 24 inches and BD = 16 inches, what is the area of ΔABC? A) 96 in² B) 192 in² C) 288 in² D) 384 in² E) 400 in²
10	If the triangle is redrawn so that $\overline{AE}$ is both the median and the altitude of ΔACD and $\overline{AD}$ is still the median of ΔABC, what is the ratio of the area of ΔAED to the area of ΔABE? A) 1:3 B) 1:4 C) 1:6 D) 1:8 E) Answer not given

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## 6th Grade – February 3, 2017
Team Contest

1	June and Carson are playing cards using a standard 52-card deck. June is holding 11 cards in her hand and Carson is holding 13 cards in his hand. What is the number of cards remaining in the deck?
2	Peyton can throw a ball 60 yards. Russell can throw a ball 5% farther than Peyton. How many yards can Russell throw a ball?
3	Brenda is thinking of a number from 1 to 10, including 1 and 10. As a percent, what is the probability that her number is greater than seven?
4	A full 2-quart pitcher can fill eight 8-ounce glasses completely. As a mixed number in lowest terms, how many 12-ounce glasses can be filled by the same 2-quart pitcher?
5	What is the number of square centimeters in the area of the kite, if KT = 20 cm and IE = 10 cm? I K T E
6	When the following list of numbers is put in order from least to greatest, as a decimal, what is the positive difference between the largest and the smallest values? To get the positive difference, subtract the smaller value from the larger value. $\dfrac{32}{5}$ 6.5 $\dfrac{51}{8}$ 6.3 $\dfrac{76}{12}$
7	On the circular dartboard shown, you get a score of 9 points for throwing a dart that lands in the smaller circle and a score of 5 points for throwing a dart that lands outside the smaller circle but still on the dartboard. You get zero points for throws that miss the dartboard. Your final score is the sum of all your throws. For example, a total of three throws landing in the smaller circle would result in a final score of 27, and a total of two throws, where one lands in the smaller circle and one lands outside the smaller circle, but on the dartboard would result in a final score of 14. Even with an unlimited number of throws, there are several final scores that are not possible. What is the largest final score that is impossible? 9 5

8	If one positive whole number less than 100 is chosen at random, as a reduced common fraction, what is the probability that it is in the section labeled D (inside the rectangle but outside the two circles)?

Positive whole numbers less than 100

Even numbers   Multiples of 9   D

C   A   B
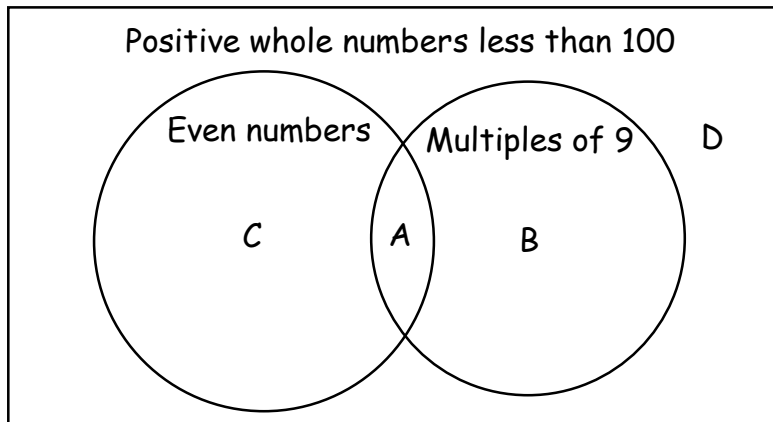
9	The image of point A(-2, 5) is point A'(1, -2) after a reflection over line k. The equation for line k is in the form $y = mx + b$. What is the value of m?

y

A(-2, 5)•

k

x

•A'(1, -2)
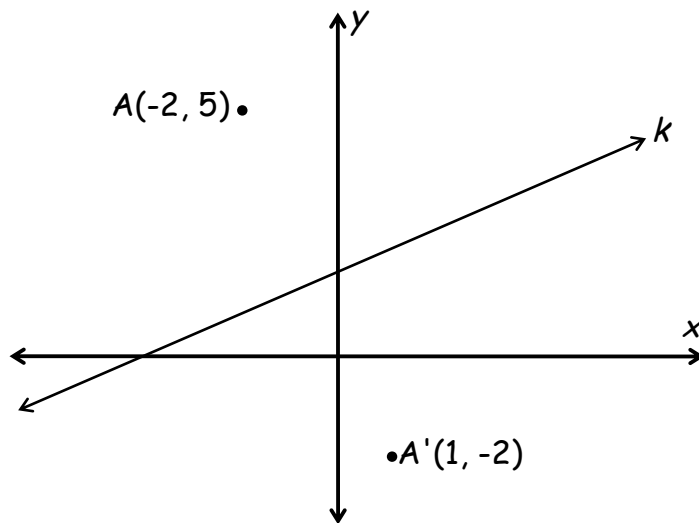
10	A certain clock runs twenty-four percent fast, meaning that, for example, during any 10-minute stretch of time, the clock will show that 12 minutes and 24 seconds have elapsed. The clock will be set to 12:00 am at exactly midnight as March 17, 2017 ends and March 18, 2017 begins. It will not be adjusted or reset and it always indicates whether the time shown is am or pm. Assuming the clock continues to run fast at this rate, during which future day will the clock first be accurate again? Give your answer as a date in the form xx/xx/xxxx, where the first xx represents the day of the month and the second xx represents the month. The left-hand x is a 0 if the day or month is a single digit. The xxxx represents the year.

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6th Grade – February 3, 2017
Robert Dirks' Relay Contest – Questions & Key

RELAYS - 5 minutes per relay – 15% of team score

*There is no talking during this event and you must always be facing forward. Person #1 will be given an answer sheet(s) and will need to fill out the top. The proctor will hand out a strip of paper to each person. These need to be face down on your desk until it is time for the relay to start. Once the relay begins, everyone may turn over their strip of paper and begin working. You may write on the strip of paper to come up with your answer. However, when person #1 figures out his/her problem, he/she will record **just his/her final answer** on the answer sheet and pass only the answer sheet back to the person behind. This continues until person #4 puts an answer on the answer sheet and gives it to the proctor. A correct answer from person #1, #2 and #3 is worth 1 point each. A correct answer from person #4 is worth 2 points making each relay worth 5 points. You will see the expression **TNYWG** [Proctor: write this on the board] which means: "the number you will get". This is where you put your teammate's answer that they pass back to you, and then you should be able to solve your question. Once the relay begins, turn over your strip of paper and **make sure you have the right person number.** Remember, no talking and remain facing forward to avoid being disqualified!*

	Practice Relay	**Answer**
Person 1	What is the largest factor of 30 other than 30?	15
Person 2	What is the product of TNYWG and 10?	150
Person 3	Two angles in a triangle have measures that add up to TNYWG degrees. What is the number of degrees in the measure of the third angle in the triangle?	30 [degrees]
Person 4	What is the greatest common factor of TNYWG and 50?	10
	Relay #1	**Answer**
Person 1	What is the number of inches in one foot?	12 [inches]
Person 2	What is the number of positive factors that TNYWG has?	6 [factors]
Person 3	TNYWG inches is the length of the radius of a circle. In terms of π, what is the number of square inches in the area of the circle?	36π [in^2]
Person 4	TNYWG cubic inches is the volume of a cylinder. The radius of the cylinder is $\sqrt{2}$ inches. What is the number of inches in the height of the cylinder?	18 [inches]
	Relay #2	**Answer**
Person 1	If $x^2 = 49$, what is the negative value of x?	-7
Person 2	What is the sum of TNYWG and -11?	-18
Person 3	What is TNYWG squared?	324
Person 4	A palindrome is a number that reads the same forwards as backwards. What is the number of palindromes between TNYWG and 1000?	67 [palindromes]

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COLLEGE KNOWLEDGE BOWL ROUND #1 – SET 1

#	Problem	Answer
1	What is 200 times 11?	2200
2	What is negative two raised to the fifth power?	-32
3	How many ways are there to re-arrange the five Percy Jackson books on a bookshelf?	120 [ways]
4	A horse is grazing in a field. She is tied to a 30-foot rope attached to a fence. In terms of pi, what is the number of square feet in the semicircular area of grass she can reach?	450 pi [sq feet]
5	David buys a bag of M&Ms. Inside are six orange, three red, five purple, and four yellow. If he eats them one by one at random, how many would he have to eat without looking before he is sure to have eaten two of the same color?	5 [M&Ms]
6	What is 414 divided by 18?	23
7	What is fifteen-sixteenths as a decimal rounded to the nearest hundredth?	0.94
8	If you roll five dice and get five identical numbers, it is called a Yahtzee. What is the probability, as a reduced common fraction, of rolling a Yahtzee on the first try using five fair six-sided dice?	1/1296 or "1 out of 1296" or "1 over 1296"
9	What is the largest prime factor of 780?	13
10	How many two-digit numbers have digits that add up to more than 12?	21 [2-digit numbers]

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COLLEGE KNOWLEDGE BOWL ROUND #2 – SET 2

#	Problem	Answer
1	What is the remainder when 100 is divided by 7?	2
2	How many prime numbers are there between 50 and 70?	4 [prime numbers]
3	What is the radius, in centimeters, of a circle whose area is 121 pi square centimeters?	11 [cm]
4	Solve the following equation for x: 45 minus 6x equals 21	[x=] 4
5	What is the largest multiple of 15 that is less than 200?	195
6	What is 2017 in scientific notation?	2.017×10^3
7	What are the coordinates, in the form x comma y, of the y intercept of the line 4y plus 3x equals negative 20?	(0, -5) or "zero negative five"
8	A cube is painted blue and then cut into 125 smaller cubes. How many of these cubes will have two or more blue faces?	44 [cubes]
9	A fair twelve-sided die is rolled. As a reduced common fraction, what is the probability that the number rolled is a factor of 36?	7/12 or "7 out of 12" or "7 over 12"
10	Let X represent a two-digit prime number. X plus four is a multiple of 5, X plus 2 is a multiple of 3. What is the smallest possible value of X?	31

COLLEGE KNOWLEDGE BOWL ROUND #3 – SET 3

#	Problem	Answer
1	How many nickels are in a dollar and twenty-five cents?	25 [nickels]
2	A rectangular prism has sides of length 5, 12, and 30 inches. What is the volume of the prism, in cubic inches?	1800 [cubic in]
3	What is three raised to the fifth power?	243
4	As a reduced common fraction, what is five-eighths of three-tenths?	3/16 or "3 over 16"
5	Solve the following equation for X: 4X plus 15 equals 6X minus 7.	[X=]11
6	Two soccer players are racing to get to the ball. If player A is 36 meters away from the ball and runs at a rate of 7 meters per second, and player B is 50 meters away and runs 10 meters per second, which one will get there first?	Player B
7	In a very short maze, there are three equally likely paths to choose from at the start, and each path forks into three more equally likely paths midway through the maze. Only one path is correct and leads to the end. As a common fraction, what is the probability of getting it right on the first try?	1/9 or "1 out of 9" or "1 over 9"
8	On a certain day in the winter, Eliza notices that the sun sets at 4:18 PM. How many minutes elapse from sunset until sunrise at 7:57 AM the next morning?	939 [minutes]
9	It takes Grace 90 minutes to finish 40 percent of a drawing. As a decimal, how many hours will it take her to complete the drawing, assuming she works at a constant rate?	3.75 [hours]
10	An Orc's weight is 25 percent of what a Warg weighs, and a Warg's weight is 130 percent of what a Goblin weighs. If a goblin weighs 160 pounds, how many pounds would an Orc weigh?	52 [pounds]

COLLEGE KNOWLEDGE BOWL ROUND #4 – SET 4

#	Problem	Answer
1	What is the largest three-digit multiple of 10?	990
2	Evaluate: twenty-six percent of three hundred fifty	91
3	A triangle has two angles that measure 36 and 51 degrees. What is the measure in degrees of the third angle?	93 [degrees]
4	Andrew can shell and eat 12 pistachios per minute, and Ellie can shell and eat 8 per minute. How many minutes will it take them to finish a bowl of 100 pistachios?	5 [minutes]
5	What is the median of the following set of numbers: 3, 12, 45, 6, 72, 18	15
6	When four fair coins are flipped, what is the probability as a reduced common fraction that there are either four heads or four tails?	1/8 or "1 out of 8" or "1 over 8"
7	On a farm there are horses and chickens. Given that there are 19 heads and 62 legs, how many chickens are there?	7 [chickens]
8	Two positive numbers have a difference of 9 and a product of 70. What is the sum of the two numbers?	19
9	How many distinct prime factors of 84 are also factors of 126?	3 [factors]
10	A triangle has sides that form an arithmetic sequence. Side 1 is five units shorter than side 2, which is five units shorter than side 3. What is the number of units in the smallest possible perimeter the triangle could have if the side lengths must be whole numbers?	33 [units]

COLLEGE KNOWLEDGE BOWL ROUND #5 – SET 5

#	Problem	Answer
1	Julie has 35 gummy bears and she gives her sister 20 percent of them. How many does she still have?	28 [gummy bears]
2	Felix is riding his bike to a friend's house at a constant speed. After six minutes he is thirty percent of the way there. How many minutes will the whole ride take?	20 [mins]
3	In terms of pi, what is the volume in cubic units of a cylinder with radius 5 and height 12 units?	300 pi [sq units]
4	What is the median of the counting numbers from 6 to 36, inclusive?	21
5	One card is drawn from a standard deck of cards. As a common fraction, what is the probability of drawing a red king or red queen?	1/13 or "1 out of 13" or "1 over 13"
6	Express four-sevenths as a decimal rounded to the nearest hundredth.	0.57
7	What would the value of Y be in the following equation, if X equals 2? 3Y plus X squared times 2 equals Y minus 5X plus 4.	[y=] - 7
8	Sasheer can fold an origami crane in 2 minutes and 15 seconds. At this rate, how many cranes will she have completely folded in a half hour?	13 [cranes]
9	What is the units digit of 2 to the 15th power?	8
10	A rectangle has an area of 126 square units. What is the number of units in the smallest possible perimeter it could have, if the side lengths must be whole numbers?	46 [units]

COLLEGE KNOWLEDGE BOWL ROUND #6 – SET 6

#	Problem	Answer
1	What is the product of the digits in the number 2017?	0
2	Two fair six-sided dice are rolled. As a reduced common fraction, what is the probability that both numbers are prime?	1/4 or "1 over 4" or "1 out of 4"
3	What is the product of the number of edges on a cube times the number of faces?	72
4	What is three squared plus five squared minus four squared?	18
5	What is the tenth term in the arithmetic sequence whose first four terms are: 4, 9, 14, 19?	49
6	In a survey of 32 people, everybody either liked soccer or basketball or both. There were 17 people who liked soccer and 23 people who liked basketball. What percentage of the people surveyed liked both?	25 [percent]
7	How many different ways can you re-arrange the letters in the word LLAMA, spelled L-L-A-M-A?	30 [ways]
8	If X is an even number and Y is an odd number, would the sum X squared plus Y squared be even, odd, or sometimes each one?	Odd
9	What is the sum of the distinct prime factors of 360?	10
10	With his superhuman speed, the Flash can jog a mile in 90 seconds. He can sprint a mile in 12 seconds. How many minutes will it take him to travel a hundred miles if he jogs every mile that is a multiple of ten and sprints the rest?	33 [minutes]

COLLEGE KNOWLEDGE BOWL ROUND – EXTRA

#	Problem	Answer
1	A regular hexagon is divided evenly into six triangles by lines connecting opposite vertices. How many degrees are in the measure of one of the new interior angles of one of the triangles in the center of the hexagon?	60 [degrees]
2	What is the difference when 156 is subtracted from 320?	164
3	How many diagonals can be drawn in a regular pentagon?	5 [diagonals]

Extra

"Math is Cool" Championships -- 2016-17

Student Name _____ Team #_____

School Name _____ Proctor Name_____Room #_____

6th Grade   <u>Mental Math</u> – 30 sec per question

8 problems read orally to everyone - Approximately 8% of Individual Score - 25% of team score
You may NOT be seated next to anyone from your school. If you are MOVE NOW to avoid being disqualified! When it is time to begin, the proctor will read the first question twice. You may not do any writing or talking while arriving at a solution. Once you have a solution, record it on the sheet in front of you. **You may not change or cross out answers once you have written an answer down. If there are eraser marks, write-overs, or crossed-out answers, they will be marked wrong.** *Once all students have laid their pencils on the desk, another question will be asked. If a student doesn't lay his/her pencil down, the maximum wait time is 30 seconds after completion of the second reading of the question before another question is asked. You may continue to work on a problem while the next question is being read. The value of each question is a one or zero. Each student will be asked the same eight questions. Individual scores used to determine individual placing will be determined by the sum of the Mental Math score and the Individual Test score for each individual. In addition, the top three Mental Math scores from one team will be totaled and doubled and will contribute to 25% of the team score.*

	Answer	**1 or 0**	**1 or 0**
1	3 [times]		
2	4 [ways]		
3	420 [minutes]		
4	3.5		
5	2		
6	992		
7	4 [free throws]		
8	6 [inches]		

Final Score:
KEY

First Score
(out of 20)

School Name_____ Team #_____

Proctor Name _____ Room #_____

Team Multiple Choice Contest – 15 minutes – 20% of team score

This test is the only test where you will be penalized for incorrect responses. You will receive 2 points for a correct letter response, 0 points for leaving it blank and -1 point for an incorrect response. When you are prompted to begin, tear off the colored sheet, pass out a copy of the test to each team member, and begin testing. **Since this is a multiple choice test, ONLY a letter response should be listed as an answer on the answer sheet.**

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

DO NOT WRITE IN SHADED REGIONS

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

"Math is Cool" Championships – 2016-17
6th Grade – February 3, 2017

School Name_____ Team #_____

Proctor Name_____ Room #_____

Team Contest – Score Sheet – 15 minutes – 30% of team score

When you are prompted to begin, tear off the colored sheet and give a copy of the test to each of your team members and begin testing. Each problem is scored as a 1 or 0. Record all answers on the colored answer sheet.

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1	28 [cards]		
2	63 [yards]		
3	30 [%]		
4	$5\frac{1}{3}$ [glasses]		
5	100 [cm^2]		
6	[0].2		
7	31		
8	$\frac{4}{9}$		
9	$\frac{3}{7}$		
10	03/22/2017		

KEY

PRACTICE RELAY

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
15	**150**	**30 [deg]**	**10**
1 or 0	1 or 0	1 or 0	2 or 0

RELAY # 1

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
12 [in]	**6 [factors]**	**36π [in²]**	**18 [in]**
1 or 0	1 or 0	1 or 0	2 or 0

RELAY # 2

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
-7	**-18**	**324**	**67** **[palindromes]**
1 or 0	1 or 0	1 or 0	2 or 0

"Math is Cool" Championships -- 2016-17

Student Name _____   Team # _____

School Name _____   Proctor Name_____   Room #_____

6th Grade   <u>Mental Math</u> – 30 sec per question

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	Answer	1 or 0	1 or 0
1			
2			
3			
4			
5			
6			
7			
8			

"Math is Cool" Championships – 2016-17
6th Grade – February 3, 2017

School Name_____ Team #_____

Proctor Name _____ Room #_____

Team Multiple Choice Contest – 15 minutes – 20% of team score

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DO NOT WRITE IN SHADED REGIONS

	Answer	-1, 0 or 2	-1, 0 or 2
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

"Math is Cool" Championships – 2016-17
6th Grade – February 3, 2017

Final Score:	

School Name_____Team #_____

First Score

Proctor Name_____Room #_____

(out of 10)

Team Contest – Score Sheet – 15 minutes – 30% of team score

When you are prompted to begin, tear off the colored sheet and give a copy of the test to each of your team members and begin testing. Each problem is scored as a 1 or 0. Record all answers on the colored answer sheet.

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			