

## Academic Fest 2019 – Middle School, Sample Question (General Math)

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### Rules for General Math

- 1. Eligibility:** Students entering grades 6<sup>th</sup> through 8<sup>th</sup> in school year 2019 – 2020.
  - 2. About the Test:**
    - a. Time : 45 minutes
    - b. Questions : 50
    - c. All the questions have multiple choice answers. All problems have ONE and ONLY ONE correct [BEST] answer. There is penalty for all incorrect answer.
    - d. All problems answered correctly are worth FIVE points. TWO points will be deducted for all problems answered incorrectly. No points will be added or subtracted for problems not answered.
    - e. Calculators MAY NOT be used on this test.
    - f. In case of ties, percent accuracy will be used as a tie breaker.
    - g. Calculators, books, scrap papers or any supporting documents will not be allowed in the test room. Contestants will be provided with the scrap papers, pencil and eraser. However, they are allowed to bring their own pencils and eraser.
  - 3.** Contestants should arrive on time to get benefit of the full duration of 45 minutes. If any contestant arrives after the beginning of the contest, he/she will get only the remaining time to finish the contest.
  - 4.** Each contestant must write his/her contestant ID only on the answer-sheet for the answer-sheet to be evaluated.
  - 5.** Each contestant must return the answer sheet to the coordinator at the end of the test duration.
  - 6.** No Parents/Guardians/visitors will be allowed in the test room during the test.
  - 7.** The judges' decisions will be final.
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### Questions:

1. If the length of the rectangle is  $3x$ , width  $2x$ , and its perimeter is 80. What is the value of  $x$ ?
  - a. 4
  - b. 8**
  - c. 10
  - d. 12

## Academic Fest 2019 – Middle School, Sample Question (General Math)

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- e. 16
2. In a rectangle, the length  $x$  is half the width  $y$ . What is the area of the rectangle in terms of  $y$ ?
- $(1/2)y$
  - $y/4$
  - $2 \cdot y \cdot y$
  - $y \cdot y$
  - $(y \cdot y)/2$**
3. The area of a circle with radius 6 is how many times the area of a circle with radius 2?
- 9**
  - 3.14
  - 3
  - 1
  - $1/3$
4. Find the smallest of three consecutive even integers whose sum is 48.
- 8
  - 10
  - 12
  - 14**
  - 16
5. Find the largest of three consecutive odd integers such that the sum of the first and the second is 27 less than 3 times the third.
- 17
  - 19
  - 21**
  - 23
  - 25
6.  $[3 + (-1) + 2]^2 =$
- 8
  - 12
  - 14
  - 16**
  - 36
7. A basketball team averages 98 points in its first three games. How many points must it score in the next game in order to have a 100 point average overall?
- 102
  - 104
  - 108
  - 112
  - 106**
8. In a certain company, 5 employees earn \$16000 a year, 3 employees earn \$20000, and 2 employees earn \$24000 a year. What is the average annual salary of these employees?
- \$18000**
  - \$20000

## Academic Fest 2019 – Middle School, Sample Question (General Math)

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- c. \$19729  
d. \$19200  
e. \$18000
9. Your uncle smokes 2 packs of cigarettes per day. If cigarettes cost \$3 per pack, how much does smoking cost your uncle in the year 2003?
- a. 312  
b. 730  
c. 1095  
d. 1460  
e. **2190**
10.  $(\frac{1}{2} - \frac{1}{3}) * (\frac{2}{3} + \frac{1}{6})$
- a.  $\frac{1}{18}$   
b.  $\frac{1}{9}$   
c.  **$\frac{5}{36}$**   
d.  $\frac{5}{18}$   
e. 1
11. Oscar has 15 marbles. If he gives  $\frac{1}{3}$  of his marbles to Sally and  $\frac{1}{5}$  of the rest to Mike, how many marbles does Oscar have left?
- a. 1  
b. 3  
c. 5  
d. 7  
e. **8**
12. Which of the following is greater than  $\frac{3}{5}$ ?
- a.  $\frac{1}{2}$   
b.  $\frac{2}{7}$   
c.  $\frac{6}{11}$   
d.  $\frac{5}{9}$   
e.  **$\frac{2}{3}$**
13. Ian owns a collection of 60 baseball cards. If he gives  $\frac{1}{5}$  of his collection to his friend Kevin and  $\frac{1}{4}$  of the remainder to his friend Paul, how many baseball cards does Ian have left?
- a. 54  
b. **36**  
c. 33  
d. 24  
e. 3
14.  $30.3 / 4.04 =$
- a. 0.75  
b. 1.01  
c. **7.5**  
d. 10.1  
e. 75
15. The average (or mean) number of letters in the names for the first ten counting number, ONE, TWO,...,TEN, is

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- a. 3.7  
b. 3.8  
c. **3.9**  
d. 4  
e. more than 4
16. Lenny can bench press 320 pounds. Ollie can press 400 pounds. The weight Ollie can bench is what percent greater than the weight Lenny can bench press?  
a. 20%  
b. **25%**  
c. 32%  
d. 40%  
e. 80%
17. Forty percent of  $\frac{1}{8}$  of what is 20?  
a. **400**  
b. 320  
c. 100  
d. 4  
e. 1
18. If 12 is 20% of 40% of a certain number, what is the number?  
a. 20  
b. 24  
c. 72  
d. 96  
e. **150**
19.  $1 + \frac{5}{10} + \frac{3}{1000} + \frac{9}{10000} =$   
a. 1.539  
b. 1.5309  
c. **1.5039**  
d. 1.50309  
e. 1.5039
20. What is the sum of the roots of the equation  $x^2 + x - 20 = 0$ ?  
a. 1  
b. **-1**  
c. 9  
d. -9  
e. 0
21. Of the 400 people in an auditorium,  $\frac{1}{4}$  are wearing hats. Of those,  $\frac{1}{5}$  is wearing fedoras. How many people in the auditorium are not wearing fedoras?  
a. 20  
b. 80  
c. 180  
d. 220  
e. **380**
22. If the fractions  $\frac{1}{2}$ ,  $\frac{2}{5}$ ,  $\frac{3}{8}$ ,  $\frac{4}{11}$ , and  $\frac{5}{7}$  were ordered from least to greatest, the second smallest number in the resulting sequence would be

## Academic Fest 2019 – Middle School, Sample Question (General Math)

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- a.  $\frac{1}{2}$
- b.  $\frac{2}{5}$
- c.  **$\frac{3}{8}$**
- d.  $\frac{4}{11}$
- e.  $\frac{5}{7}$

23. Chris plays solitaire at the constant rate of 5 hands in 20 minutes. How many hands of solitaire can Chris play in 2 hours?

- a. 6
- b. 9
- c. 12
- d. 18
- e. **30**

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## Academic Fest 2019 – Middle School, Sample Question (General Math)

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24. A bottle-capping machine caps 12 bottles per minute. How many minutes does the machine take to cap 30 bottles?
- 2.5**
  - 5
  - 6
  - 12
  - 60
25. The average of 4 numbers is 5.5. When an additional number is included, the average of all 5 numbers is 6. What is the additional number?
- 5.75
  - 6.5
  - 8.0**
  - 22.0
  - 30.0
26. The average of 2, 4, 6, and 8 equals the average of 1, 3, 5, and
- 7
  - 9
  - 10
  - 11**
  - 12
27. If  $x$  is not equal to 2, then  $(5x+10)/(x+2) =$
- 2
  - 3
  - 4
  - 5**
  - 6
28. If  $(1/2)x + 12 = 4$ , then  $x =$
- 16**
  - 8
  - 4
  - 8
  - 6
29.  $(19 \cdot 19 + 19)/20 =$
- 19/10
  - 57/20
  - 19**
  - 38
  - 361
30. If Joe Bob was 25 years old 5 years ago, how old was he  $X$  years ago?
- $X - 30$
  - $X - 20$
  - $30 - X$**
  - $20 - X$
  - $20 + X$

## Academic Fest 2019 – Middle School, Sample Question (General Math)

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31. If  $x$  is an integer, which of the following must be odd?
- $3x$
  - $2x$
  - $3x+1$
  - $4x$
  - $4x+1$**
32. The distance from Town A to Town B is 5 miles and the distance from Town B to Town C is 4 miles. Which of the following could NOT be the distance, in miles, from Town A to Town C?
- 1
  - 4
  - 8
  - 9
  - 10**
33. If the product of  $xy$  is negative, which of the following must be true?
- $x < 0$
  - $y < 0$
  - $x/y > 0$
  - $x/y < 0$**
  - $x+y < 0$
34. How many factors of 42 are divisible by 3?
- 2
  - 3
  - 4**
  - 5
  - 6
35. Forty percent of  $1/8$  of what is 20?
- 400**
  - 320
  - 100
  - 4
  - 1
36. If the ratio of male students to female students in a philosophy class is 3:5, and there are a total of 40 students in the class, how many female students are in the class?
- 8
  - 15
  - 16
  - 24
  - 25**
37. Point C and D lie on line segment AB. C is the midpoint of AB, and the length of CD is  $1/3$  the length of CB. If the length of CD is 2, what is the length of AB?
- 8
  - 10
  - 12**
  - 16
  - 24

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---

38. In an isosceles triangle the base is 10 cm and the area of the triangle is 60 square centimeters, what is its perimeter, in centimeters?
- 18
  - 24
  - 30
  - 36**
  - 48
39. Two opposite sides of a rectangular piece of length 10 inches and width 6 inches are joined without overlap to form a cylinder of maximum height. Of the following, which is the best approximation of the radius of the base of the cylinder, in radius?
- 1**
  - 2
  - 3
  - 5
  - 6
40. If  $j$  and  $k$  are integers and  $j + k = 2j + 4$ , which of the following must be true?
- $j$  is even
  - $k$  is even
  - $k - j$  is even
- none
  - I only
  - II only
  - III only**
  - I, II and III
41. How many degrees are between the hands of a clock at 3:30?
- 105 degrees
  - 90 degrees
  - 75 degrees**
  - 37 degrees
  - 70 degrees
42. The angles of a triangle are in the ratio of 2:5:8. How many degrees are in the largest angle?
- 83 degrees
  - 48 degrees
  - 20 degrees
  - 104 degrees
  - 96 degrees**
43. A cube has a surface area of 150 sq. ft. What is its volume, in cu. ft.?
- 300
  - 125**
  - 900
  - 625
  - 150

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44. After traveling 220 miles, Peter completed  $\frac{4}{5}$  of his trip. How far does he still have to travel?
- 27.5
  - 44
  - 55**
  - 176
  - 275
45. There are 2 girls for every 1 boy in a class. If there are 10 girls in a class, how many boys are there?
- 10
  - 2
  - 4
  - 6
  - 5**
46. Fred has a jarful of nickels, dimes, and quarters, in the ratio of 2:5:10, respectively. If the total value of these coins is \$15.50, how many dimes are in Fred's jar?
- 17
  - 25**
  - 50
  - 85
  - 155
47. Five friends play blackjack in Las Vegas and lose an average of \$100 each. If the losses of the friends total \$380, what is the average loss of the other friends?
- \$40**
  - \$60
  - \$100
  - \$120
  - \$1900
48. A set of 10 numbers has an average of 12. When a subset of numbers, which has an average of 15, is removed from the original set, the sum of the remaining numbers is 60. How many numbers remain from the original set?
- 3
  - 4
  - 5
  - 6**
  - 8
49. The latest model of space shuttle can achieve a maximum speed of 25 miles per second. This maximum speed is how many miles per hour?
- 1500
  - 3600
  - 9000
  - 15000
  - 90000**
50. If a laser printer can print 2 pages in 10 seconds, how many pages can it print in 3 minutes at the same rate?
- 5
  - 12

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- c. 18
- d. 36
- e. 60

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