

# 2019 Mini-Mathletes Competition 

## Name: <br> School: <br> Grade: 45

## Rules:

1. You will have 60 minutes to complete the exam.
2. The exam consists of 30 problems each with five choices.
3. Each correct answer is worth 6 points and there is NO penalty for guessing so you should answer every problem!
4. No calculators, phones, smartwatches, or any other aids are allowed during the test.
5. If you finish before time is called, review your answers. When time is called, stop and put your pencil down. You may not answer any more questions after this point.
6. If you need a pencil or scratch paper during the test, raise your hand.
7. Figures are not necessarily drawn to scale.

## Problems:

1. A school store bought 575 pencils and 168 erasers to sell for its students. This morning, students bought 119 pencils and 73 erasers. How many total pencils and erasers are left?
(A) 551
(B) 552
(C) 562
(D) 583
(E) 661
2. I have 2 quarters, 7 dimes, 5 nickels, and 12 pennies. How many cents do $I$ have in total?
(A) 138
(B) 147
(C) 157
(D) 252
(E) 263
3. Peter walked $3 \frac{1}{2}$ kilometers. Eric walked $\frac{1}{4}$ kilometer more than Peter. Andy walked $2 \frac{2}{5}$ kilometer less than Eric. How far did Andy walk?
(A) $1 \frac{7}{20}$
(B) $3 \frac{7}{20}$
(C) $4 \frac{3}{20}$
(D) $6 \frac{3}{20}$
4. Joseph runs at a constant speed of 8 miles per hour for 30 minutes, and takes a break afterwards. Then, he runs at a constant speed of 10 miles per hour for 15 minutes. How many total miles has he traveled?
(A) 5
(B) 5.5
(C) 6.5
(D) 7
(E) 7.5
5. I have a picture that is 10 inches wide and 6 inches tall. I put this picture in a frame that is 1 inch thicker on each side. What is the area of the shaded frame?

(A) 16
(B) 18
(C) 36
(D) 60
(E) 64
6. Melissa purchased $\$ 39.46$ in groceries at a store. The cashier gave her $\$ 1.48$ in change from a $\$ 50$ bill. How much more change should the cashier have given Melissa?
(A) $\$ 8.96$
(B) $\$ 9.06$
(C) $\$ 9.72$
(D) $\$ 10.54$
(E) $\$ 11.68$
7. Daniel has 12 lollipops, Emma has 21 lollipops, and Jack has 29 lollipops. Jack gives Emma some lollipops. Then Emma gives Daniel some lollipops. Now, Jack has 2 more lollipops than both Daniel and Emma. How many lollipops did Emma give to Daniel?
(A) 4
(B) 5
(C) 6
(D) 7
(E) 8
8. Alice, Bob, Carl, Dave, and Evan want to play enough games of chess to be sure every one plays everyone else exactly once. What is the least number of total games they need to play?
(A) 15
(B) 20
(C) 25
(D) 30
(E) 35
9. How many ways can 35 cents be split into change using nickles, dimes, and quarters?
(A) 3
(B) 4
(C) 5
(D) 6
(E) 7
10. What is the area of a triangle with vertices at the points $(2,0),(3,1)$, and $(5,6)$.
(A) 1
(B) 1.5
(C) 2
(D) 2.5
(E) 3
11. Given the concave quadrilateral $A B C D$ and interior angles at $A, B$, and $C$, find $\angle C D A$.

(A) $188^{\circ}$
(B) $190^{\circ}$
(C) $192^{\circ}$
(D) $202^{\circ}$
(E) $210^{\circ}$
12. On a circus bike with two circular wheels, the front wheel has a radius of 2.5 feet and the back wheel has a radius of 4 inches. While the front wheel makes 100 revolutions, how many will the the back wheel make?
(A) 600
(B) 650
(C) 700
(D) 750
(E) 800
13. Annie and Allie are building a toy dollhouse (which consists of a right rectangular prism and a right triangular prism on top) together. If the volume of only the rectangular prism 720 cubic units, what is the volume of the entire dollhouse?

(A) $780 u^{3}$
(B) $840 u^{3}$
(C) $880 u^{3}$
(D) $900 \mathrm{u}^{3}$
(E) $920 u^{3}$
14. Rafael is tiling the floor of his 12 -foot by 16 -foot living room. He wants to place 1 foot by 1-foot square tiles to form a border along the edges of the room and to fill in the rest of the floor with 2 -foot by 2 -foot square tiles. How many total tiles will he use?
(A) 72
(B) 78
(C) 81
(D) 87
(E) 96
15. Mason's teacher told him that his average test score in his math class is 83 . He has taken seven tests and received scores of $88,73,81,83,79,94$, and $x$ (an unknown score). If Mason calculates correctly, what is his last test score?
(A) 73
(B) 83
(C) 84
(D) 85
(E) 89
16. On Mars, I go to a shopping mall. I have 2 Oompas to spend. 1 Oompa is equal to 18 Loompas. 3 Loompas is equal to 16 Lampas. 4 Lampas is equal to 14 Mampas. If I buy a pair of shoes for 500 Mampas, how many Mampas should I get back in change?
(A) 172
(B) 198
(C) 210
(D) 224
(E) 248
17. Catherine is in charge of making smoothies for a large party. To make the smoothies, she uses four types of fruit. She adds 4 cups of strawberries, 1.5 times that amount of blueberries, and an equal amount of both mangoes and bananas. If Catherine added a total of 16 cups of fruit to her smoothie, what percent was just mangoes?
(A) 12.5
(B) 16
(C) 18.75
(D) 20.25
(E) 25
18. Grace is creating an art project for school. She cuts out two congruent circles $A$ and $B$ of radius 4 and a smaller circle $C$. Grace glues the three these circles on top of a larger circle so that they are all tangent (touching at one point) to each other. What is the radius of $C$ ?

(A) 2
(B) $\frac{9}{4}$
(C) $\frac{8}{3}$
(D) $\frac{5}{2}$
(E) $\frac{12}{5}$
19. If $x @ y=\frac{1}{x}+\frac{1}{y}$ then what is the value of $2 @(6 @ 9)$ ?
(A) $\frac{27}{10}$
(B) $\frac{7}{2}$
(C) $\frac{18}{5}$
(D) $\frac{39}{10}$
(E) $\frac{41}{10}$
20. A palindrome is a whole number that reads the same forwards and backwards. If one neglects the colon, certain times displayed on a digital watch in 12-hour format are palindromes. Three examples are: 1:01, 4:44, and 12:21. How many times during a 12 -hour period will be palindromes?
(A) 40
(B) 45
(C) 48
(D) 54
(E) 57
21. There are 4 men and 5 women in a small office, but only a group of 2 men and 2 women can go to a special conference. How many different groups can be formed from the office?
(A) 52
(B) 60
(C) 72
(D) 80
(E) 96
22. What is the value of $1+3+5+\cdots+2017+2019-2-4-6-\cdots-2016-2018$ ?
(A) -2020
(B) -1010
(C) 0
(D) 1010
(E) 2020
23. A 20-gallon container is filled halfway with a mixture that is $90 \%$ vinegar and $10 \%$ water. How many gallons of water must be added for the mixture to become $60 \%$ vinegar and $40 \%$ water?
(A) 8
(B) 10
(C) 12
(D) 15
(E) 16
24. A bag of gummy bears contains 8 blue, 5 red, and 3 orange. You pick two at random by first picking one, eating it, and then picking the second. What is the probability (chance) that both gummy bears picked will be blue?
(A) $\frac{1}{5}$
(B) $\frac{7}{30}$
(C) $\frac{1}{2}$
(D) $\frac{8}{15}$
(E) $\frac{5}{8}$
25. If I draw 3 lines and 1 circle on a sheet of paper, what is the maximum number of points on the paper that lie on at least two of the figures?
(A) 9
(B) 11
(C) 14
(D) 19
(E) 20
26. The sum of four numbers $w, x, y$, and $z$ is 64 , where $w<x<y<z$. The sum of $z$ and $w$ is twice the mean of all the numbers. The number x is half the largest number. What is the value of $y$ if $w=4$ ?
(A) 8
(B) 10
(C) 18
(D) 26
(E) 30
27. Jane rolls a fair six-sided dice three times. What is the probability (chance) that the second roll is greater than both the first roll and the third roll?
(A) $\frac{145}{216}$
(B) $\frac{1}{3}$
(C) $\frac{5}{16}$
(D) $\frac{25}{72}$
(E) $\frac{55}{216}$
28. How many different patterns can be made by shading exactly two of the nine squares in a 3 by 3 grid? Patterns that can be matched by reflections and / or rotations are not considered different. For example, the patterns shown below only count once.

(A) 6
(B) 8
(C) 9
(D) 12
(E) 21
29. The cube $A B C D E F G H$ shown below has midpoints $J$ (on $F B$ ) and $I$ (on $H D$ ). If the cube has a side length of 4 , what is the area of the shaded region?

(A) $4 \sqrt{3}$
(B) 16
(C) $8 \sqrt{3}$
(D) $8 \sqrt{6}$
(E) 24
30. A bike leaves City A travelling at a speed of 10 mph (miles per hour). 21 minutes later a car leaves City A travelling in the same direction at 40 mph . How much distance has each vehicle traveled when they meet?
(A) $\frac{15}{2}$
(B) 7
(C) $\frac{41}{6}$
(D) $\frac{14}{3}$
(E) $\frac{19}{5}$
