Name: $\qquad$
School: $\qquad$
Grade: $\qquad$

## Round 1: Multiple Choice Test

There are 30 problems in this round. You will have 60 minutes to complete the test. Make sure to bubble in your answer sheet. Correct answers are worth 6 points each. There is no penalty for incorrect answers. Have fun!

## Problem 1

Nicole can throw a ball up in the air three times as far as her friend. If Nicole can throw a certain ball up 96 feet, how many feet up can her friend throw the ball?
A. 24
B. 28
C. 30
D. 32
E. 40

## Problem 2

If all the prime numbers in the world are multiplied together, what is the units digit of this product?
A. 0
B. 1
C. 5
D. 6
E. 9

## Problem 3

Maddie has 9 pairs of shoes. Her first brother has 3 pairs less than her, and her second brother has twice the number of shoes as the first brother. How many shoes do all three have together?
A. 18
B. 27
C. 30
D. 33
E. 36

## Problem 4

Harry has 4 sisters and 5 brothers. His sister Harriet has $S$ sisters and $B$ brothers. Find the product of $S$ and $B$.
A. 10
B. 12
C. 15
D. 18
E. 20

## Problem 5

The area of a circle is less than $50 \pi$ square units. What is the sum of all the possible integer radii of the circle?
A. 20
B. 25
C. 28
D. 33
E. 36

## Problem 6

What is the least positive integer divisible by the four smallest composite integers?
A. 216
B. 192
C. 72
D. 36
E. 8

## Problem 7

One right triangle has hypotenuse of length 13, and another leg of length 5. Another right triangle has hypotenuse of length 10 , and another leg of length 8 . What is the ratio of the area of the smaller triangle to the area of the larger triangle, expressed as a common fraction?
A. $5 / 8$
B. $10 / 13$
C. $4 / 5$
D. $2 / 3$
E. $1 / 2$

## Problem 8

The sum of two positive integers is 12 and the sum of their squares is 80 . What is the positive difference between these two integers?
A. 4
B. 5
C. 6
D. 7
E. 8

## Problem 9

Caleb is four years older than his brother and six years older than his sister. The sum of all their ages is 32 . How old will Caleb be 5 years from now?
A. 14
B. 23
C. 22
D. 21
E. 19

## Problem 10

A 60 -foot by 20 -foot garden is enclosed by a fence. To increase the area of the garden, while still using the same fence, its shape is changed to a square. How much larger is the area of the garden now than before?
A. 100
B. 120
C. 400
D. 900
E. 1600

## Problem 11

What is the minimum possible product of three different numbers of the set $\{-8,-6$, $-4,0,3,7\}$ ?
A. 0
B. -168
C. -192
D. -280
E. -336

## Problem 12

The ratio of Hanna's allowance to Lucy's allowance is 4:7. The ratio of Lucy's allowance to Aria's allowance is 10:11. What is the ratio of Hanna's allowance to Aria's allowance?
A. $35 / 77$
B. $40 / 77$
C. $14 / 55$
D. $4 / 11$
E. $9 / 11$

## Problem 13

How many letters in MATHMATTERS have a vertical line of symmetry?
A. 4
B. 5
C. 7
D. 8
E. 9

## Problem 14

The perimeter of a rectangular garden is 90 feet. If the length of the field is twice the width, what is the area of the field, in square feet?
A. 360
B. 450
C. 500
D. 720
E. 900

## Problem 15

When an integer is randomly selected from 40 to 50 inclusive, what is the probability of NOT selecting a prime integer? Express your answer as a common fraction.
A. $3 / 10$
B. $7 / 10$
C. $3 / 11$
D. $8 / 11$
E. $3 / 4$

## Problem 16

Seven identical cubic blocks are glued together as shown below. Each face of every cube has area 2 . What is the total surface area of the entire solid?
A. 56
B. 28
C. 102
D. 14
E. 16


## Problem 17

If the pattern $3,6,9,3,6,9,3,6,9, \ldots$ repeats forever, what is the product of the 131st and 113th terms?
A. 18
B. 27
C. 36
D. 54
E. 81

## Problem 18

Five friends are having their pictures taken. If they can only take pictures in groups of 2,3 , or 5 people, in how many total different ways can the pictures be taken? Note that order two groupings of people are considered identical if one can be rearranged into another.
A. 30
B. 50
C. 21
D. 26
E. 28

## Problem 19

Shay and Ashley are baking chocolate chip cookies for a party. The recipe they use calls for $7 / 6$ cups of flour for one dozen cookies. Each person will consume an average of three cookies. If they need to make enough for themselves and 70 other guests, how many cups of flour will Shay and Ashley need?
A. 12
B. 15
C. 18
D. 20
E. 21

## Problem 20

What is the area of the quadrilateral with vertices $A(-1,0), B(3,0), C(2,-6)$ and $\mathrm{D}(1,-2)$ ?
A. 9
B. 10
C. 12
D. 15
E. 16

## Problem 21

What is the surface area of a rectangular prism if the volume is 23 cubic units, and the side lengths of the prism are integers?
A. 92
B. 94
C. 138
D. 126
E. 98

## Problem 22

Max makes 70\% of his free throws in a particular practice. During this practice, he misses six free throws. How many of the total free throws he takes does he make?
A. 12
B. 14
C. 16
D. 18
E. 20

## Problem 23

At The Brew, the local café, the ratio of cold drinks to hot drinks sold is 7:8. 480 total drinks were sold this week. How many cold drinks did The Brew sell?
A. 250
B. 240
C. 236
D. 224
E. 214

## Problem 24

Two right triangles with integer side lengths have areas of 6 and 150 . What is the difference of their perimeters?
A. 72
B. 65
C. 60
D. 50
E. 48

## Problem 25

I can swim 4 miles per hour, bike at 15 miles per hour, and run at 8 miles per hour. How many minutes would it take me to complete a mini-triathlon that consists of 1 mile swimming, 25 miles biking, and 6 miles running?
A. 120 minutes
B. 130 minutes
C. 140 minutes
D. 150 minutes
E. 160 minutes

## Problem 26

There are 12 ice cream flavors available at the ice cream store, and 4 distinct toppings. How many choices of cones can Ian choose from, if a cone consists of two distinct types of ice cream and one topping? (Topping must go on top of the two scoops and order of the scoops does matter)
A. 528
B. 264
C. 1024
D. 48
E. 12

## Problem 27

Triangles BDC and ACD share a side and are both isosceles. If $\angle \mathrm{ABC}=70^{\circ}$, what is $\angle B A C$, in degrees?
A. 60
B. 55
C. 45
D. 40
E. 35

## Problem 28



What is the value of the following: 1-2 + $3-4+\ldots-2016+2017$ ?
A. 1006
B. 1007
C. 1008
D. 1009
E. 1010

## Problem 29

How many ways are there to arrange the letters in the word PRETTY?
A. 360
B. 400
C. 480
D. 720
E. 780

## Problem 30

A 3 in $\times 3$ in square is surrounded by a border consisting of all points in the plane of the square that are within 1 inch of the square and not in the square. In square inches, what is the area of the border? Express your answer in terms of $\pi$ (pi).
A. $\pi+6$
B. $\pi+12$
C. $\pi+9$
D. $9-\pi$
E. $12-\pi$


