

2015-2016 年度美国“数学大联盟杯赛”(中国赛区)初赛

(三、四年级)

(初赛时间: 2015 年 11 月 14 日, 考试时间 60 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。

1. Today is a crazy shopping day for my gym. I bought 50 soccer balls at \$24 each, and I bought 24 basketballs at \$34 each. How much did I spend in total?
A) \$816 B) \$1200 C) \$1700 D) \$2016
2. If the last two digits of a number are “84”, then the number must be divisible by:
A) 3 B) 4 C) 5 D) 6
3. 9 math books are for sale at a total of \$117. 12 dictionaries are for sale at a total of \$108. The price for one math book is ? more than the cost of one dictionary.
A) \$4 B) \$5 C) \$6 D) \$7
4. Which of the following lists puts the three types of angles in ascending order, according to their degree measures?
A) Right, acute, obtuse B) Obtuse, right, acute
C) Acute, right, obtuse D) Obtuse, acute, right
5. Amy is standing in a straight line of people. There are 200 people standing at her left and there are 300 people standing at her right. How many people are in the line?
A) 300 B) 301 C) 500 D) 501
6. Lucy worked from February 4th to February 20th. Then she took a break and worked from March 5th to March 16th. Lucy worked for ? days.
A) 26 B) 27 C) 28 D) 29
7. $3(84) + 6(58) = 6(?)$
A) 100 B) 113 C) 142 D) 144
8. The units digit of a perfect square *cannot* be
A) 1 B) 5 C) 8 D) 9
9. $6(10^6) + 5(10^5) + 4(10^4) + 3(10^3) + 2(10^2) + 1(10^1) =$
A) 654321 B) 6543210 C) 123456 D) 1234560
10. The units digit of the product of two consecutive integers cannot be
A) 0 B) 1 C) 2 D) 6
11. How many minutes are there from Feb. 5th 1:30 AM to Feb. 6th 11:06 AM?
A) 555 B) 576 C) 2000 D) 2016
12. A perfect number is a positive integer which is equal to the sum of its proper positive divisors. For example, 6 is a perfect number since $6 = 1 + 2 + 3$. Which of the following is a perfect number?



- A) 29 B) 101 C) 121 D) 496
13. The product of the first 36 positive integers is *not*
- A) even B) divisible by 5
C) divisible by 67 D) divisible by 72
14. SuperPat was running 1001 km. He took a break after every 11 km he ran. How many breaks did he take until he completed his run?
- A) 90 B) 91 C) 92 D) 93
15. To mortgage my car, I paid half of its price in the first month, then paid 1/10 of its original price in the second month. I still owe the car company \$10,000. The price of my car is ?
- A) \$10,000 B) \$15,000 C) \$20,000 D) \$25,000
16. The areas of a square and a rectangle are the same. The length of a side of the square is 6, and length of one side of the rectangle is 12. The perimeter of the square is ? than the perimeter of the rectangle.
- A) 6 less B) 6 more C) 12 less D) 12 more
17. What is the difference between the largest divisor of 2016 that is less than 2016, and the smallest divisor of 1001 that is larger than 1?
- A) 2015 B) 1008 C) 1007 D) 1001
18. In the 24-hour notation, the first two digits tell the user the number of hours past midnight. The second two digits tell the user the number of minutes past the last hour. If the time now is 11:01, what time will be 555 minutes from now using 24-hour notation?
- A) 08:16 B) 08:26 C) 20:16 D) 20:26
19. What is the sum of the first 63 positive integers given that the sum of the next 63 positive integers is 5985?
- A) 2016 B) 2025 C) 3879 D) 5832
20. Two sides of an isosceles triangles are 1 and 45. What is the perimeter of the triangle?
- A) 46 B) 47 C) 90 D) 91
21. If you double the radius of a certain circle, the area of the larger circle is ? times the area of the smaller circle.
- A) 2 B) 4 C) 8 D) 16
22. The product of 4 different primes has a total of ? positive divisors.
- A) 4 B) 5 C) 8 D) 16
23. Which of the following numbers is divisible by 3 but *not* divisible by 9?
- A) 333 B) 2015 C) 2016 D) 12345
24. Which of the following is the number of positive factors of 99^2 ?
- A) 15 B) 20 C) 24 D) 30
25. Running Man is running a certain distance at a constant speed of 300 m/min and can finish the entire distance in 3 hours. If he ran at a constant speed of 360 m/min, how many minutes less would it take him to run this distance?
- A) 30 B) 150 C) 180 D) 360
26. Monkeys love eating apples! A monkey eats apples in a basket. If it eats 5 apples per day, it can finish all the apples in the basket in more than 10 days, and the number of apples it eats on the last day is 3. If it



- eats 7 apples per day, it can finish all the apples in the basket in less than 10 days, and the number of apples it eats on the last day is 2. How many apples are there in the basket?
- A) 52 B) 54 C) 56 D) 58
27. N is a two-digit number. N divided by 2 is still a two-digit number. M is a two-digit number after switching the ones digit and tens digit of $N/2$. The product of seven and half of M is equal to N . What is the possible value of N ?
- A) 98 B) 84 C) 70 D) 56
28. Professor Tony has 9 hats each tagged with one of the numbers 1 to 9 respectively. Professor Tony lets each of his six boy students wear a hat, and throws away the remaining 3 hats (the students don't know which hats are thrown away). Each student can see the numbers on the hats of other students, but not the number on his own hat. Then Professor Tony writes a number on the blackboard and tells each student to raise his hand if he can be sure that the number on his own hat is a divisor of the number on the blackboard. Four students raise their hands. What is minimum possible value of the number on the blackboard?
- A) 60 B) 72 C) 96 D) 120
29. 365 天里有多少个 1000 秒?
- A) 31536000 B) 525600 C) 86400 D) 31536
30. 在琼斯食堂里, 每份晚餐有 8 个肉丸和 3 块蒜蓉面包。今天卖出的肉丸数量比卖出的蒜蓉面包数量多 600。今天琼斯卖出了多少份晚餐?
- A) 100 B) 120 C) 360 D) 960
31. 一个奇数乘 3 以后将会是 ?
- A) 质数 B) 合数 C) 奇数 D) 偶数
32. 把 123456789 除以 10000 的商转化为小数以后, 十位和千分位的积是多少?
- A) 8 B) 12 C) 32 D) 48
33. 前 6 个正整数的最小公倍数有多少个正约数?
- A) 5 B) 6 C) 8 D) 12
34. 在小镇大学里, 学生们的专业是音乐、美术, 或两者。如果有 500 个学生是音乐专业, 600 个学生是美术专业, 300 个学生是音乐和美术专业, 那么大学里有多少个学生?
- A) 500 B) 800 C) 1000 D) 1400
35. 如果你花 30 分钟做了 35 道题目, 那么用同样的速度, 你做 315 道题目需要多少小时?
- A) 3 B) 4 C) 4.5 D) 270
36. 一个物体的 2016 度逆时针旋转, 与它的多少度顺时针旋转是一样的?
- A) 36 B) 72 C) 144 D) 252
37. 前 10 个正整数的积, 末尾有几个 0?
- A) 1 B) 2 C) 3 D) 4
38. 有几个正三位数满足个位数是十位数和百位数的积?
- A) 20 B) 23 C) 30 D) 32
39. 某次小明坐缆车上山, 从他坐上车开始, 一路上他一直在数对面交错而过的缆车数量, 一共是 60 辆, 则在这一整条索道(双向)共有多少辆缆车?
- A) 30 辆 B) 60 辆 C) 61 辆 D) 120 辆