

2015-2016 年度美国“数学大联盟杯赛”(中国赛区)初赛

(七年级)

(初赛时间: 2015年11月14日, 考试时间90分钟, 总分200分)

学生诚信协议: 考试期间, 我确定没有就所涉及的问题或结论, 与任何人、用任何方式交流或讨论, 我确定以下的答案均为我个人独立完成的成果, 否则愿接受本次成绩无效的处罚。


如果您同意遵守以上协议请在装订线内签名

选择题: 每小题5分, 答对加5分, 答错不扣分, 共200分, 答案请填涂在答题卡上。

- Of the following, which has the largest value?
A) 2016 B) 20×16 C) 201×6 D) $20 + 16$
- I have worked for a number of days equal to the product of five consecutive positive integers. I may have worked for ? days.
A) 64 B) 100 C) 120 D) 360
- The product of a 3-digit number and a 5-digit number at most has ? digits.
A) 7 B) 8 C) 9 D) 10
- What is the sum of the greatest common factor of 16 and 20 and the least common multiple of 16 and 20?
A) 36 B) 76 C) 81 D) 84
- The volume of a cube is a perfect fourth power. Which of the following could be the length of an edge of the cube?
A) 4 B) 8 C) 16 D) 32
- Today, Jerry read part of a book starting on top of page 17 and finishing on the bottom of page 45. How many pages did he read?
A) 27 B) 28 C) 29 D) 30
- Using the 24-hour notation, what is the time 72960 seconds after midnight?
A) 08:15 B) 08:16 C) 20:15 D) 20:16
- How many odd positive primes are less than 30?
A) 8 B) 9 C) 10 D) 11
- $10(100 + 1) + 10(100 + 2) + 10(100 + 3) + 10(100 + 4) =$?
A) 4100 B) 5000 C) 5100 D) 6100
- SuperDan has been working efficiently in painting houses. He painted a whole number of houses on each of three days. If the product of these three numbers is a prime, he could have painted a total of ? houses.
A) 17 B) 23 C) 26 D) 43
- 12 years from now, Joe's age will be double what it is today. How old was Joe 10 years ago?
A) 2 B) 12 C) 22 D) 36

12. The measure of $\angle A$ is 50° . If $\angle B$ is complementary to $\angle A$ and supplementary to $\angle C$, what is the measure of $\angle C$?
- A) 40° B) 50° C) 100° D) 140°
13. The sum of five consecutive whole numbers is always
- A) odd B) even C) prime D) composite
14. At 1 PM, there are 256 apples on a tree. Half of the apples on the tree fall off each hour until only 1 apple is left on the tree. At what time will there be exactly 2 apples on the tree?
- A) 8 PM B) 9 PM
 C) 10 PM D) 11 PM
15. Which of the following is a prime?
- A) 91 B) 127 C) 789 D) 1661
16. What is the hundredths digit in the number 2.0152016×10^4 ?
- A) 2 B) 0 C) 1 D) 6
17. The length of one leg of a right triangle is 30. The hypotenuse of this triangle is 34. What is the area of this triangle?
- A) 240 B) 272 C) 480 D) 510
18. What is the maximum number of points of intersection of one circle and three different lines?
- A) 9 B) 10 C) 11 D) 12
19. Which of the following is *not* the reciprocal of a whole number?
- A) 0.125 B) 0.25 C) 0.5 D) 0.75
20. I have some \$1, \$5, \$10, \$20, \$50, and \$100 bills. If my bills have a total value of \$999, what is the minimum number of bills I have?
- A) 17 B) 18 C) 19 D) 20
21. Jack and Jill are climbing stairs starting from the first floor at the same time and travelling at constant speeds. When Jack reaches the 11th floor, Jill reaches the 6th floor. Which floor will Jill be at when Jack reaches the 15th floor?
- A) 7 B) 8 C) 9 D) 10
22. Set $A = \{10, 20, 30, 40, 50\}$. The numbers in set B are each 100 more than the corresponding numbers in set A . What is the range of set B ?
- A) 40 B) 100 C) 500 D) 540
23. The product of 12345679 and my number is a number with all its digits the same. My number could be
- A) 37 B) 60 C) 78 D) 81
24. The area of isosceles right triangle T is twice of that of square S . What is the ratio of the length of a leg of T to the length of a side of S ?
- A) 1:4 B) 1:2 C) 2:1 D) 4:1
25. How many integers between 1 and 100 have exactly 5 divisors?
- A) 0 B) 1 C) 2 D) 3



26. Math books are for sale! If you buy two books, you can get the third one for half price. If each book costs \$6, what is the least that you can pay for 2016 math books at this sale?
 A) 9999 B) 10080 C) 11088 D) 12096
27. If p is a prime, what is the product of the positive divisors of p^{10} ?
 A) p^{20} B) p^{40} C) p^{45} D) p^{55}
28. The sum of the first ? positive integers is 2016.
 A) 60 B) 61 C) 62 D) 63
29. 10 students in my class like mathematics, and 15 students in my class like English. If my class has 21 students, how many students like both mathematics and English?
 A) 4 B) 5 C) 6 D) 7
30. A regular polygon with each angle of measure 108° has ? sides.
 A) 5 B) 6 C) 7 D) 8
31. How many of the first 100 positive integers are double a prime?
 A) 15 B) 20 C) 25 D) 30
32. Cy can build a bridge in 3 years. Di can do the same task in 6 years. Working together, Cy and Di can build a bridge in ? years.
 A) 1 B) 1.5 C) 2 D) 2.5
33. I made a list of 2016 numbers. The first four numbers in order are 2, 0, 1, and 6. I continued to write these same four numbers in the same order until I have written 2016 numbers. What is the last digit I wrote?
 A) 2 B) 0 C) 1 D) 6
34. I am taking 10 tests this year. My average grade of the first 7 tests is 87. If my average grade on all 10 tests is a 90, what should my average be on the last 3 tests?
 A) 90 B) 93 C) 95 D) 97
35. In the diagram at the right, any two adjacent points in the same column or same row are the same distance apart. How many different squares may be drawn whose vertices are 4 of the points in this diagram?
 A) 12 B) 14 C) 18 D) 20
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36. The sum of ten different natural numbers is 69. The difference between the biggest number and smallest number is 10. What is the product of the biggest number and the smallest number?
 A) 20 B) 22 C) 24 D) 26
37. $\overline{2x9y1}$ is a five-digit number, and it is a perfect square. What is the value of $x^2 + 2xy + y^2$?
 A) 36 B) 49 C) 64 D) 81
38. The first two terms in a number sequence are 1 and 2. Starting from the 3rd term, each term is the ones digit of the sum of its two preceding terms. What is the 2015th term?
 A) 2 B) 3 C) 4 D) 5