

Use global search and replace to change the following variables.

--- Done by Test Writer ---

Year: 2019-20 → 2018-19

Grade: 7th - 8th → 6th Grade, 7th Grade, 8th Grade

Check to make sure it has the proper grade or
'Middle School' as appropriate

Champs: Championships → Championships or Masters

For the individual, delete 41-45 on answer sheet and
problems.

--- Done by Site Coordinator ---

Date: #date → October 20, 2018

Sponsor: #sponsor → Sponsor SoSoBank or to blank

“Math is Cool” Championships – 2019-20

#sponsor

#date

7th - 8th 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 all involved, both competitors and observers. Display of poor sportsmanship may result in disqualification.*
- *Calculators or any other aids may not be used on any portion of this contest.*
- *Unless stated otherwise, all rational, non-integer answers need to be expressed as reduced common fractions except in case of problems dealing with money. In the case of problems requiring dollar answers, answer as a decimal rounded to the nearest hundredth (ie, to the nearest cent).*
- *All radicals must be simplified and all denominators must be rationalized.*
- *Units are not necessary as part of your answer unless it is a problem that deals with time and in that case, a.m. or p.m. is required. 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 (name, team number, etc.) at the top of the sheet filled out.*
- *Tests will be scored as a 0 if answers are not recorded on the answer sheets.*
- *Blank answer sheets and answer sheets with no name will 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

*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.*

Final Score:

(Out of 8)

“Math is Cool” Championships -- 2019-20

School: _____ Room # _____ Team # _____

Name: _____ Proctor: _____

7th - 8th Mental Math – 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 – 2019-20

#sponsor

7th - 8th – #date

Mental Math Contest

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#	Problem
1	What is thirteen times sixty?
2	How many distinct ways are there to arrange the letters in the word READ, spelled R-E-A-D?
3	The area of a rectangle is ninety-five square inches and the length is nineteen inches. What is the number of inches in the height of the rectangle?
4	What is one-third of one-sixth of fifty-four?
5	How many edges does a triangular prism have?
6	Jim can sell sixty pens in one hour. It takes Pam two-thirds of the time to sell the same number of pens. In minutes, how long does it take Pam to sell thirty pens?
7	What is the slope of the line with coordinates eight comma three and four comma two?
8	What is the positive difference between sixty-two squared and forty squared?

Final Score:

KEY

(Out of 8)

“Math is Cool” Championships -- 2019-20

School: _____ Room # _____ Team # _____

Name: _____ Proctor: _____

7th - 8th Mental Math – 30 sec per question

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

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	Answer
1	780
2	24 [ways]
3	5 [inches]
4	3
5	9 [edges]
6	20 [minutes]
7	$\frac{1}{4}$
8	2244

“Math is Cool” Championships – 2019-20

#date

Total # Correct:

STUDENT NAME: _____ School Name: _____

Circle Math: **Pre-Algebra Algebra 1** **Geometry** Team #: _____ Room #: _____

7th - 8th 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:			

7th -8th Grade

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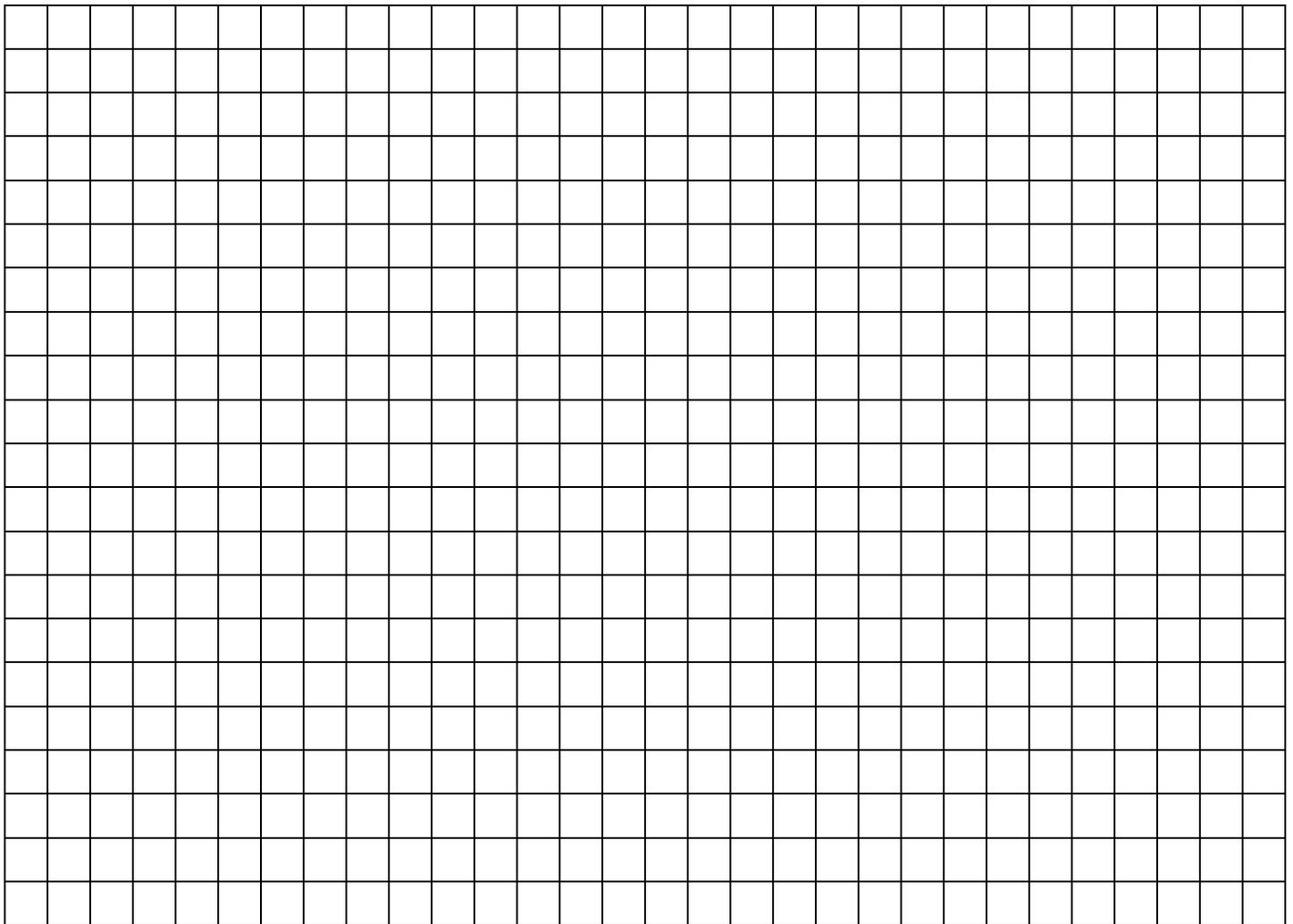
#date

7th - 8th Individual Contest

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 – 2019-20

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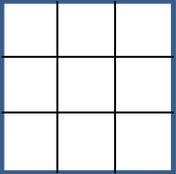
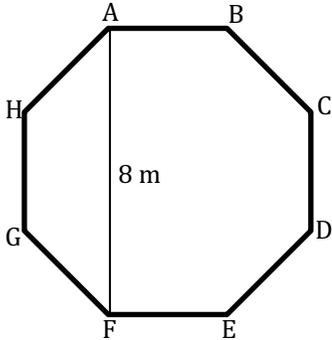
#date

7th - 8th Individual Contest

Questions 1-30: 2 points each	
1	Meghan makes 90% of her free throws. At this rate, how many will she miss if she shoots 130 free throws?
2	Every time Martha hiccups, she increases her favorite number by 5. Right now, her favorite number is 7. What will her favorite number be after she hiccups 17 times?
3	A recipe that calls for 4 cups of flour yields 16 cinnamon rolls. How many cups of flour are needed to make 20 cinnamon rolls?
4	What is 21 squared?
5	Solve the equation for x: $3x - 7 = 7x + 1$
6	One tablespoon of olive oil is mixed with one tablespoon of balsamic vinegar. A second tablespoon of olive oil is mixed with one tablespoon of lemon juice. The two mixtures are combined. What percent of the combined mixture is balsamic vinegar?
7	What is $325602356 + 571092242$?
8	Let $D = r \cdot t$. What is the value of D if $r = 7$ and $t = 17$?
9	Evaluate: $7!$
10	What is the number of distinct prime factors of 2020?
11	What is the number of square inches the area of an isosceles right triangle with a leg length of 4 inches?
12	A pentagonal hexecontahedron has 60 faces, each of which is a pentagon with the same area. If the area of one pentagon is 5 in^2 , then what is the number of square inches in the total surface area of the figure?
13	What is the number of square feet in the area of a trapezoid with base lengths of 7 ft and 13 ft and a height of 7654 ft?
14	What is the cube root of 125?
15	In degrees, what is the measure of the smaller angle formed by the hour hand and the minute hand of a clock at 3:00?
16	What is the sum of the 2 largest relatively prime numbers that are less than 100? Relatively prime numbers have no factors in common with each other besides 1.

17	If the length of one leg of a right triangle is 8 inches and the length of the hypotenuse is 17 inches, what is the number of inches in the length of the other leg?
18	What is the product of the smallest 5 composite numbers?
19	What is the remainder when 16561 is divided by 131?
20	A piece of paper is 8.5 x 11 inches. As a common fraction, what is the number of square feet in the area of the piece of paper?
21	When my number is divided by 9, the remainder is 6. When it is divided by 7, the remainder is 5. When it is divided by 5, the remainder is 1. What is the smallest possible number my number could be?
22	It is 180 miles from Seattle to Moses Lake. It takes Tulsi 2.5 hours to make the trip. What is Tulsi's average rate in yards per minute? Hint: there are 5280 feet in a mile and 3 feet in a yard.
23	A sample of bitter almond oil has a mass in grams that consists of 65% benzaldehyde. If the sample contains 50 grams of benzaldehyde, what is the number of grams in the total mass of the sample, rounded to the nearest whole gram?
24	Let $a = 5$, $b = 300$, and $x = 20$. What is the value of y if $ab = xy$?
25	An extension ladder can be set to any length between 10 feet and 15 feet. When set to 10 feet and leaned against a wall, with its base 6 feet from the base of the wall, the ladder reaches a height on the wall of h feet. If the base of the ladder remains 6 feet from the base of the wall, while the ladder is extended to a length of 12 feet, then the ladder reaches a height on the wall of H feet. As a decimal to the nearest tenth, what is the number of feet in the value of $H - h$? Hint: $\sqrt{3} \approx 1.732$
26	A circle has a radius of 5 centimeters. An arc on the circle is $\frac{1}{12}$ of the circumference of the circle. In terms of π and as a reduced fraction, what is the number of centimeters in the length of the arc?
27	A fidget spinner initially spins at a rate of 100 revolutions per second. The number of revolutions per second is divided by 2 every 2 minutes. As a decimal to the nearest hundredth, how many revolutions per second is the fidget spinner spinning after 8 minutes?
28	A matrix is a rectangular set of numbers. The determinant of a matrix $\begin{bmatrix} a & c & b & d \end{bmatrix}$ is given by the formula: determinant = $ad - bc$. What is the determinant of the matrix $\begin{bmatrix} 7 & 3 & -2 & -3 \end{bmatrix}$?
29	What is the sum of all the solutions to the following equation? $ 2x - 1 = 3$
30	In terms of π and as a fraction in lowest terms, what is the number of cubic inches in the volume of a sphere with surface area 256π in ² .

Challenge Questions: 3 pts each

31	A bag contains 7 yellow marbles, 6 green marbles, 2 pink marbles, and 1 red marble. Amy, Andrew, Beto, and Cory are taking turns drawing marbles out of the bag in alphabetical order until someone draws the red marble. As a common fraction, what is the probability that Amy draws the red marble?
32	In terms of π , what is the number of cubic centimeters in the volume of a cone with a height of 5 cm and a slant height of 13 cm?
33	Tim can paint a fence in 16 hours. When he works together with Tom, it takes 4 hours. In minutes, how long would it take Tom to paint the fence by himself?
34	A rectangular prism has a length 3 times its width and a height twice its length. If its volume is 144 cm^3 , what is the number of square centimeters in its surface area?
35	How many ways are there to fill the nine squares of a 3 by 3 grid with 1s, 0s, or a mixture of 1s and 0s, with exactly one number per square?
	
36	In simplest radical form and as a simplified fraction, what is the number of square inches in the area of a regular hexagon with side length 5 inches?
37	A three-digit base-d number can be written in the form abc_d . The number of possible three-digit base-d numbers depends on the value of d. As a decimal to the nearest tenth what is the mean number of three-digit base-d numbers for $2 < d < 11$?
38	What is the number of square units in the area of quadrilateral ABCD with vertices whose coordinates are A(5, 8), B(9, 7), C(11, 2), and D(2, 2)?
39	As a camp for racquet sports, instruction is offered in tennis, racquetball, and badminton. There are 60 campers, all of whom receive instruction in at least one sport. Thirty-eight campers have instruction in tennis, 42 campers have instruction in racquetball, and 42 campers have instruction in badminton. What is the smallest number of campers who could receive instruction in all three sports?
40	In the form $a\sqrt{b} - c$, where b is an integer with no perfect square factors other than 1, what is the number of meters in the perimeter of regular octagon ABCDEFGH, given that AF = 8 meters?
	

“Math is Cool” Championships – 2019-20

#date

Total # Correct:

KEY

STUDENT NAME: _____ School Name: _____

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

7th - 8th Individual Contest – Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answers
1	13 [free throws]
2	92
3	5 [cups]
4	441
5	[x =] -2
6	25 [%]
7	896694598
8	[D =] 119
9	5040
10	3 [prime factors]
11	8 [in ²]
12	300 [in ²]
13	76540 [ft ²]
14	5
15	90 [°]

	Answers
16	197
17	15 [inches]
18	17280
19	55
20	187/288 [ft ²]
21	96
22	2112 [yards per minute]
23	77 [grams]
24	[y =] 75
25	2.4 [feet]
26	$5\pi/6$ [cm] or $5/6 \pi$
27	6.25 [revs per second]
28	-15
29	1
30	$2048\pi/3$ [in ³] or $2048/3 \pi$

	Answers
31	1/4
32	240π [cm ³]
33	320 [minutes]
34	216 [cm ²]
35	512 [ways]
36	$\frac{75\sqrt{3}}{2}$ [in ²]
37	329.5 [three-digit base-d numbers]
38	36 [units ²]
39	2 [campers]
40	$64\sqrt{2} - 64$ [m]

7th - 8th Grade

Math is Cool" Championships – 2019-20

7th - 8th – #date

Final Score:

First Score
(out of 20)

Student Name _____

Proctor Name _____ Room # _____

SCHOOL NAME _____ Team # _____

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.***

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			

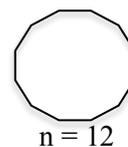
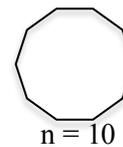
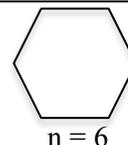
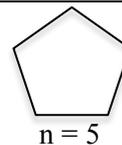
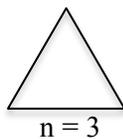
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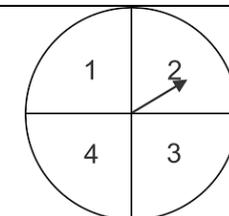
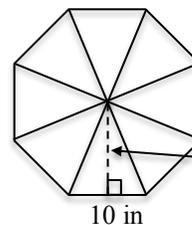
7th - 8th – #date

Team Multiple-Choice Contest

Refer to the following polygons for problems 1-4.
The variable n stands for the number of sides in each polygon. Each figure is a regular polygon, and the word regular means the sides of a given polygon are equal in length and the interior angles of a given polygon are equal in measure.



1	If the side length of the 4-sided polygon is 13 inches, what is the area of that polygon? A) 26 in^2 B) 52 in^2 C) 156 in^2 D) 169 in^2 E) 196 in^2
2	If the side length of the 6-sided polygon is 11 inches and the side length of the 12-sided polygon is 12 inches, what is the ratio of the perimeter of the 12-sided polygon to the perimeter of the 6-sided polygon? A) 11:12 B) 11:24 C) 12:11 D) 17:24 E) 24:11
3	<p>The octagon can be divided into 8 congruent isosceles triangles as shown. The height of each of the triangles is called the apothem. If the side length of the octagon is 10 inches and the length of the apothem is approximately 12 inches, then the approximate area of the octagon can be calculated by finding the area of one of the triangles and then multiplying by the number of sides, or $\frac{10 \cdot 12}{2} \cdot 8 = 480 \text{ in}^2$. Using this same method, what is the approximate area of the 10-sided shape if the side length is 6 inches and the length of the apothem is approximately 9.2 inches?</p> <p>A) 138 in^2 B) 276 in^2 C) 414 in^2 D) 552 in^2 E) 1104 in^2</p>
4	<p>The approximate length of the apothem for the pentagon ($n = 5$) is 5.5 inches and the approximate length of the apothem of the heptagon ($n = 7$) is 10.4 inches. Using these approximate values, the ratio of the area of the pentagon to the area of the heptagon is 55:182. What is the ratio of the side length of the pentagon to the side length of the heptagon?</p> <p>A) 4:5 B) 5:4 C) 52:130 D) 55:104 E) 55:182</p>

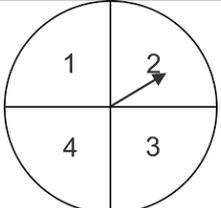
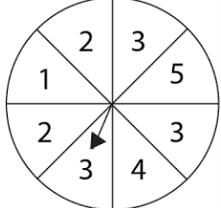


Refer to the following information for problems 5 – 7.

In a probability experiment, the expected value is the sum of the products of each outcome of the experiment multiplied by their probabilities. Consider a probability experiment involving the spinner shown. Each section of the spinner is the same area so the probability of each number on the spinner is $\frac{1}{4}$. Therefore, the expected value of one spin of the spinner is $\frac{1}{4} \cdot$

$1 + \frac{1}{4} \cdot 2 + \frac{1}{4} \cdot 3 + \frac{1}{4} \cdot 4 = \frac{1}{4} + \frac{2}{4} + \frac{3}{4} + \frac{4}{4} = \frac{10}{4} = 2.5$. This means that for any given number

of spins, you would expect the sum of the results to equal 2.5 times the number of spins. For example, if the spinner were spun 10 times the expected value of the sum of the results would be $2.5 \cdot 10 = 25$.

5	<p>If you spin the spinner four times, what is the expected value of the sum of the four results?</p> <p>A) 2.5 B) 10 C) 12.5 D) 20 E) 25</p>	
6	<p>A different spinner has eight outcomes each with a probability of $\frac{1}{8}$ as shown below. What is the expected value of one spin of this spinner?</p> <p>A) $\frac{23}{84}$ B) 2 C) 2.5 D) 2.75 E) 2.875</p>	
7	<p>When rolling a pair of standard six-sided dice once, what is the expected value of the sum of the two numbers showing on the dice?</p> <p>A) 6 B) $\frac{121}{18}$ C) 7 D) $\frac{131}{18}$ E) $7\frac{1}{3}$</p>	

Refer to the following information for problems 8 – 10.

The following table shows the dates on which the last 10 world records in the men’s and women’s 1500-meter run were set. The times are given in minutes, seconds, and tenths of a second, up through 1980. Beginning in 1981, times are given in minutes, seconds, and hundredths of a second. The times in the top cell of the Women and Men columns are the current Women’s and Men’s world records in the 1500-meter run as of the time this scenario was written.

Women	Date	Men	Date
3:50.07	July 17, 2015	3:26.00	July 14, 1998
3:50.46	September 11, 1993	3:27.37	July 12, 1995
3:52.5	August 3, 1980	3:28.86	September 6, 1992
3:55.0	July 6, 1980	3:29.46	August 23, 1985
3:56.0	June 28, 1976	3:29.67	July 16, 1985
4:01.4	September 9, 1972	3:30.77	September 4, 1983
4:05.1	September 7, 1972	3:31.24	August 28, 1983
4:06.5	September 4, 1972	3:31.4	August 27, 1980
4:06.9	July 18, 1972	3:32.1 (.03)	July 15, 1980
4:09.6	August 15, 1971	3:32.1 (.09)	August 15, 1979

Source: https://en.wikipedia.org/wiki/1500_metres_world_record_progression

8	<p>Based on the past 10 records shown in the table, during which month was a new women’s world record in the 1500-meter run most often set?</p> <p>A) July B) August C) September D) equally often in July and September E) equally often in July, August, and September</p>	
9	<p>In seconds, what is the average of the 9 reductions (reduction = how much time is shaved off by the new record-setter) in each of the 10 successive women’s world records shown in the table?</p> <p>A) 2.17 B) 2.21 C) 2.27 D) 2.31 E) 2.33</p>	
10	<p>Imagine a race in which the men’s 1500-meter world record holder from July 14, 1998 is racing against the women’s 1500-meter world record holder from June 28, 1976. Assuming both runners run at their world record pace, how many meters would the woman still need to run in order to finish the race once the man crosses the finish line?</p> <p>A) $\frac{59}{25}$ B) $\frac{118}{25}$ C) $\frac{5625}{59}$ D) $\frac{11250}{59}$ E) Answer not given.</p>	

Math is Cool" Championships – 2019-20

7th - 8th – #date

Final Score:

KEY

Student Name _____

Proctor Name _____ Room # _____

SCHOOL NAME _____ **Team #** _____

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.***

DO NOT WRITE IN SHADED REGIONS

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

“Math is Cool” Championships – 2019-20
7th - 8th – #date

Final Score:

First Score
(out of 10)

SCHOOL NAME _____ **Team #** _____

Proctor Name _____ Room # _____

Team Contest – Score Sheet

TEAM TEST - 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 **1 or 0**. Record all answers on the colored answer sheet.*

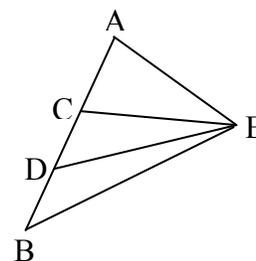
DO NOT WRITE IN SHADED REGIONS

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

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Team Contest

1	A rope is 129 inches long. As a decimal to the nearest hundredth, what is the number of feet in the length of the rope?
2	The ratio of 6 th , 7 th and 8 th grade students at a math competition is 12:6:5. If there are seventy-two 7 th graders, how many total students are at the competition?
3	As a reduced fraction in lowest terms, what is the probability that a number selected at random from the following set is an even number? {1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17}
4	The line with equation $y = \frac{2}{3}x + 3$ is graphed on a coordinate plane. As a common fraction, what is the x-coordinate of the x-intercept of the line?
5	The perimeter of a rectangle is 42 centimeters and the area is 98 cm ² . What is the number of centimeters in the length of the shortest side of the rectangle?
6	Kamala’s favorite number is a four-digit number between 3000 and 3300. The digit in the hundreds place is either a 1 or a 2. The digit in the tens place is either a 3 or a 4. The digit in the ones place is either a 5 or a 6. What is the sum of all numbers that could be Kamala’s favorite number?
7	The sum of the measures of the three angles in any triangle is 180°. Let a, b, and c represent the whole number measures of the three angles in $\triangle ABC$, where $c > b > a$ and $a + b = 100^\circ$. What is the greatest possible whole number value of c/a ?
8	The surface area of the rectangular prism shown is 1550 cm ² . The ratio of length to width to height is 2:3:5. What is the number of cubic centimeters in the volume of the prism?
9	A data set consists of 7 distinct integers. The difference between the largest and the smallest integer is 26, the median equals the mean, and the 2 nd smallest number is 50. What is the largest possible mean of this data set?
10	What is the number of distinct pathways from point A to point B? No segments or parts of segments may be traveled more than once, but endpoints of segments labeled C, D, and E may be passed through more than once.



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Final Score:

KEY

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Proctor Name _____ Room # _____

Team Contest – Score Sheet

TEAM TEST - 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 **1 or 0**. Record all answers on the colored answer sheet.*

DO NOT WRITE IN SHADED REGIONS

Answer	
1	10.75 [feet]
2	276 [students]
3	$\frac{2}{5}$
4	$-\frac{9}{2}$
5	7 [cm]
6	25524
7	2
8	3750 [cm ³]
9	64
10	9 [pathways]

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School: _____ Team # _____

Proctor: _____ Room # _____

PRACTICE RELAY

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
1 or 0	1 or 0	1 or 0	2 or 0

Fill in your answer and pass back to the next person.

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School: _____ Team # _____

Proctor: _____ Room # _____

PRACTICE RELAY

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
1 or 0	1 or 0	1 or 0	2 or 0

Fill in your answer and pass back to the next person.

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School: _____ Team # _____

Proctor: _____ Room # _____

RELAY #1

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
1 or 0	1 or 0	1 or 0	2 or 0

Fill in your answer and pass back to the next person.

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School: _____ Team # _____

Proctor: _____ Room # _____

RELAY #1

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
1 or 0	1 or 0	1 or 0	2 or 0

Fill in your answer and pass back to the next person.

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School: _____ Team # _____

Proctor: _____ Room # _____

RELAY #2

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
1 or 0	1 or 0	1 or 0	2 or 0

Fill in your answer and pass back to the next person.

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School: _____ Team # _____

Proctor: _____ Room # _____

RELAY #2

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
1 or 0	1 or 0	1 or 0	2 or 0

Fill in your answer and pass back to the next person.

7th-8th Grade	Practice Relay – Person 1
Question 1	What is 15% of 80?

7th-8th Grade	Practice Relay – Person 1
Question 1	What is 15% of 80?

7th-8th Grade	Practice Relay – Person 2
Question 1	What is 15% of 80?
Question 2	What is TNYWG squared?

7th-8th Grade	Practice Relay – Person 2
Question 1	What is 15% of 80?
Question 2	What is TNYWG squared?

7th-8th Grade	Practice Relay – Person 3
Question 2	What is TNYWG squared?
Question 3	What is the remainder when TNYWG is divided by 17?

7th-8th Grade	Practice Relay – Person 3
Question 2	What is TNYWG squared?
Question 3	What is the remainder when TNYWG is divided by 17?

7th-8th Grade	Practice Relay – Person 4
Question 3	What is the remainder when TNYWG is divided by 17?
Question 4	What is the cube root of TNYWG?

7th-8th Grade	Practice Relay – Person 4
Question 3	What is the remainder when TNYWG is divided by 17?
Question 4	What is the cube root of TNYWG?

7th-8th Grade	Relay #1 – Person 1
Question 1	As a decimal to the nearest tenth, what is fifty divided by twenty?

7th-8th Grade	Relay #1 – Person 1
Question 1	As a decimal to the nearest tenth, what is fifty divided by twenty?

7th-8th Grade	Relay #1 – Person 2
Question 1	As a decimal to the nearest tenth, what is fifty divided by twenty?
Question 2	What is TNYWG times four?

7th-8th Grade	Relay #1 – Person 2
Question 1	As a decimal to the nearest tenth, what is fifty divided by twenty?
Question 2	What is TNYWG times four?

7th-8th Grade	Relay #1 – Person 3
Question 2	What is TNYWG times four?
Question 3	What is the mean of the two-digit multiples of TNYWG?

7th-8th Grade	Relay #1 – Person 3
Question 2	What is TNYWG times four?
Question 3	What is the mean of the two-digit multiples of TNYWG?

7th-8th Grade	Relay #1 – Person 4
Question 3	What is the mean of the two-digit multiples of TNYWG?
Question 4	TNYWG equals A^2 plus B^2 and A does not equal B. A and B are positive integers. What is A plus B?

7th-8th Grade	Relay #1 – Person 4
Question 3	What is the mean of the two-digit multiples of TNYWG?
Question 4	TNYWG equals A^2 plus B^2 and A does not equal B. A and B are positive integers. What is A plus B?

7th-8th Grade	Relay #2 – Person 1
Question 1	What is the positive difference between the number of sides of an octagon and a quadrilateral?

7th-8th Grade	Relay #2 – Person 1
Question 1	What is the positive difference between the number of sides of an octagon and a quadrilateral?

7th-8th Grade	Relay #2 – Person 2
Question 1	What is the positive difference between the number of sides of an octagon and a quadrilateral?
Question 2	What is the remainder when 143 is divided by TNYWG?

7th-8th Grade	Relay #2 – Person 2
Question 1	What is the positive difference between the number of sides of an octagon and a quadrilateral?
Question 2	What is the remainder when 143 is divided by TNYWG?

7th-8th Grade	Relay #2 – Person 3
Question 2	What is the remainder when 143 is divided by TNYWG?
Question 3	Let A equal TNYWG times 47. What is the value of B if $A + B = 13^2$?

7th-8th Grade	Relay #2 – Person 3
Question 2	What is the remainder when 143 is divided by TNYWG?
Question 3	Let A equal TNYWG times 47. What is the value of B if $A + B = 13^2$?

7th-8th Grade	Relay #2 – Person 4
Question 3	Let A equal TNYWG times 47. What is the value of B if $A + B = 13^2$?
Question 4	As a decimal to the nearest hundredth times π , what is the number of square centimeters in the area of the largest circle that can be inscribed in a square whose perimeter is TNYWG cm?

7th-8th Grade	Relay #2 – Person 4
Question 3	Let A equal TNYWG times 47. What is the value of B if $A + B = 13^2$?
Question 4	As a decimal to the nearest hundredth times π , what is the number of square centimeters in the area of the largest circle that can be inscribed in a square whose perimeter is TNYWG cm?

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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 15% of 80?	12
Person 2	What is TNYWG squared?	144
Person 3	What is the remainder when TNYWG is divided by 17?	8
Person 4	What is the cube root of TNYWG?	2
	Relay #1	Answer
Person 1	As a decimal to the nearest tenth, what is fifty divided by twenty?	2.5
Person 2	What is TNYWG times four?	10
Person 3	What is the mean of the two-digit multiples of TNYWG?	50
Person 4	TNYWG equals A^2 plus B^2 and A does not equal B. A and B are positive integers. What is A plus B?	8
	Relay #2	Answer
Person 1	What is the positive difference between the number of sides of an octagon and a quadrilateral?	4
Person 2	What is the remainder when 143 is divided by TNYWG?	3
Person 3	Let A equal TNYWG times 47. What is the value of B if $A + B = 13^2$?	28
Person 4	As a decimal to the nearest hundredth times π , what is the number of square centimeters in the area of the largest circle that can be inscribed in a square whose perimeter is TNYWG cm?	12.25π [cm ²]

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KEY

PRACTICE RELAY

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
12	144	8	2
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
2.5	10	50	8
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
4	3	28	12.25π [cm²]
1 or 0	1 or 0	1 or 0	2 or 0

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College Bowl #1 10 Possible	College Bowl #2 10 Possible	College Bowl #3 10 Possible

Do not use tally marks.

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School: _____ Team # _____

Proctor: _____ Room # _____

College Bowl #1 10 Possible	College Bowl #2 10 Possible	College Bowl #3 10 Possible

Do not use tally marks.

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COLLEGE KNOWLEDGE BOWL ROUND #1 – SET 1

#	Problem	Answer
1	What is three hundred times twelve point five?	3750
2	In terms of π , what is the number of square centimeters in the area of a circle with a diameter of twelve centimeters?	36π [cm ²]
3	Iron Man asks his assistant, Mary Motts, for seven cups of coffee per day. If each cup of coffee takes three minutes to brew, how many minutes does Mary spend brewing coffee per week?	147 [minutes]
4	How many seconds are in two hours and nine minutes?	7740 [seconds]
5	As a reduced fraction in lowest terms, what is the slope of a line that passes through the points three comma negative two and negative nine comma four?	$-1/2$ or “-1 over 2” or “1 over -2”
6	What is the number of inches in the perimeter of a square with a diagonal of three times the square root of two inches?	12 [inches]
7	Jenny randomly draws two marbles from a jar containing five blue marbles and thirteen red marbles. As a reduced fraction in lowest terms, what is the probability that both marbles are red?	$26/51$ or “26 out of 51” or “26 over 51”
8	What is thirty percent of two hundred and sixty?	78
9	What is the sum of all the positive integer factors of twenty-four?	60
10	In degrees, what is the sum of the measures of the interior angles of a pentagon?	540 [degrees]

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COLLEGE KNOWLEDGE BOWL ROUND #2 – SET 2

#	Problem	Answer
1	A drawer contains five red socks, fourteen blue socks, seven yellow socks, and fifty-seven green socks. How many socks must I take out of the drawer without looking to guarantee that I have a pair with the same color?	5 [socks]
2	Jeanie makes twenty-five dollars per hour. As a decimal number of dollars to the nearest hundredth, how much does she make per hour after she gets a fifteen percent raise?	28.75 [dollars] or “twenty-eight seventy-five”
3	As a common fraction, what is the slope of a line perpendicular to the line with equation Y equals five-ninths X plus eight?	$-9/5$ or “-9 over 5” or “9 over -5”
4	A right triangle has legs of length eight inches and six inches. How many inches are in the perimeter of the triangle?	24 [inches]
5	Loki shapeshifts thirteen times every six hours. In a week, how many times will he shapeshift?	364 [times]
6	Since Charlie McCharles uploaded his first video on youtube, his number of “likes” has increased forty percent with each new video. If Charlie had one thousand “likes” after uploading his first video, how many additional videos will it take for his number of “likes” to exceed two thousand?	3 [videos]
7	How many positive integer factors do two hundred twenty-one and eight hundred and fifty have in common?	2 [factors]
8	How many distinct ways can you arrange the letters in the word RIDE, spelled R – I – D – E?	24 [ways]
9	How many cups are in two gallons?	32 [cups]
10	What is thirty-three squared minus one?	1088

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COLLEGE KNOWLEDGE BOWL ROUND #3 – SET 3

#	Problem	Answer
1	Find the average of the numbers from one to fifteen.	8
2	A cylinder has a height of twelve inches and a diameter of eight inches. What is the volume of the cylinder, in cubic inches? Express your answer in terms of pi.	192π [in ³]
3	What is five factorial?	120
4	How many threes would you need to multiply together to get a product greater than one thousand?	7 [threes]
5	Nick likes the first meme out of every five memes that he sees on Instagram. Zoe likes the first meme out of every seven she sees. If they look at a meme account with eight hundred posts, how many memes will they both like, assuming they both like the first one they see?	23 [memes]
6	What is the sum of the solutions to the following equation: X squared plus seven X minus one hundred and twenty equals zero?	-7
7	A dartboard consists of three concentric circles of radius three, four, and five inches. Assuming a thrown dart hits the board, as a common fraction, what is the probability that a dart thrown will land inside the circle with radius four inches, but outside the circle with radius three inches?	$\frac{7}{25}$ or “7 out of 25” or “7 over 25”
8	As a decimal to the nearest tenth, what is fifty-six percent of two thousand and twenty?	1131.2
9	How many diagonals can you draw in a regular nonagon?	27 [diagonals]
10	When on a trip to New Zealand, Zoe sees two penguins every twelve hours. At this rate, if Zoe stays in New Zealand for the whole month of June, how many penguins will she see?	120 [penguins]

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COLLEGE KNOWLEDGE BOWL ROUND #4 – SET 4

#	Problem	Answer
1	What is the median of the following set of numbers: three, fifteen, eight, seven, four, twenty-two, and one?	7
2	If a recipe calls for one part flour for every three parts water, as a decimal to the nearest tenth, how many cups of flour should I use for six point six cups of water?	2.2 [cups]
3	What is the value of X in the given equation: three X plus two equals twenty-three?	$[x =] 7$
4	What is the product of the number of diagonals in a pentagon, the number of sides in a trapezoid, and the number of <u>yards</u> in a quarter-mile?	8800
5	A rectangular prism has a volume of eight hundred cubic centimeters and the length of each of its edges is an integer number of centimeters. What is the number of centimeters in the smallest possible height of the prism if the bases of the prism are squares?	2 [cm]
6	Freddie practices guitar for nine hours each weekday and eleven hours each on Saturdays and Sundays. If he starts practicing on Monday and it takes him one hundred and ten hours to master a rhythm, on what day will he master the rhythm?	Friday
7	Revenagers: Midgame earned one billion dollars on day one. If it runs for seven days, and on each day it makes twice what it made on the previous day, how many billions of dollars will it make in total during the seven-day period?	127 [billion dollars] or [\$] 127,000,000
8	Two positive integers have a difference of four and a product of forty-five. What is their sum?	14
9	What is the product of eighteen, one-third, and two-thirds?	4
10	What is the greatest common factor of two hundred and seventy-six and eighty-four?	12

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COLLEGE KNOWLEDGE BOWL ROUND #5 – SET 5

#	Problem	Answer
1	What is the quotient of the number of seconds in an hour divided by the number of degrees in a circle?	10
2	What is the product of the first four odd prime numbers?	1155
3	A card is randomly from a standard fifty-two card deck. As a reduced fraction in lowest terms, what is the probability that it is black or that it is an eight?	7/13 or “7 over 13” or “7 out of 13”
4	In square inches, what is the positive difference between the area of a square with side length of two inches and the area of a square with a diagonal of length “five times the square root of two” inches?	21 [in ²]
5	A train leaves Chicago going to Detroit averaging ninety miles per hour. At the same time, a second train leaves Detroit going to Chicago averaging sixty miles per hour. There are three hundred miles between Chicago and Detroit. What percent of the journey will the Chicago-bound train have completed when the two trains pass each other?	40 [%]
6	What is fifty-three squared minus forty-six squared?	693
7	Andrea and Paul had their first date on March thirteenth. If they go on their second date on March fifteenth, and go on dates every second day afterwards, during what month will their one hundredth date occur?	September
8	Captain America is frozen in a cube of ice. Each side of the cube measures twenty feet, and the ice melts at an average rate of sixteen cubic feet per year. In how many centuries will the cube be completely melted?	5 [centuries]
9	The prices of Tesla cars are seventy-five thousand, thirty-five thousand, eighty-one thousand, and fifty thousand dollars. What is the positive difference between the highest and lowest of these prices?	[\$] 46000
10	John’s number of followers triples every time he posts a vine. One morning, John has 7 followers. As a result of posting four vines that day, how many followers will he have?	567 [followers]

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COLLEGE KNOWLEDGE BOWL ROUND #6 – SET 6

#	Problem	Answer
1	How many faces do seven cubes have altogether?	42 [faces]
2	Three fans buy tickets to the Wrong Direction benefit concert. Tickets cost two hundred and sixty-five dollars each. One hundred percent of money from ticket sales will be divided evenly among five charities. What is the number of dollars that will go to each charity from the three fans' ticket sales?	[\$] 159
3	Two standard dice are rolled and the two numbers face-up are added. As a reduced fraction in lowest terms, what is the probability that the sum is eight?	5/36 or “5 out of 36” or “5 over 36”
4	What is the number of miles in sixty-three thousand three hundred and sixty feet?	12 [miles]
5	What is the number of square inches in the area of a triangle with sides of length seven, twenty-four, and twenty-five inches?	84 [square inches]
6	Thirty dogs are living in an animal shelter. On Monday, sixty percent of the dogs are adopted out. On Tuesday, two-thirds of the remaining dogs are adopted out. On Wednesday, two dogs are adopted out. As a reduced fraction in lowest terms, what fraction of the original number of dogs are left in the shelter?	1/15 or “1 out of 15” or “1 over 15”
7	Apple sold five thousand iPhones in City A in twenty eighteen. If the number of iPhones they sell in City A goes down by ten percent every year, how many iPhones will they sell in City A in twenty twenty-one?	3645 [iPhones]
8	How many integers between two hundred and three hundred are divisible by eleven?	9 [numbers]
9	The first three terms of an arithmetic sequence are eight, fifteen, and twenty-two. What is the tenth term in the sequence?	71
10	As a decimal to the nearest hundredth, what is the value of X in the following equation: two-thirds X plus one fifth equals three tenths?	[x =] [0].15

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COLLEGE KNOWLEDGE BOWL ROUND – EXTRA

#	Problem	Answer
1	John Titus has already read fourteen chapters of a book with seventy-seven chapters in two days. Assuming he continues reading at the same rate, in how many more days will he finish the book?	9 [days]
2	At the start of Monday, the price of a box of chocolates was five dollars. The price was raised by twenty percent during the day, and then reduced by twenty-five percent at the start of Tuesday. In dollars and cents, what was the price of the chocolates after this reduction?	[\$] 4.50 or “four fifty” or “four dollars and fifty cents”
3	What is the sum of the positive factors of eighteen?	39
4	What is the number of square inches in the area of a triangle whose base is ten inches and whose height is four times the length of the base?	200 [in ²]
5	The book “Larry Botter and the Philosopher’s Calculator” has ninety-seven thousand five hundred words. Each page in the book has an average of three hundred and twenty-five words. As a reduced fraction in lowest terms, what is the probability that a randomly chosen page number is a multiple of twenty-one?	7/150 or “7 out of 150” or “7 over 150”
6	A twenty-nine-foot ladder leans against a wall. If the ladder reaches a height of twenty-one feet up the wall, how many feet is the base of the ladder away from the base of the wall?	20 [feet]