# "Math is Cool" Masters – 2016-17
December 10, 2016

**STUDENT NAME:** _____

Proctor Name: _____

**School Name:** _____

Team #: _____    Room #: _____

**PRE-ALGEBRA - Individual Contest – Score Sheet**
**DO NOT WRITE IN SHADED REGIONS**

| | Answer | 1 or 0 | 1 or 0 |
|---|---|---|---|
| 1 | 27/50 | | |
| 2 | 88 | | |
| 3 | 5 [digits] | | |
| 4 | [x =]3 | | |
| 5 | 33 [jolly ranchers] | | |
| 6 | 3 [3-day stretches] | | |
| 7 | 172 | | |
| 8 | [x =]2 | | |
| 9 | 9 [int values] | | |
| 10 | 72 | | |
| 11 | 120 [cm] | | |
| 12 | 37 | | |
| 13 | 7 | | |
| 14 | 1152 | | |
| 15 | 210 | | |

**1-15 TOTAL:**

| | Answer | 1 or 0 | 1 or 0 |
|---|---|---|---|
| 16 | -15 | | |
| 17 | 2 [multiples] | | |
| 18 | 10 | | |
| 19 | 1/6 | | |
| 20 | 45 | | |
| 21 | 9 [fractions] | | |
| 22 | 1/2 | | |
| 23 | 82.5 [inches] | | |
| 24 | 5 [pansies] | | |
| 25 | 17/27 | | |
| 26 | $2.75 \times 10^{22}$ [human cells] | | |
| 27 | 80 [integers] | | |
| 28 | 210 [°] | | |
| 29 | 39 [meters] | | |
| 30 | 10 [units] | | |

**16-30 TOTAL:**

| | Answer | 1 or 0 | 1 or 0 |
|---|---|---|---|
| 31 | 27 | | |
| 32 | 12 [tosses] | | |
| 33 | 9 | | |
| 34 | 72 | | |
| 35 | 1/6 | | |
| 36 | 3 | | |
| 37 | 17.5 | | |
| 38 | 3 [prisms] | | |
| 39 | 32/81 | | |
| 40 | $6\sqrt{3}$ [cm] | | |

**31-40 TOTAL:**

**PRE-ALGEBRA**

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### December 10, 2016

**STUDENT NAME:** _____

**Proctor Name:** _____

**School Name:** _____

Team #: _____    Room #: _____

Total Correct: [ ]

## PRE-ALGEBRA - 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:** [ ] [ ]

**PRE-ALGEBRA**

# "Math is Cool" Masters – 2016-17
December 10, 2016

Total Correct: **KEY**

**STUDENT NAME:** _____

**Proctor Name:** _____   **School Name:** _____

Team #: _____   Room #: _____

## ALGEBRA - Individual Contest – Score Sheet
### DO NOT WRITE IN SHADED REGIONS

| | Answer | 1 or 0 | 1 or 0 |
|---|---|---|---|
| 1 | 5 [digits] | | |
| 2 | [x =]3 | | |
| 3 | 33 [jolly ranchers] | | |
| 4 | 3 [3-day stretches] | | |
| 5 | [x =]2 | | |
| 6 | 172 | | |
| 7 | 9 [integer values] | | |
| 8 | 72 | | |
| 9 | 120 [cm] | | |
| 10 | 37 | | |
| 11 | 7 | | |
| 12 | 210 | | |
| 13 | -15 | | |
| 14 | 1152 | | |
| 15 | 88 | | |
| **1-15 TOTAL:** | | | |

| | Answer | 1 or 0 | 1 or 0 |
|---|---|---|---|
| 16 | 2 [multiples] | | |
| 17 | 10 | | |
| 18 | 45 | | |
| 19 | 1/6 | | |
| 20 | 5 [pansies] | | |
| 21 | 11/2 | | |
| 22 | 1/2 | | |
| 23 | 548 [ft²] | | |
| 24 | 8 | | |
| 25 | 17/27 | | |
| 26 | 108 [°] | | |
| 27 | 910 | | |
| 28 | 82.5 [inches] | | |
| 29 | $2.75 \times 10^{22}$ [human cells] | | |
| 30 | 12 [tosses] | | |
| **16-30 TOTAL:** | | | |

| | Answer | 1 or 0 | 1 or 0 |
|---|---|---|---|
| 31 | 9 | | |
| 32 | 999 | | |
| 33 | 1/6 | | |
| 34 | 3 [prisms] | | |
| 35 | 3 | | |
| 36 | 23.12 [4] | | |
| 37 | $4+4\sqrt{2}$ [cm] | | |
| 38 | 32/81 | | |
| 39 | 17.5 | | |
| 40 | $8\sqrt{3}-12$ [cm] or equivalent | | |
| **31-40 TOTAL:** | | | |

## ALGEBRA
40: $\dfrac{12}{3+2\sqrt{3}}$ [cm] is equivalent

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Proctor Name: _____

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Team #: _____   Room #: _____

Total Correct: _____

## ALGEBRA - 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:** | | | |

**ALGEBRA**

# "Math is Cool" Masters – 2016-17
## Sponsored by:
### December 10, 2016
### 7th & 8th 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, 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 problems dealing with money. In the case of problems requiring dollar answers, answer as a decimal rounded to the neares 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.*

# "Math is Cool" Masters – 2016-17
## Sponsored by:
### 7th & 8th Grade – December 10, 2016
### Mental Math Contest

## 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.*

| # | Problem |
|---|---------|
| 1 | What is the value of X, if three X plus twenty-one equals eighty-one? |
| 2 | One pound equals sixteen ounces. An apple weighs four ounces. What is the number of apples, whose combined weight is three pounds? |
| 3 | A circle has an area of eighty-one pi square centimeters. What is the number of centimeters in the diameter of the circle? |
| 4 | What is the sum of one squared plus two squared plus three squared? |
| 5 | A wheel turns at fifty revolutions per minute. If this rate decreases by fourteen percent, what is the wheel's new number of revolutions per minute? |
| 6 | What is the number of ways to make seventeen cents using just nickels and pennies? |
| 7 | In the equation A plus B equals ten, what is the number of distinct ordered pair solutions, A comma B, in which A and B are positive integers? |
| 8 | Rafi rolls a pair of standard dice. One die is red and the other is green. As a common fraction, what is the probability that he rolls a red two or a green five? |

# "Math is Cool" Masters – 2016-17
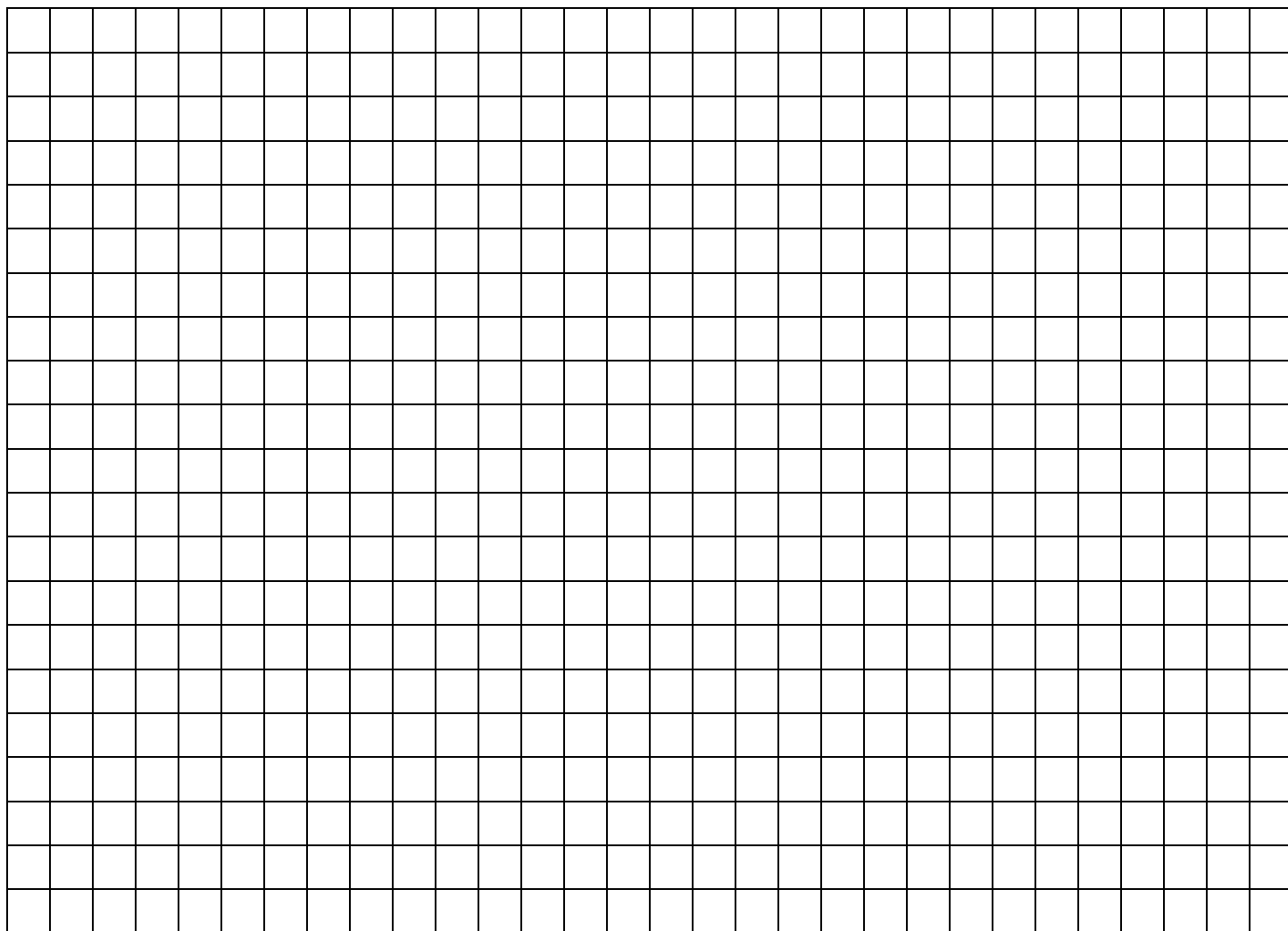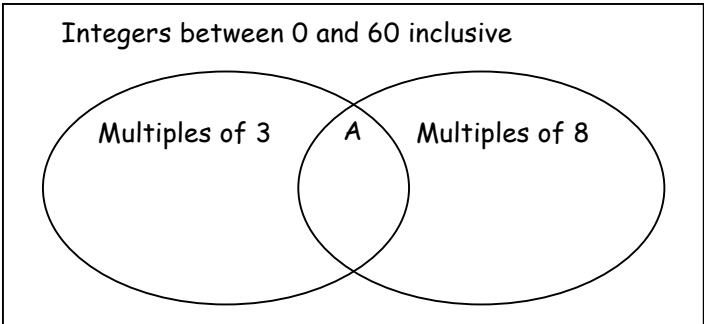
Sponsored by:

December 10, 2016

PRE-ALGEBRA -  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 – PRE-ALGEBRA - 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.*

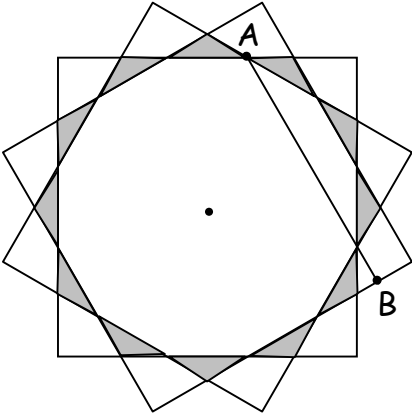| | Questions 1-30: 2 points each |
|---|---|
| 1 | What fraction of the positive integers from 1 to 50 are greater than 23? |
| 2 | What is the positive difference between the largest two-digit multiple of 11 and the smallest two-digit prime number? |
| 3 | What is the number of digits in the product of 41 and 253? |
| 4 | What is the value of x in the expression $11^x = 1331$? |
| 5 | Zamzam gives one-third of her jolly ranchers to her sister. She then gives half of what she has left to her brother. She ends up with eleven jolly ranchers for herself. How many did have to start with? |
| 6 | What is the number of consecutive three-day stretches that include a Wednesday? |
| 7 | What is the sum of the prime numbers between 80 and 90? |
| 8 | Solve for x:        3x - 8 = -2 |
| 9 | If $-7 \le x < 2$, then what is the number of integer values that x could have? |
| 10 | What is the sum of the numbers in section A in the Venn diagram below?<br><br>Integers between 0 and 60 inclusive<br>Multiples of 3    A    Multiples of 8 |
| 11 | The width of a rectangle is 10 centimeters. The length of the rectangle is five times the width. What is the number of centimeters in the perimeter of the rectangle? |
| 12 | What is the quotient of 333 divided by 9? |
| 13 | What is the largest prime factor of 2016? |

| 14 | Evaluate: $2^1 \cdot 3^2 \cdot 4^3$ |
|----|------------------------------------|
| 15 | Evaluate: 27 + 109 + 74 |
| 16 | Evaluate: 24 - ( 80 - 16) + $5^2$ |
| 17 | How many multiples of 17 are there from 1 to 50? |
| 18 | What is the greatest common factor of 20, 30, and 50? |
| 19 | The numbers 1, 2, and 3 are written once each randomly in a list of three numbers. As a reduced common fraction, what is the probability that they are written in order, 1, 2, 3? |
| 20 | Evaluate: $(3 \square 4) \square 2$, if $a \square b = a^2 - b^2$ |
| 21 | What is the number of distinct common fractions in the form $\frac{ab}{10}$ where $ab$ is a positive two-digit integer with $a$ representing the tens digit, $b$ representing the ones digit, and $a + b = 10$? |
| 22 | Brenda and Min are playing a game with a shuffled, standard deck of cards. Brenda wins if she draws an even-numbered red card. Aces and face cards are not considered odd or even. Min wins if she draws any Ace or face card. On any given draw of one card, as a reduced common fraction, what is the probability that neither will win? |
| 23 | A set of stairs has ten treads and eleven risers. Each riser is 6 inches tall and $\frac{3}{4}$ inch thick and each tread is 12 inches wide and $1\frac{1}{2}$ inches thick. The design of the stairs where they meet the top floor and where they meet the bottom floor is shown below.  This design is consistent throughout the stair system. The thickness of the floor above riser 11 is also $1\frac{1}{2}$ inches. As a decimal number of inches, what is the height from the floor at the base of the stairs to the floor at the top of the stairs? |

top floor

-riser 11

tread 10

-riser 10

. . .

-riser 2

tread 1

-riser 1

bottom floor

| | |
|---|---|
| 24 | A circular flowerpot has a diameter of ten inches. In order to thrive, an individual pansy plant needs at least fifteen square inches at the surface of the soil. What is the maximum number of pansies that can thrive in this pot? |
| 25 | What is the median of the following five numbers? $$\frac{3}{4} \qquad 0.6 \qquad 0.\overline{6} \qquad \frac{21}{36} \qquad \frac{17}{27}$$ |
| 26 | The human body has about $3.72 \times 10^{12}$ cells and there are currently estimated to be $7.4 \times 10^9$ humans living on earth. In scientific notation, what is the number of living human cells on earth? Round the decimal part of your answer to the nearest hundredth. |
| 27 | What is the number of positive three-digit integers in the form $abc$, where $a$ represents the hundreds digit and is an odd number, $b$ represents the tens digit and is a composite number, and $c$ represents the ones digit and is a prime number? |
| 28 | A tessellation of the plane can be made with squashed equilateral pentagons as shown. What is the number of degrees in the sum of the measures of $\angle EAB$ and $\angle ABC$ ?  |
| 29 | Two robots are 91 meters apart and facing each other. The first robot moves toward the second robot at an average rate of 3 meters per second. The second robot moves towards the first robot at an average rate of 4 meters per second. Assuming the robots begin moving at the same time, what is the number of meters in the distance traveled by the first robot at the time the two robots meet. |
| 30 | On a coordinate plane, point A has coordinates (3, -4). Point A' results from tripling the coordinates of point A. What is the number of units in the length of $\overline{AA'}$? |

# Challenge Questions: 3 pts each

| | |
|---|---|
| 31 | What is the value of $123_4$ in base-10? |
| 32 | Ten friends stand in a circle. One person tosses a ball to a second person, who tosses it back to the first person or to a third person. What is the minimum number of tosses required so that each person catches the ball at least once and at least one person catches the ball three times? |
| 33 | What is the smallest positive integer that is exactly four less than the sum of its positive integer factors? |
| 34 | The second term in a geometric sequence is 108 and the fourth term is 243. What is the first term? |
| 35 | At a carnival it costs $2 to play a game where you throw a ball at a stack of ten tin cans on a randomly moving platform. If you knock over the cans you get $12. Otherwise, you win nothing. As a reduced common fraction, what does your probability of knocking over the cans need to be in order for the expected value of playing to be exactly $0? |
| 36 | Each distinct letter represents a distinct single digit integer. What is the value of E? $$\begin{array}{r} L\ I\ V\ E \\ +\ T\ H\ E \\ \hline D\ R\ E\ A\ M \end{array}$$ |
| 37 | A data set consists of four distinct positive integers and has a mean of 4. What is the sum of all of the distinct possible values of the median? |
| 38 | The space diagonal of a rectangular prism is the segment drawn from one vertex through the interior space of the prism to the opposite vertex as shown. The dimensions of the prism are $a$ by $b$ by $c$ and the length of the space diagonal is $d$, such that $a$, $b$, $c$, and $d$ are all distinct positive integers. What is the number of distinct rectangular prisms in which $a$, $b$, and $c$ are all less than 10 units? Note: If $a$, $b$, and $c$ are written as ordered triples, $(a, b, c)$, then $(1, 2, 3)$ and $(3, 2, 1)$ do not represent distinct prisms. |

| 39 | Charlie the Chimp is taking a multiple choice test. There are four questions on the test and there are three answer choices for each question. Only one answer choice is correct for each question. Since Charlie is a chimp, he will be guessing on each question. As a common fraction, what is the probability that he guesses exactly one right answer? |
|---|---|
| 40 | In the figure shown there are three congruent squares whose diagonals all intersect at the point shown in the center and whose side lengths are 12 centimeters. The shaded region consists of 12 congruent isosceles triangles. $\overline{AB}$ is parallel to 2 sides of one of the squares. In simplest radical form, what is the number of centimeters in the length of $\overline{AB}$? |

**PRE-ALGEBRA**
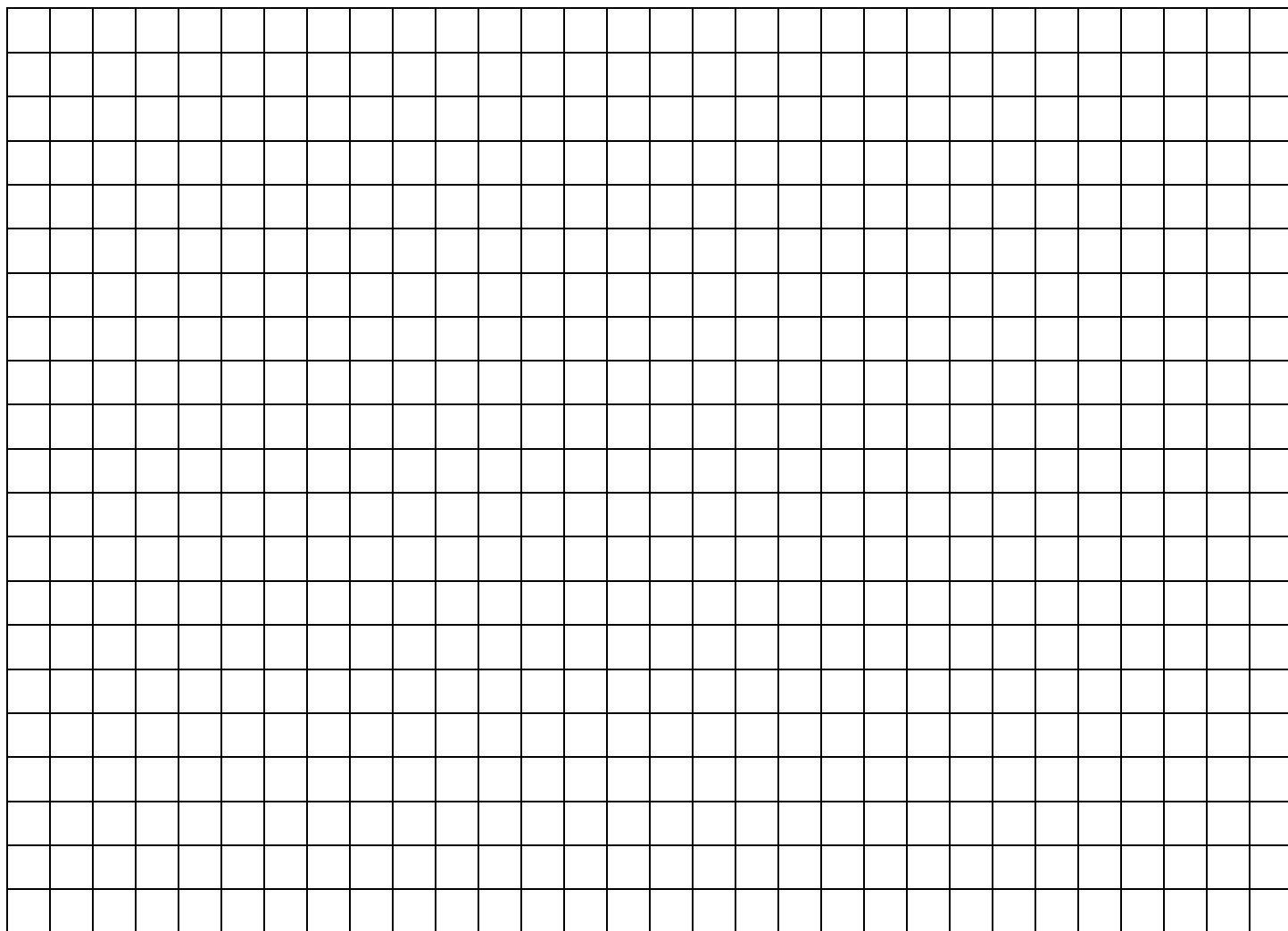
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ALGEBRA -  Individual Contest

**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 – ALGEBRA - 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.*
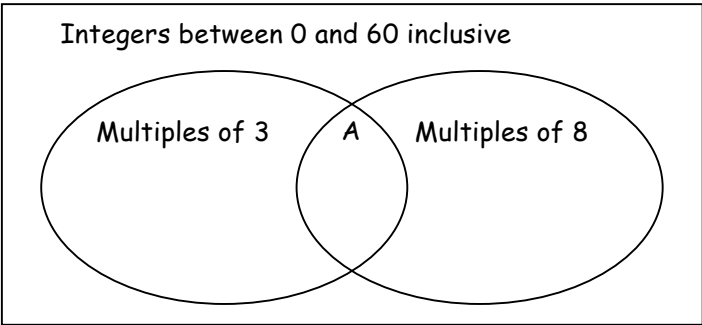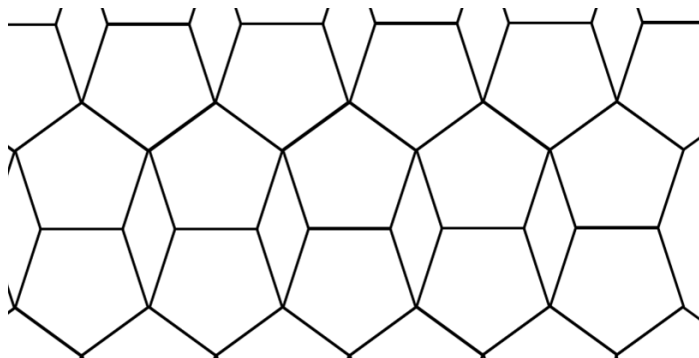
| | Questions 1-30: 2 points each |
|---|---|
| 1 | What is the number of digits in the product of 41 and 253? |
| 2 | What is the value of x in the expression $11^x = 1331$? |
| 3 | Zamzam gives one-third of her jolly ranchers to her sister. She then gives half of what she has left to her brother. She ends up with eleven jolly ranchers for herself. How many did have to start with? |
| 4 | What is the number of consecutive three-day stretches that include a Wednesday? |
| 5 | Solve for x:        3x - 8 = -2 |
| 6 | What is the sum of the prime numbers between 80 and 90? |
| 7 | If $-7 \le x < 2$, then what is the number of integer values that x could have? |
| 8 | What is the sum of the numbers in section A in the Venn diagram below? <br><br> Integers between 0 and 60 inclusive <br><br> Multiples of 3    A    Multiples of 8 |
| 9 | The width of a rectangle is 10 centimeters. The length of the rectangle is five times the width. What is the number of centimeters in the perimeter of the rectangle? |
| 10 | What is the quotient of 333 divided by 9? |
| 11 | What is the largest prime factor of 2016? |
| 12 | Evaluate:     27 + 109 + 74 |
| 13 | Evaluate:     24 - ( 80 - 16) + $5^2$ |
| 14 | Evaluate:     $2^1 \cdot 3^2 \cdot 4^3$ |
| 15 | What is the positive difference between the largest two-digit multiple of 11 and the smallest two-digit prime number? |

| 16 | How many multiples of 17 are there from 1 to 50? |
|---|---|
| 17 | What is the greatest common factor of 20, 30, and 50? |
| 18 | Evaluate:    $(3 \square 4) \square 2$,  if $a \square b = a^2 - b^2$ |
| 19 | The numbers 1, 2, and 3 are written once each randomly in a list of three numbers. As a reduced common fraction, what is the probability that they are written in order, 1, 2, 3? |
| 20 | A circular flowerpot has a diameter of ten inches. In order to thrive, an individual pansy plant needs at least fifteen square inches at the surface of the soil. What is the maximum number of pansies that can thrive in this pot? |
| 21 | As a reduced common fraction, what is the mean value of all distinct common fractions in the form $\frac{ab}{10}$, where $ab$ is a positive two-digit integer with $a$ representing the tens digit, $b$ representing the ones digit, and $a + b = 10$? |
| 22 | Brenda and Min are playing a game with a shuffled, standard deck of cards. Brenda wins if she draws an even-numbered red card. Aces and face cards are not considered odd or even. Min wins if she draws any Ace or face card. On any given draw of one card, as a reduced common fraction, what is the probability that neither will win? |
| 23 | Jerome needs to paint the walls and ceiling of his bedroom. Two walls are 8 feet by 12 feet and the other two walls are 8 feet by 14 feet. There is one door that is 3 feet by 7 feet and one window that is 5 feet by 3 feet. The ceiling is 12 feet by 14 feet. The walls, ceiling, door and window are all rectangles. What is the number of square feet that need to be painted, assuming he does not paint the door or window? |
| 24 | On a coordinate plane, the point with coordinates A(1, 7) is reflected across the line with the equation y = x. What is the sum of the coordinates of the image, A'? |
| 25 | What is the median of the following five numbers? $\quad \frac{3}{4} \qquad 0.6 \qquad 0.\overline{6} \qquad \frac{21}{36} \qquad \frac{17}{27}$ |
| 26 | A tessellation of the plane can be made with regular pentagons and rhombuses as shown. What is the number of degrees in $m\angle ABC - m\angle DAB$? |

| 27 | A geometric sequence consists of the numbers 5, 15, 45, 135, 405, 1215, . . . , where 5 is the first number in the sequence. All of the numbers in the sequence are divided by 2 to form a different geometric sequence. What is the sum of the first six numbers of the new sequence? |
|---|---|
| 28 | A set of stairs has ten treads and eleven risers. Each riser is 6 inches tall and $\frac{3}{4}$ inch thick and each tread is 12 inches wide and $1\frac{1}{2}$ inches thick. The design of the stairs where they meet the top floor and where they meet the bottom floor is shown below.  This design is consistent throughout the stair system. The thickness of the floor above riser 11 is also $1\frac{1}{2}$ inches. As a decimal number of inches, what is the height from the floor at the base of the stairs to the floor at the top of the stairs?

top floor

tread 10          -riser 11

-riser 10

. . .

tread 1          -riser 2

-riser 1
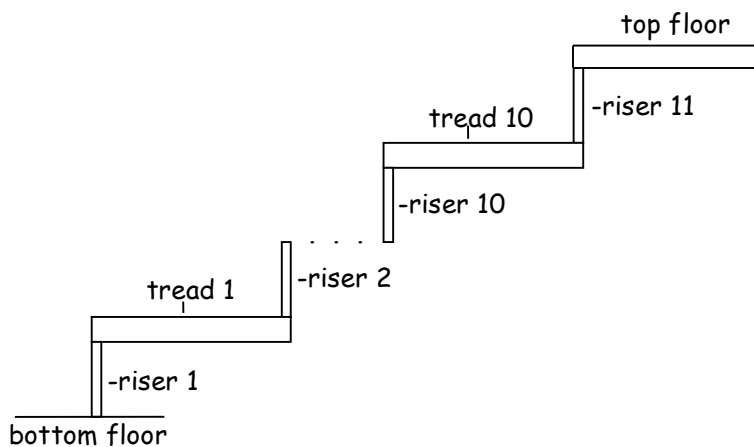
bottom floor |
| 29 | The human body has about $3.72 \times 10^{12}$ cells and there are currently estimated to be $7.4 \times 10^9$ humans living on earth. In scientific notation, what is the number of living human cells on earth? Round the decimal part of your answer to the nearest hundredth. |
| 30 | Ten friends stand in a circle. One person tosses a ball to a second person, who tosses it back to the first person or to a third person. What is the minimum number of tosses required so that each person catches the ball at least once and at least one person catches the ball three times? |

# Challenge Questions: 3 pts each

**31** What is the smallest positive integer that is exactly four less than the sum of its positive integer factors?

**32** Three positive 3-digit integers are part of a geometric series and are in the form *abc*, *bca*, *cab*, where *a* = 2*c* and *b* = *c* + 1. What is the sum of the three 3-digit integers?

**33** At a carnival it costs $2 to play a game where you throw a ball at a stack of ten tin cans on a randomly moving platform. If you knock over the cans you get $12. Otherwise, you win nothing. As a reduced common fraction, what does your probability of knocking over the cans need to be in order for the expected value of playing to be exactly $0?
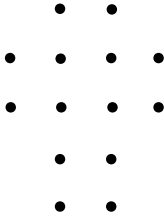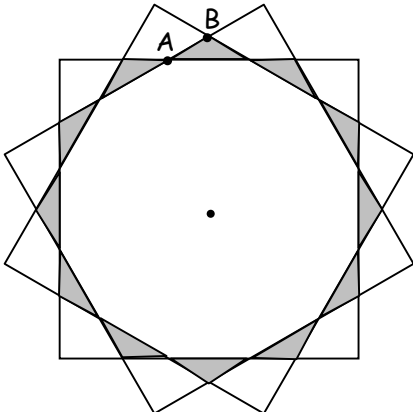
**34** The space diagonal of a rectangular prism is the segment drawn from one vertex through the interior space of the prism to the opposite vertex as shown. The dimensions of the prism are *a* by *b* by *c* and the length of the space diagonal is *d*, such that *a*, *b*, *c*, and *d* are all distinct positive integers. What is the number of distinct rectangular prisms in which *a*, *b*, and *c* are all less than 10 units? Note: If *a*, *b*, and *c* are written as ordered triples, (*a*, *b*, *c*), then (1, 2, 3) and (3, 2, 1) do not represent distinct prisms.
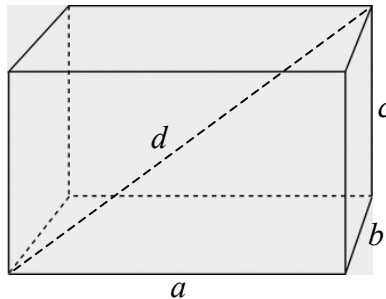


**35** Each distinct letter represents a distinct single digit integer. What is the value of E?

```
    L  I  V  E
 +  T  H  E
 ─────────────
 D  R  E  A  M
```

**36** Express the base-10 number 11.375 as a decimal in base-4.

| 37 | Three dots are chosen from the arrangement of dots shown and used as the vertices of a right triangle. In simplest radical form, what is the number of centimeters in the largest possible perimeter of one of these right triangles? Assume the horizontal and vertical distance between any two adjacent dots is one centimeter. |
|---|---|
| | <br><br>• •<br>• • • •<br>• • • •<br>• •<br>• • |
| 38 | Charlie the Chimp is taking a multiple choice test. There are four questions on the test and there are three answer choices for each question. Only one answer choice is correct for each question. Since Charlie is a chimp, he will be guessing on each question. As a common fraction, what is the probability that he guesses exactly one right answer? |
| 39 | A data set consists of four distinct positive integers and has a mean of 4. What is the sum of all of the distinct possible values of the median? |
| 40 | In the figure shown there are three congruent squares whose diagonals all intersect at the point shown in the center and whose side lengths are 12 centimeters. The shaded region consists of 12 congruent isosceles triangles. In simplest radical form, what is the number of centimeters in the length of $\overline{AB}$? |
| | B<br>A |

**ALGEBRA**

# "Math is Cool" Masters – 2016-17
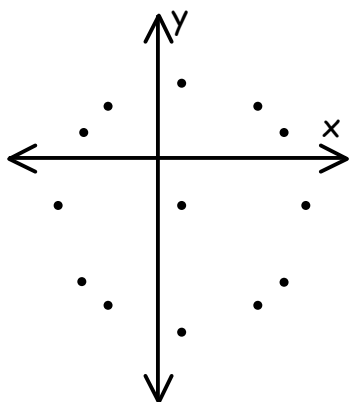
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7th Grade – December 10, 2016

Individual Multiple Choice Contest

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The table and graph below show solutions to the following equation:

$(x - 1)^2 + (y + 2)^2 = 25$

| x | -4 | -3 | -3 | -2 | -2 | 1 | 1 | 4 | 4 | 5 | 5 | 6 |
|---|----|----|----|----|----|----|----|----|----|----|----|----|
| y | -2 | 1 | -5 | 2 | -6 | 3 | -7 | 2 | -6 | 1 | -5 | -2 |



---

**1**
If all of the points on the graph that are listed in the table are connected with smooth curve, what would be the resulting shape?

A) Square    B) Circle    C) Parabola  D) Hyperbola    E) Sinusoid

---

**2**
What are the coordinates of the one point on the graph whose coordinates are not listed in the table?

A) (-3, 1)    B) (-2, 1)    C) (1, -3)    D) (1, -2)    E) (0, 0)

---

**3**
For the given equation, if x = 3, what is one of the corresponding values of y?

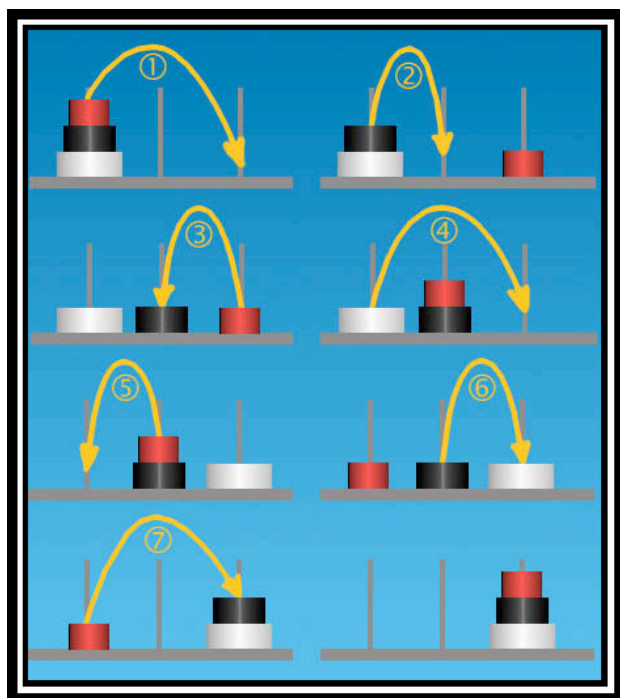A) $\sqrt{21}$    B) $\sqrt{21} - 2$    C) $2 - \sqrt{21}$    D) 2    E) $3\sqrt{7}$

---

**4**
In the form y = mx + b, what is the equation of the line tangent to the figure named in problem 1, at the point (-2, -6)?

A) $3x + 4y = -30$    B) $y + 6 = -\dfrac{3}{4}(x + 2)$    C) $y = \dfrac{3}{4}x - 4.5$    D) $y = -\dfrac{4}{3}x - \dfrac{26}{3}$

E) $y = -\dfrac{3}{4}x - 7.5$

On old legend tells of a temple where a pyramid puzzle was used for the mental discipline of young priests. The legend says that at the beginning of time, the priests in the temple were given a stack of 64 gold disks, each one a little smaller than the one beneath it. Their assignment was to transfer the 64 disks one at a time from one of three poles to another, with one important rule: a large disk can never be placed on a smaller one. Once this task was completed, according to the myth, the temple would crumble and the world would vanish. The seven steps required to move a stack of 3 disks are shown in the diagram.



| 5 | What is the minimum number of moves needed to move a stack of 2 disks with three poles? <br> A) 1      B) 2      C) 3      D) 4      E) 5 |
|---|---|
| 6 | What is the minimum number of moves needed to move a stack of 4 disks with three poles? <br> A) 9      B) 11      C) 13      D) 15      E) 19 |
| 7 | Which equation can be used to determine the total minimum number of moves, $m$, for a stack of $n$ disks with three poles? <br> A) $m = 2^n - 1$    B) $m = 2n - 1$    C) $n = 2^m - 1$    D) $mn = 2^x - 1$    E) Answer not given |

The Earth rotates about 365.242375 times a year, but a typical calendar year has 365 days. To make up the difference we observe the following three rules:

Rule #1  During years that are multiples of 4, we have an extra day on February 29, called leap day. This gives us an average of 365.25 days per year, which is slightly more than it needs to be.

Rule #2  During years that are multiples of 100 we don't have a leap day. This puts the average number of days in a year at 365.24, which is slightly lower than it needs to be.

Rule #3 During years that are multiples of 400, we have a leap day, instead of not having one. This gives us an average of 365.2425 days per year, and this is generally considered close enough.

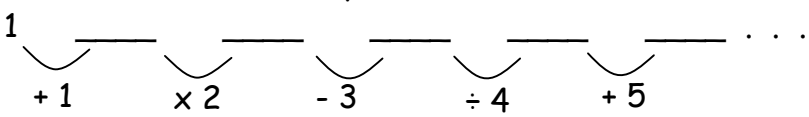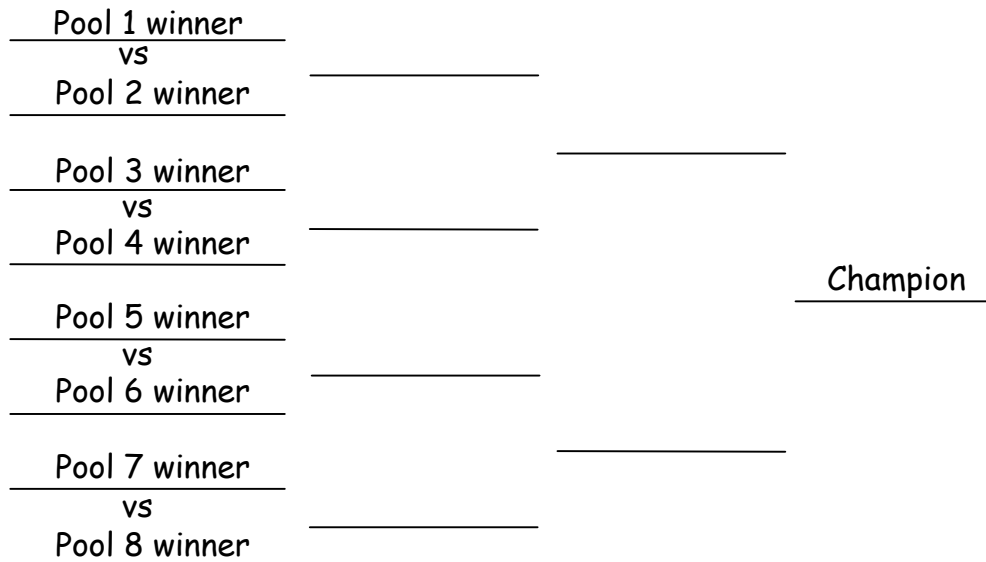| 8 | In the following list of years, how many have leap days?<br>    1400, 1600, 1760, 1930, 2000, 2016, 2108<br>A) 3        B) 4        C) 5        D) 6    E) 7 |
| --- | --- |
| 9 | What is the probability that a person born during the time interval from on or after 1/1/2020 to on or before 1/1/2030 will be born on a leap day?<br>A) $\dfrac{1}{1218}$   B) $\dfrac{1}{1827}$   C) $\dfrac{2}{1827}$   D) $\dfrac{2}{3653}$   E) $\dfrac{3}{3653}$ |
| 10 | In order to change the overall average number of days in a year from 365.2425 to 365.242375 an additional rule could be combined with the first three rules:<br><br>Rule #4  During years that are multiples of n, a leap day is dropped from the calendar, when according to the three rules described above there normally would be one. Which of the following is the value of n?<br><br>A) 1000     B) 4000     C) 8000     D) 10000     E) Answer not given |

# "Math is Cool" Masters – 2016-17
## Sponsored by:
### 7th Grade – December 10, 2016
### Team Contest

| | |
|---|---|
| **1** | Dr. Ross lectures her math class for 50 minutes. How many seconds long is her lecture? |
| **2** | Three standard dice are rolled and the numbers showing are added together. What is the number of distinct possible sums? |
| **3** | What is the number of square centimeters in the positive difference between the area of a rectangle whose length is 8 centimeters and whose width is 15 centimeters and the area of a triangle whose height is 18 centimeters and whose width is 12 centimeters? |
| **4** | What is the number of positive two-digit integers, *ab*, where *a* represents the tens digit and *b* represents the ones digit, such that *a >b*? |
| **5** | A series of numbers begins with 1 as its first term and follows the rule that 1 is added to get the 2nd term, 2 is multiplied to get the 3rd term, 3 is subtracted to get the 4th term, the 4th term is divided by 4 to get the 5th term, and so on, adding, multiplying, subtracting and dividing consecutive integers. As a common fraction, what is the square root of the 9th term? <br><br> 1 ____  ____  ____  ____  ____ . . . <br> +1  x 2  - 3  ÷ 4  + 5 |
| **6** | The Flash runs at an average rate of 140 feet per second while Supergirl flies at an average rate of 170 feet per second. Supergirl is hovering in the air, 80 feet directly above the Flash. Both start moving in the same direction at the same time. On a straight line through the air, what will be the number of feet in the distance between them after 5 seconds? |
| **7** | What the number of distinct prime factors in the result when the expression $a \cdot b^c + b \cdot c^d + c \cdot d^e$ is evaluated for *a = 1, b = 2, c = 3, d = 4,* and *e = 5*? |

**8**

In a tournament there are 34 players. The players are divided into 8 pools. Six pools have 4 players each and 2 pools have 5 players each. Within each pool, each player plays each of the other players exactly once. The winners of each pool are then assigned a spot in an 8-player bracket as shown, in which players are eliminated from the tournament once they lose. Assume there are no ties. How many total games are played to determine a champion in this tournament?

Pool 1 winner
vs
Pool 2 winner

Pool 3 winner
vs
Pool 4 winner

Champion

Pool 5 winner
vs
Pool 6 winner

Pool 7 winner
vs
Pool 8 winner

**9**

An equilateral triangle with side length 6 centimeters has a second equilateral triangle inside it such that any point on any side of the inner triangle is always 1 centimeter away from the closest side of the outer triangle. In simplest radical form, what is the number of square centimeters in the area of the space outside the inner triangle, but inside the outer triangle?



1 cm   1 cm
6 cm   6 cm
6 cm
1 cm
6 cm
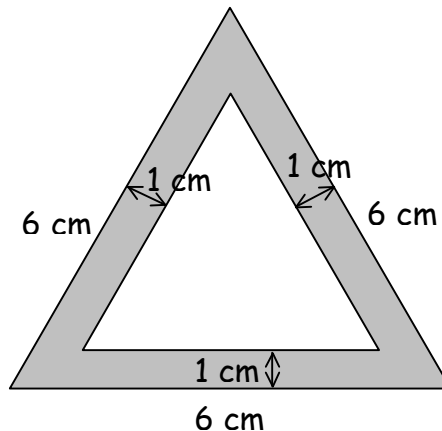
**10**

A basketball team has 10 players on its roster. A starting lineup consists of 5 players. The positions of the players include 2 guards, 2 forwards, and 1 center. If there is no difference between the responsibilities of the two guard positions and also no difference between the two forward positions, what is the total number of possible starting lineups for this team?

| 1 | Nigel is thinking of a positive three-digit integer. The digit in the hundreds place must not be a zero. No more than one of the remaining two digits may be a zero. What is the number of three-digit integers that could be the one Nigel is thinking of? |
|---|---|
| 2 | A bottling company has overhead expenses of $1200 per month plus a cost of $0.30 to fill, cap, and label each individual bottle. Let E represent the company's total monthly expenses and b represent the total number of bottles filled, capped, and labeled in a month. Complete the equation:<br><br>E = |
| 3 | A trapezoid has one base of length 11 centimeters, a height of 7 centimeters and an area of 98 square centimeters. What is the number of centimeters in the second base of the trapezoid? |
| 4 | The equations for two parabolas are $y = (x - 2)^2 - 4$ and $y = -(x + 1)^2 + 5$. The parabolas intersect each other in two points. What is the sum of the y-coordinates of these two points? |
| 5 | Rounded to the nearest whole number, what is the mean number of letters in the words for the 7 days of the week? |

## COLLEGE KNOWLEDGE BOWL ROUND #1 – SET 1

| # | Problem | Answer |
|---|---------|--------|
| 1 | What is the remainder when 857 is divided by 3? | 2 |
| 2 | Three angles of a quadrilateral are 80 degrees, 115 degrees, and 44 degrees. What is the number of degrees in the measure of the fourth angle? | 121 [degrees] |
| 3 | The square root of 72 lies between two consecutive positive integers. What is the sum of these two integers? | 17 |
| 4 | What is the midpoint of the line segment that connects the point **zero comma negative four** and the point **six comma fourteen**? Give your answer as an ordered pair, x comma y. | 3,5 or three comma five |
| 5 | Alex's bill is 23 dollars and 40 cents. If she wants to tip 20 percent of her bill, how much will her tip be, in dollars and cents? | [$]4.68 |
| 6 | What is zero point six four as a reduced common fraction? | 16/25 or 16 over 25 |
| 7 | A random number generator is set to produce a number between 1 and 24 inclusive. As a reduced common fraction, what is the probability it is prime? | 3/8 or 3 out of 8 or 3 over 8 |
| 8 | A right triangle has legs of 16 and 30 inches. How many inches long is its hypotenuse? | 34 [inches] |
| 9 | It takes Kara 3 minutes to eat 4 pot-stickers, and it takes James 6 minutes to eat 5 of them. Together they are eating a bowl of 40 pot-stickers. How many minutes does James need as a head start so that he ends up eating exactly half of them? | 9 [minutes] |
| 10 | The product of two consecutive numbers is 210. What is their sum? | 29 |

## COLLEGE KNOWLEDGE BOWL ROUND #2 – SET 2

| # | Problem | Answer |
|---|---------|--------|
| 1 | What is the product of 17 times 31? | 527 |
| 2 | If the shadow of a 5 foot tall girl is 7.5 feet, how many feet long is the shadow of a 24 foot tall dragon? | 36 [feet] |
| 3 | Will rolls a 20 sided die. As a reduced common fraction, what is the probability he rolls a 13 or higher? | 2/5 or 2 out of 5 or 2 over 5 |
| 4 | How many prime numbers are there between 40 and 70? | 7 [prime numbers] |
| 5 | A magic cube suddenly grows in size so that each edge is six times as long as it was before. How many times larger is the new volume? | 216 [times larger] |
| 6 | What is the sum of the digits in the decimal representation of three eighths? | 15 |
| 7 | A stone brick in the shape of a rectangular prism has side lengths 4, 5, and 7 inches. What is the number of square inches in the total surface area of the prism? | 166 [in sq.] |
| 8 | How many ways can you rearrange the letters in the word ZIPPER ? | 360 [ways] |
| 9 | How many distinct prime factors does 75 thousand six hundred have? | 4 [prime factors] |
| 10 | Batman hits a target with his batarang 14 out of 20 times. What is the longest streak of consecutive hits that he **must** have made? | 2 [hits] |

## COLLEGE KNOWLEDGE BOWL ROUND #3 – SET 3

| # | Problem | Answer |
|---|---------|--------|
| 1 | In the equation Y equals 4X plus 16, what is the value of X when Y equals 48? | [x =] 8 |
| 2 | As a reduced common fraction, what is the probability of rolling two composite numbers with two fair six-sided dice? | 1/9 or 1 out of 9 or 1 over 9 |
| 3 | Find the mean of the following data set: 7, 84, 119 | 70 |
| 4 | What is the equation of the line parallel to the X axis that passes through the point five comma twelve? | Y = 12 |
| 5 | Two supplementary angles are in a ratio of 1 to 5. What is the number of degrees in the measure of the larger angle? | 150 [degrees] |
| 6 | If Mike is 12 years old and Nancy is 16, what will the sum of their ages be in 54 years? | 136 [years] |
| 7 | Superman is flying at 120 miles per hour. How many seconds will it take him to go 6 miles? | 180 [seconds] |
| 8 | Latifah owns the first four Harry Potter books, plus a duplicate copy of the second one. How many distinct ways can she arrange them on the shelf? | 60 [ways] |
| 9 | If Lucas scores 88, 96, 92, and 99 on his first four math tests, what does he need to get on his fifth one to have an average of 95? | 100 |
| 10 | As a reduced common fraction, what is the probability that the roll of two fair six sided dice produces two numbers whose product is 16 or greater? | 11/36 or 11 out of 36 or 11 over 36 |

# "Math is Cool" Masters – 2016-17
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### 7th Grade – December 10, 2016

## COLLEGE KNOWLEDGE BOWL ROUND #4 – SET 4

| # | Problem | Answer |
|---|---------|--------|
| 1 | When X equals 3, what is the value of 2X squared plus 5X plus 1? | 34 |
| 2 | What is the sum of the first 12 odd positive integers? | 144 |
| 3 | What is the number of square inches in the area of a trapezoid with height 5 inches and bases of 12 and 16 inches? | 70 [sq inches] |
| 4 | What is the fifth smallest composite number? | 10 |
| 5 | Every five hours, Jack's magic hen lays a golden egg. How many whole eggs will she lay in two days? | 9 |
| 6 | I flip six fair coins. As a reduced common fraction, what is the probability that exactly one of them is heads? | 3/32 or 3 out of 32 or 3 over 32 |
| 7 | What is 2 to the 12th power? | 4096 |
| 8 | When the following fractions are put in order from least to greatest, which one is in the middle? Five-eighths, Two-thirds, Four-sevenths. | 5/8 or five eighths |
| 9 | 45 percent of my skittles are red, 20 percent are yellow, and the rest are green. I have 5 more red skittles than yellow. How many green ones do I have? | 7 [green skittles] |
| 10 | Harry has a bag of jelly beans. He gives one quarter of them to Ron, then half of the remainder to Hermione. He eats three quarters of what he has left, and then sees there are 3 still in the bag. How many did he start with? | 32 [jelly beans] |

# "Math is Cool" Masters – 2016-17
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## COLLEGE KNOWLEDGE BOWL ROUND #5 – SET 5

| # | Problem | Answer |
|---|---------|--------|
| 1 | How many minutes pass between 11:41 AM and 2:36 PM? | 175 [minutes] |
| 2 | The area of a triangle is 56 square inches. How many inches are in the height of the triangle, if the length of the base is 16 inches? | 7 (inches) |
| 3 | On any given day, the probability of Scott being late to school is 20 percent. The probability of him scoring a goal at lacrosse practice after school is 50 percent. What is the probability, as a percentage, that he is on time to school and scores a goal? | 40 [percent] |
| 4 | At the start of a hike, Kenji's water bottle holds 32 ounces of water. Midway, after he has drunk 8 ounces, he mixes 1 ounce of powdered lemonade into the bottle. As a ratio, what is the concentration of lemonade to water in the bottle? | 1:24 or 1 to 24 |
| 5 | Buffy slays 6 vampires on Monday and 4 every day Tuesday through Friday. Over the weekend she slays a total of 27. On average, how many vampires does she slay per day? | 7 [vampires] |
| 6 | What is the slope of the line for the equation   4X -2 = 5Y | 4/5 or 4 over 5 |
| 7 | What is the least common multiple of 153 and 45? | 765 |
| 8 | What is the number of square centimeters in the area of a rhombus with diagonals of 14 and 15 centimeters? | 105 [sq. cm] |
| 9 | A palindrome is a number that reads the same forwards and backwards. How many palindromes are there between 1000 and 2000? | 10 [palindromes] |
| 10 | How many positive integer factors are there for 1256? | 8 [factors] |

## COLLEGE KNOWLEDGE BOWL ROUND #6 – SET 6

| # | Problem | Answer |
|---|---------|--------|
| 1 | Angel has thirty cards numbered 1 through 30. If she randomly draws one, as a reduced common fraction, what is the probability that it is a multiple of 7? | 2/15 or 2 out of 15 or 2 over 15 |
| 2 | The following sequence of operations is performed on a number: Add 7, multiply by 4, add 28, and divide by 8. If the answer at the end is 7, what was the original number? | 0 |
| 3 | In terms of pi, what is the number of square centimeters in the area of a circle with radius 17 centimeters? | $289\pi$ [sq. cm] |
| 4 | What is the greatest common factor of 91 and 143? | 13 |
| 5 | Solve for X:   5X plus 3 equals X plus 51 | [X =] 12 |
| 6 | What is the sum of the first 12 positive integers? | 78 |
| 7 | A pentagon has three angles whose measures are 96 degrees, 108 degrees, and 112 degrees. What must be the number of degrees in the average of the measures of the remaining two angles? | 112 [degrees] |
| 8 | What is the number of units in the distance between the points negative 6 comma 14 and 18 comma negative 4 | 30 [units] |
| 9 | Chelsea is painting a mural. She can paint 4 square feet in an hour. After each hour of painting she has to take a fifteen minute break to stretch. How many hours will it take her to paint a total of 36 square feet? | 11 [hours] |
| 10 | What is the number of inches in the diameter of a cone with a volume of 100 pi cubic inches and a height of 12 inches? | 10 [inches] |

# "Math is Cool" Masters – 2016-17
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### 7th Grade – December 10, 2016

## COLLEGE KNOWLEDGE BOWL ROUND – EXTRA

| # | Problem | Answer |
|---|---------|--------|
| 1 | In terms of pi, what is the number of square centimeters in the surface area of a sphere with radius 7 centimeters? | 196 pi [sq. cm] |
| 2 | What is the eighteenth term in the arithmetic sequence whose first three terms are 3, 8, and 13? | 88 |
| 3 | Angle A is complimentary to angle B, and angle B is supplementary to angle C. If angle C is part of a triangle whose other two angles have measures 35 degrees and 50 degrees, what is the number of degrees in the measure of angle A? | 5 [degrees] |
| 4 | What number does N stand for, if 3 to the power of 2N is 729? | 3 |
| 5 | As a common fraction, what is the probability that the roll of two fair six sided die creates a sum of 7 or smaller? | 7/12 or 7 out of 12 or 7 over 12 |
| 6 | A boat is travelling to its destination at a constant speed. At 2:30pm it is one quarter of the way there, and at 5pm it is two thirds of the way. How many hours did the entire trip take? | 6 [hours] |
| 7 | Judy's strides are two feet long, and Nick's strides are 2.5 feet long. Judy takes two strides per second, and Nick takes four strides every three seconds. If they start in the same place at the same time going the same direction, how many feet apart will they be after 30 seconds? | 20 [feet] |
| 8 | In terms of pi, what is the number of cubic inches in the volume of a right circular cone with a radius of 4 inches and a height of 6 inches? | 32 pi [cubic inches] |

# "Math is Cool" Masters -- 2016-17

School: _____ Room # _____ Team # _____

Name: _____ Proctor: _____

7th & 8th Grade     <u>Mental Math</u> – 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.*

| | Answer | 1 or 0 | 1 or 0 |
|---|---|---|---|
| **1** | [x =] 20 | | |
| **2** | 12 [apples] | | |
| **3** | 18 [centimeters] | | |
| **4** | 14 | | |
| **5** | 43 [revolutions per minute] | | |
| **6** | 4 [ways] | | |
| **7** | 9 [solutions] | | |
| **8** | 11/36 | | |
| | | | |

# Math is Cool" Masters – 2016-17
## 7th Grade – December 10, 2016

Student Name _____

Proctor Name _____ Room # _____

**SCHOOL NAME** _____ **Team #_____**

**INDIVIDUAL MULTIPLE CHOICE - 15 minutes – 10 problems – 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. It is not necessary to write your personal name on the test, but you may put it at the bottom of the test so your coach will be able to give you back the correct test. This test is taken individually, but it is part of your team score, including zeros for missing team members. Your team score will be calculated by taking the mean of your four team members' scores. When you are prompted to begin, tear off the colored sheet and begin testing.* **Since this is a multiple choice test, ONLY a letter response should be indicated as an answer on the answer sheet.** *No talking during the test.*

## DO NOT WRITE IN SHADED REGIONS

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

# "Math is Cool" Masters – 2016-17
## 7th Grade – December 10, 2016

Final Score:
## KEY

**SCHOOL NAME** _____ **Team #** _____

First Score

Proctor Name _____ Room # _____

(out of 10)

## 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 | 3000 [seconds] | | |
| 2 | 16 [sums] | | |
| 3 | 12 [cm$^2$] | | |
| 4 | 45 [integers] | | |
| 5 | $\frac{7}{4}$ | | |
| 6 | 170 [feet] | | |
| 7 | 2 [factors] | | |
| 8 | 63 [games] | | |
| 9 | $18 - 3\sqrt{3}$ [cm$^2$] | | |
| 10 | 7560 [lineups] | | |
| | | | |

# "Math is Cool" Masters – 2016-17
## 7th Grade – December 10, 2016

Final Score:

## KEY

Proctor Name _____ Room # _____

First Score

**SCHOOL NAME** _____ **Team #_____**

**PRESSURE ROUND - 10 minutes – 5 problems - 5 rounds – 15% of team score**

*When it is time to begin, you will be handed a packet of five problems. There is a copy of the problems for each team member. Two minutes after the start of the test you are expected to submit an answer for one of the problems (it can simply be a guess). The maximum value of this answer is 1 point. In another two minutes you are expected to submit another answer to one of the four remaining problems; its maximum value is two points. This process will continue until all the problems are answered and each consecutive problem's worth will go up by one point. You must submit your answers on the colored sheets given to you. If you do not have an answer at the end of a two minute period, you must still submit an answer sheet with an identified problem number on it. Failure to do so will result in loss of points. This event is timed, and you will be given a verbal 5 second warning and told to hold your answer sheet up in the air. You may keep working as the sheets are collected. If a team answers the same question more than once, only the first answer will be scored and the other attempts will be ignored.*

## Pressure Round Answers

| | Answer |
|---|---|
| 1 | 891 [integers] |
| 2 | [E =] [$0].3[0]b + [$]1200 or equivalent (min required: .3b + 1200) |
| 3 | 17 [centimeters] |
| 4 | 1 |
| 5 | 7 [letters] |

# "Math is Cool" Masters -- 2016-17

School: _____ Room # _____ Team # _____

Name: _____ Proctor: _____

7th & 8th Grade  <u>Mental Math</u> – 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.*

| | Answer | 1 or 0 | 1 or 0 |
|---|---|---|---|
| **1** | | | |
| **2** | | | |
| **3** | | | |
| **4** | | | |
| **5** | | | |
| **6** | | | |
| **7** | | | |
| **8** | | | |
| | | | |

# Math is Cool" Masters – 2016-17
## 7th Grade – December 10, 2016

Final Score:

Student Name _____

Proctor Name _____ Room # _____

**SCHOOL NAME** _____ **Team #_____**

First Score

(out of 20)

**INDIVIDUAL MULTIPLE CHOICE - 15 minutes – 10 problems – 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. It is not necessary to write your personal name on the test, but you may put it at the bottom of the test so your coach will be able to give you back the correct test. This test is taken individually, but it is part of your team score, including zeros for missing team members. Your team score will be calculated by taking the mean of your four team members' scores. When you are prompted to begin, tear off the colored sheet and begin testing.* **Since this is a multiple choice test, ONLY a letter response should be indicated as an answer on the answer sheet.** *No talking during the test.*

## 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" Masters – 2016-17
## 7th Grade – December 10, 2016

Final Score:

**SCHOOL NAME** _____ **Team #** _____

Proctor Name _____ Room # _____

First Score

(out of 10)

## 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 | | | |
| | | | |