CIE 2016 Math Comp Math Fun
Answer Sheet

Name:_____ ID:_____ Grade: 8

Room:_____ Start Time:_____ Finish Time:_____

No.	Answer
1	B
2	D
3	A
4	B
5	B
6	C
7	A
8	A
9	B
10	B
11	B
12	B
13	B
14	A
15	C
16	C
17	E
18	B
19	A
20	C
21	A
22	A
23	D
24	C
25	B

No.	Answer
26	A
27	B
28	E
29	B
30	D
31	A
32	E
33	A
34	A
35	E
36	A
37	D
38	C
39	D
40	C
41	E
42	
43	
44	
45	
46	
47	
48	
49	
50	

CIE-USA/DFW
Math Comp 2016
Grade 8
40 questions
1 hour

Note:

- Make sure to write all your answers on the answer sheet. Only the answer sheet will be graded.
- Each question has only one correct answer.
- Bonus questions will be counted only when there is a tie using other questions.
- Print your name clearly and legibly below.

Name _____

Room _____

1. The speed of a boat in still water is 10 mph. If it travels on a river 10 miles downstream in the same amount of time it takes to travel 5 miles upstream, what's the speed of the current?

   A. 2 mph B. 10/3 mph C. 11/4 mph D. 30 mph E. None of these

2. Solve the inequality $\frac{1}{x} < 2016$

   A. $x < 0$ B. $x < \frac{1}{2016}$ C. $x > \frac{1}{2016}$

   D. $x < 0$ or $x > \frac{1}{2016}$

   E. $x \leq 0$ **or** $x > \frac{1}{2016}$

3. A palindromic number is an integer that remains the same when its digits are reversed like 16461. How many palindromic numbers are between 900 and 2015?

   A. 21 B. 22 C. 23 D. 24 E. None of these

4. A trapezoid has parallel base lengths of 10 and 24. The lengths of the other two legs are 13 and 15. Compute the area of the trapezoid.

   A. 51 B. 204 C. 102 D. 408 E. 256

5. Edward and Emily are running in a circular track of radius 100 meters. Edward can run 400 meters per minute, while Emily can run 300 meters per minute. If they start at the same point at the same time, running the same direction, how long will it take Edward to catch Emily again?

   A. π minutes B. 2π minutes C. 3 minutes D. 6 minutes E. 1.5π minutes

6. Evaluate $\sqrt{2+\sqrt{2+\sqrt{2+\sqrt{2+\cdots}}}}$.

A. $2\sqrt{2}$ B. -1 C. 2 D. 4 E. None of the above

7. Jason was buying treats for 28 kids for his birthday party. He was told that 10 cookies and 18 scones will cost $36, but 15 cookies and 13 scones will cost $40. How much is one cookie?

A. $1.80 B. $2.00 C. $2.20 D. $2.40 E. None of the above

8. There are five Fridays and four Thursdays in January 2016. What day of the week is August 30th, 2016?

A. Tuesday B. Thursday C. Saturday D. Sunday E. None of above

9. There exists a positive integer n such that $1+2+3+\cdots+n=2016$. What is n ?

A. 62 B.63 C. 64 D. 65 E. None of the above

10. There are 3 dice with 2 fair dice and one unfair die with faces 1, 1, 3, 4, 5, 6. After tossing the dice, what's the probability to get at least one 1?

A. 1/6

B. 29/54

C. 91/216

D. 125/216

E. None of these

11. $\frac{3+6+9+\cdots+300}{5+10+15+\cdots+500}=?$

A. 5/3 B. 0.6 C. 0.75 D. 0.65 E. 0.5

12. Kyubee takes a solid 5x5x5 cube and paints the whole outer surface. He then cuts the cube up into 125 identical unit cubes. What is the ratio of the number of cubes with two faces painted to the number of cubes with one face painted?

A. 1:1 B. 2:3 C. 1:2 D. 5:3 E. 3:5

13. What is the units digit of $2013^{2016} + 2014^{2016} + 2015^{2016} + 2016^{2016}$?

A. 3 B. 8 C. 2 D. 6 E. 4

14. Which of the following is true about the equation $2015x^2 - 45x + \frac{1}{4}$?

A. Two different real solutions

B. Two identical real solutions

C. No real solutions

D. Three real solutions

E. The sum of the solutions equals $-\frac{9}{403}$.

15. If $x + \frac{1}{x} = 3$, what is $\frac{1}{x^4} + x^4$?

A. 81 B. 79 C. 47 D. 51 E. None of these

16. A Math contest has 40 multi-choice questions. Each question has 5 answers and only one answer is correct. If you at random select one answer for each question, what is the probability of getting at least one correct answer?

A. 0.2×0.8^{39}

B. 8×0.8^{39}

C. $1 - 0.8^{40}$

D. $0.2 + 0.2^2 + 0.2^3 + \cdots + 0.2^{39} + 0.2^{40}$.

E. $0.2 \times 0.8^{39} + 0.2^2 \times 0.8^{38} + 0.2^3 \times 0.8^{37} + \cdots + 0.2^{39} \times 0.8 + 0.2^{40}$.

17. Find the next term in the sequences 3, 11, 35, 107, 323, …

A. 967 B. 969 C. 1067 D. 311 E. None of these.

18. Find 2020_6+2015_6 .

A. 4029_6 B. 4035_6 (C) 4029 (D) 4025_6 (E) None of these

19. If A:B = 2:3, B:C = 3:4, C:D = 4:5, D:E = 5:6, what is A:E?

A. 1/3 B. 2/3 C. 1/2 D. 2/5 E. 3/4

20. Solve $\frac{1}{3}(6x-2) \geq \frac{3}{4}(-12x+8)$.

A. $x \geq -\frac{20}{33}$ *B.* $x \leq -\frac{20}{33}$ *C.* $x \geq \frac{20}{33}$ *D.* $x \leq \frac{20}{33}$ *E.* $x \leq \frac{20}{21}$

21. A = {1, 2, 3, 4, 5, 6}, B = {2, 3, 4, 5, 6, 7} and C = {1, 3, 5, 6, 7, 9}. Find $(A \cap B) \cup (A \cap C)$.

A. {1, 2, 3, 4, 5, 6} B. {2, 3, 4, 5, 6, 7} C. {2, 3, 4, 5, 6} D. {2, 3, 5, 6, 7}

E. {3, 4, 5, 6, 7}

22. Find the sum of $0.5 + 0.\overline{35}$.

A. 10/11 B. 79/99 C. 81/99 D. 4/5 E. 80/99

23. Solve $x^3 - 21x^2 + 20x = 0$.

A. x=0, 21 B. x=0, 20 C. x=1, 21 D. x=0, 1, 20 E. None of these

24. The domain of function $f(x) = \frac{1}{\sqrt{\sqrt{2015} - \sqrt{2015 - x}}}$ is

A. $0 \le x \le 2015$ B. $0 \le x < 2015$ C. $0 < x \le 2015$

D. $0 < x < 2015$ E. None of these

25. What is the range of function $y = -2015 + \sqrt{2015 - x}$?

A. $y \ge 2015$ B. $y \ge -2015$ C. $y \ge 0$ D. $y \le 0$ E. $y \ge 2048$

26. Find 8 + 12 + 16+ 20 +… + 396 + 400.

A. 20196 B. 20192 C. 20220 D. 20224 E. None of these

27. Let i be the imaginary number. Find i^{2016}.

A. -1 B. 1 C. i D. $-i$ E. None of these

28. A parallelogram has two diagonals with lengths 3 and 4, what is its area?

A. 12 B. 6 C. 9 D. 16 E. Cannot be determined

29. How many positive integers less than or equal to 2016 are relatively prime to 2016?

A. 575 B. 576 C. 672 D. 864 E. None of the above

30. How many proper subsets are there in a set of 10 elements?

A. 2048 B. 2047 C. 1024 D. 1023 E.2049

31. Find the sum of the coefficients of all the terms when $(x-3)^6$ is expanded.

A. 64 B. 1 C. 25 D. 9 E. 36

32. In a class of 20 students, you want to form a team of 4 students. How many possible groups can you have?

A. 6480 B. 1140 C. 5814 D. 1938 E. 4845

33. What's the length of the inner diagonal of a rectangular solid with length 3, 4 and 5?

A. $5\sqrt{2}$ B. $5\sqrt{3}$ C. $5\sqrt{6}$ D. 7 E. $6\sqrt{3}$

34. It takes Edward 3 hours to paint a room, Elton 4 hours to paint the room and Emily 2 hours to paint the room. If these three paint the room together, how long will it take?

A. 12/13 hours B. 13/12 hours C. 9 hours D. 1 hour E. 1.5 hours

35. What's the area of a regular octagon with side length 2?

A. $4+2\sqrt{2}$ B. $6+4\sqrt{2}$ C. $2+4\sqrt{2}$ D. $6+2\sqrt{2}$ E. $8(1+\sqrt{2})$

36. The first 2016 positive integers can be written together to make the big number

1234567891011…2013201420152016. What is the total number of digits in this big number?

A. 6957 B. 6953 C. 6950 D. 6949 E. 6948

37. Let $a_1, a_2, a_3, \ldots, a_{10}$ be a permutation of the numbers $1,2,3, \ldots, 10$. Find the maximum value of $|a_1 - a_2| + |a_2 - a_3| + |a_3 - a_4| + \cdots + |a_9 - a_{10}|$.

A. 18 B. 27 C. 36 D. 45 E. None of the above

38. How many ordered pairs of non-negative integers (a, b) satisfy $3a-7b=2016$?

A. 95 B. 96 C. 97 D. 98 D. None of the above

39. A school offers 3 foreign languages: Spanish, French and Chinese. There are 60 students enrolled in at least one of the classes. If 30 are in Spanish class, 33 are in French class, 34 are in Chinese class, 16 are taking both French and Spanish, 14 are taking both French and Chinese, and 15 are taking both Spanish and Chinese. How many students are taking all the three languages?

A. 4 B. 5 C. 6 D. 8 E. 9

40. An ant crawls from one corner of a room to the diagonally opposite corner. If the dimensions of the room are 3×3×3, what is the shortest distance the ant can cover?

A. $3+3\sqrt{2}$ B. $6\sqrt{2}$ C. $3\sqrt{5}$ D. $2\sqrt{11}$ E. $3\sqrt{3}$

BONUS QUESTION:

41. a, b, and c are roots of the polynomial x^3-4x^2+5x-6. Let $\frac{m}{n}=\frac{1}{a+b}+\frac{1}{b+c}+\frac{1}{c+a}$, where m and n are relatively prime integers. Compute $m+n$.

A. 118 B. 124 C. 176 D. 120 E. None of these