

**CIE-USA/DFW**  
**Math Comp 2015**  
**Grade 8**  
**40 questions**

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.
- Print your name clearly and legibly below.

Name \_\_\_\_\_

Room \_\_\_\_\_

- What is 10% of 20% of 30% of 40% of 50% of 60% of 100?  
 A. 7.2    B. 0.72    C. 0.0072    D. 0.00072    E. 0.072
- Solve inequality  $\frac{1}{x} < 2015$   
 A.  $x < 0$     B.  $x < \frac{1}{2015}$     C.  $x > \frac{1}{2015}$   
 D.  $x < 0$  or  $x > \frac{1}{2015}$     E.  $x \leq 0$  or  $x > \frac{1}{2015}$
- 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. 20    B. 21    C. 22    D. 23    E. None of these
- Find the smallest number which leaves remainder of 1 when divided by 2, 3, 4, 5, 6 but divided by 7 completely.  
 A. 121    B. 301    C. 361    D. 181    E. 241
- 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, how long will it take Edward to catch Emily again?  
 A.  $\pi$  minutes    B.  $2\pi$  minutes    C. 3 minutes    D. 6 minutes    E.  $1.5\pi$  minutes
- A triangle has sides of 5, 6 and 7. The area of this triangle is  
 A. 15    B.  $6\sqrt{3}$     C.  $3\sqrt{6}$     (D)  $6\sqrt{6}$     (E) cannot be determined
- How many positive integers are divisors of 8100?  
 A. 16    B. 45    C. 20    D. 27    E. 48
- The number of diagonals in a convex regular polygon with 100 sides is

- A. 4850      B. 4950      C. 5050      D. 10000      E. None of these

9. The solution to equation  $2015^x = 2014$  is

- A. 2015/2014      B. 2014/2015      C.  $\log_{2014} 2015$   
D.  $\log_{2015} 2014$       E. No solution

10. There are 3 dices with 2 fair dices and one unfair one with faces 1, 1, 3, 4, 5, 6. If you throw them together, what's the probability to get at least one 1?

- A. 29/54  
B. 91/216  
C. 125/216  
D. 25/54  
E. None of these

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

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

12. A number is chosen at random from the first 2015 positive integers. What's the probability that the number is divisible by 3 or 5?

- A. 939/2015  
B. 188/403  
C. 941/2015  
D. 942/2105  
E. 943/2015

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

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

14. What is true about 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 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.  $0.2 \times 0.8^{39}$   
B.  $8 \times 0.8^{39}$   
C.  $1 - 0.8^{40}$   
D.  $0.2 + 0.2^2 + 0.2^3 + \dots + 0.2^{39} + 0.2^{40}$ .  
E.  $0.2 \times 0.8^{39} + 0.2^2 \times 0.8^{38} + 0.2^3 \times 0.8^{37} + \dots + 0.2^{39} \times 0.8 + 0.2^{40}$ .

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  $2015_6 + 2014_6$ .

- A.  $4029_6$       B.  $4033_6$       C. 4029      D.  $4023_6$       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.  $\frac{2}{3}$       B.  $\frac{1}{3}$       C.  $\frac{1}{2}$       D.  $\frac{2}{5}$       E.  $\frac{3}{4}$

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.  $\{2, 3, 5, 6, 7\}$   
F.  $\{3, 4, 5, 6, 7\}$

22. Find the sum of  $0.\overline{5} + 0.\overline{25}$ .

- A.  $\frac{80}{99}$     B.  $\frac{79}{99}$     C.  $\frac{81}{99}$     D.  $\frac{4}{5}$     E.  $\frac{26}{33}$

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

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

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

- A.  $0 \leq x \leq 2015$     B.  $0 \leq x < 2015$     C.  $0 < x \leq 2015$     D.  $0 < x < 2015$   
G. None of these

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

- A.  $y \geq 2015$     B.  $y \geq -2015$     C.  $y \geq 0$     D.  $y \leq 0$     E.  $y \geq 2048$

26. Find  $8 + 12 + 16 + 20 + \dots + 396 + 400$ .

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

27. Let  $i$  be the imaginary number. Find  $i^{2015}$ .

- A. 1    B. -1    C.  $i$     D.  $ii$     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 48, but greater than 30, are relatively prime to 48?

- A. 6    B. 7    C. 8    D. 9    E. 10

30. How many proper subsets are there in a set of 11 elements?

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

31. The perimeter of a 30-60-90 triangle is 12. What is the area of the triangle?

A.  $12(2 - \sqrt{3})$    B.  $12(2 + \sqrt{3})$    C.  $24(2 - \sqrt{3})$    D.  $24(2 + \sqrt{3})$    E.  
 $12(2\sqrt{3} - 3)$

32. In a class of 20 students, you want to form a team of 3 students. How many possible groups can you have?

- A. 6480      B. 1140      C. 5814      D. 1938      E. 1000

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. Write the first 2015 positive integers together to make a big number

1234567891011...201320142015. What's the total number of digits in this big number?

- A. 6953      B. 6944      C. 6950      D. 6949      E. 6948

37. 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. 3 mph      B. 4 mph      C. 10/3 mph      D. 11/4 mph      E. 30 mph

38. A trapezoid ABCD with AB parallel to CD. Two diagonals AC and BD intersect at O.

If  $AB:CD = 3:4$  and the area of triangle OAB is 9. Find the area of trapezoid of ABCD.

- A. 49      B. 45      C. 57      D. 36      E. Cannot be determined

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 French. How many students are taking all the three languages?

- A. 4                      B. 5                      C. 6                      D. 7                      E. 8

40. An ant crawls from one corner of a room to the diagonally opposite corner. If the dimensions of the room are  $3 \times 3 \times 3$ , 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. Initially it took a machine 16 minutes to fill 300 bottles of soda. After technology improvement, the machine can fill twice as fast as before. How many minutes does it take the machine to fill 750 bottles of soda after the improvement?

- A. 16 minutes  
B. 20 minutes  
C. 32 minutes  
D. 40 minutes  
E. None of these are the correct answer.