Directions: Choose the best answer for each of the following problems. Choice E is "NOT" for "None of these".

1. $36 \times 7 \div 4 - 5^2 =$

   A. 78   B. 38   C. 58   D. 3364   E. NOT

2. $\dfrac{1}{12} + \dfrac{3}{12} + \dfrac{5}{12} + \dfrac{7}{12} + ... + \dfrac{23}{12} =$

   A. 12   B. 8   C. 14   D. 24   E. NOT

3. Two teams scored a total of 61 points. One team won by 3 points. What was the higher score?

   A. 32   B. 29   C. 31   D. 30   E. NOT

4. A circle has a circumference of 12π cm. What is its area?

   A. 72π cm^2 B. 18π cm^2 C. 36π cm^2 D. 144π cm^2 E. NOT

5. Billy bought two tacos for $1.29 each and three nachos for $2.29 each. How much in total did he spend?

   A. $11.45   B. $10.45   C. $9.45   D. $8.45   E. NOT

6. If $N = -9$, then $N^2 - 6N + 9 =$

   A. 81   B. 144   C. 120   D. 156   E. NOT

7. What percent of 40 is 28?

   A. 80%   B. 75%   C. $66\dfrac{2}{3}\%$ D. 70%   E. NOT

8. $\dfrac{3}{5} + \dfrac{5}{3} =$

   A. $2\dfrac{5}{9}$ B. $2\dfrac{2}{15}$ C. $2\dfrac{4}{15}$ D. $2\dfrac{3}{4}$ E. NOT

9. Convert MMLXXIV to Arabic numerals.

   A. 274   B. 276   C. 2076   D. 2074   E. NOT

10. Juanita left her house at 5:23pm. She averaged 50 mph on her 20-mile trip to her grandmother's house. What time did she get to her grandmother's house?

   A. 5:47pm   B. 5:43pm   C. 5:51pm   D. 5:49pm   E. NOT

11. On a map, 1 inch is equivalent to 22.5 miles. How many inches on the map represent a distance of 54 miles?

   A. 2.25 inches   B. 2.75 inches   C. 2.5 inches   D. 2.4 inches   E. NOT

12. Which property is represented by $3 + 4 = 4 + 3$?

   A. additive inverse   B. additive identity   C. associativity   D. commutativity   E. NOT

13. There are 6 red and 4 blue coins in a hat. One coin is drawn out and it is blue. The coin is not replaced. What is the probability the next coin is also blue?

   A. $\dfrac{1}{3}$ B. $\dfrac{1}{2}$ C. $\dfrac{2}{5}$ D. $\dfrac{3}{5}$ E. NOT

14. The diagonal of a square is $\sqrt{120}$ cm. What is the area of the square?

   A. $90\ \mathrm{cm}^2$ B. $60\ \mathrm{cm}^2$ C. $30\ \mathrm{cm}^2$ D. $15\ \mathrm{cm}^2$ E. NOT

15. The sum of the next three terms in the sequence 1, 1, 2, 3, 5, 8, ... is

   A. 60   B. 64   C. 68   D. 72   E. NOT

16. $(51 \times 31 + 11) \div 8$ has a remainder of

   A. 3   B. 0   C. 4   D. 6   E. NOT

17. 57 (base 10) = _____ (base 7)

   A. 103   B. 110   C. 111   D. 101   E. NOT

18. Define $A \otimes B$ to be $\sqrt{A^2 + B^2}$. Find $8 \otimes 15$.

   A. 22   B. 17   C. 19   D. 23   E. NOT

19. A 1-gallon bottle is 12.5% full of water. What percent of a quart is in the bottle?

  A. 50%   B. 25%   C. 75%   D. 100%   E. NOT

20. The bases of a trapezoid are 6 cm and 26 cm. What is the height if the area is 160 cm^2?

  A. 10 cm   B. 20 cm   C. 5 cm   D. 15 cm   E. NOT

21. $(3 \times 4 + 5^0) \times (4 \times 5 - 3^1) =$

  A. 221   B. 244   C. 272   D. 253   E. NOT

22. How many zeros are at the end of the number 44! ?

  A. 6   B. 7   C. 8   D. 9   E. NOT

23. Solve for v: $3v - 5[2v + 7(6 - 3v)] = 90 - 2v$

  A. 4   B. 3   C. 8   D. 7   E. NOT

24. If $f(x) = \dfrac{x^4 - x^2}{x - 1}$, find $f(19)$.

  A. 7160   B. 7220   C. 7280   D. 7340   E. NOT

25. If set A has 46 elements, B has 29 elements, and $A \cap B$ has 12 elements, how many elements are in $A \cup B$?

  A. 47   B. 63   C. 72   D. 58   E. NOT

26. 72% of 55 is 88% of what number?

  A. 40   B. 36   C. 45   D. 42   E. NOT

27. How many distinct diagonals does a regular octagon have?

  A. 12   B. 16   C. 20   D. 24   E. NOT

28. $0.6363... - 0.3636... =$ _____ (fraction)

  A. $\dfrac{4}{9}$ B. $\dfrac{1}{3}$ C. $\dfrac{4}{11}$ D. $\dfrac{3}{11}$ E. NOT

29. What single digit M goes in the equation to make it true?

$$\begin{array}{cccc} & 8 & M & 7 \\ + & 3 & M & M \\ \hline 1 & 1 & 9 & 1 \end{array}$$

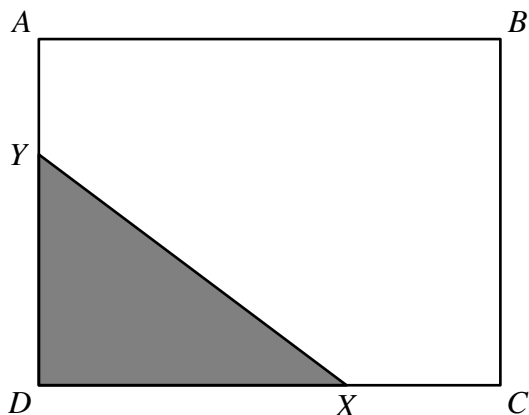   A. 3   B. 4   C. 5   D. 6   E. NOT

30. Find the sum of all solutions to the equation $2x^2 - 3x + 1 = 0$.

    A. −3   B. 3   C. −1.5   D. 1.5   E. NOT

31. The area of a rectangle is 48 cm². If the length is three times the width, what is its perimeter?

    A. 32 cm   B. 12 cm   C. 24 cm   D. 44 cm   E. NOT

32. In rectangle $ABCD$, $AB = 12$, $BC = 9$, $CX = 4$, and $XY = 10$. Find the shaded area.

A. 24
B. 32
C. 16
D. Cannot be determined
E. NOT

33. Solve $V = \dfrac{1}{3}\pi r^2 h$ for h.

    A. $h = \dfrac{3V}{\pi r^2}$ B. $h = \dfrac{V}{3\pi r^2}$ C. $h = \sqrt{\dfrac{3V}{\pi r}}$ D. $h = \dfrac{\pi r^2}{3V}$ E. NOT

34. A pump can fill an empty tank in 3 hours. How long will it take to fill a tank that is half-full if two identical pumps are used?

    A. 6 hours   B. $1\dfrac{1}{2}$ hours   C. 3 hours   D. 45 minutes   E. NOT

35. At a sandwich shop, there are 6 meats, 4 cheeses, and 2 breads to choose from. How many different sandwiches can be made with the different meat, cheese, and bread choices?

    A. 12   B. 48   C. 24   D. 36   E. NOT

36. If $2^{5x-1} = 8$, then $x =$

    A. 1.4   B. 1.2   C. 0.6   D. 0.8   E. NOT

37. If $\dfrac{3x-12}{15} = 0.8$, then $\dfrac{3x+12}{15} =$

    A. 1.8   B. 1.2   C. 2.4   D. 3.6   E. NOT

38. A parallelogram has coordinates of $(4,7)$, $(12,3)$, $(3,1)$, and $(13,9)$. Find the point of intersection of its diagonals.

    A. $(7,6)$ B. $(8,5)$ C. $(7,5)$ D. $(8,6)$ E. NOT

39. What is the largest 4-digit number that can be formed from the digits 1, 4, 2, and 6 that is evenly divisible by 8?

    A. 6214   B. 6412   C. 4612   D. 4216   E. NOT

40. The odds of winning a game are 8:11. What is the probability of winning?

    A. $\dfrac{11}{19}$ B. $\dfrac{11}{8}$ C. $\dfrac{3}{8}$ D. $\dfrac{8}{19}$ E. NOT

41. How many positive integral divisors does 49 have?

    A. 2   B. 6   C. 3   D. 4   E. NOT

42. Inés made cookies to take to school. She gave $\dfrac{2}{3}$ of the cookies to her classmates and the rest to the teachers. The teachers shared them equally, each teacher getting 2 cookies. If there are 15 teachers, how many cookies did the classmates get?

    A. 30   B. 120   C. 60   D. 90   E. NOT

43. What is the distance between the points $(-7,8)$ and $(1,-7)$?

    A. 15   B. 17   C. 19   D. 21   E. NOT

44. Which of the following is a solution to the equation $5x - 3y = -14$?

    A. $(-1,3)$ B. $(2,7)$ C. $(-3,9)$ D. $(0,5)$ E. NOT

45. Find the total surface area of a right circular cylinder with diameter 10 cm and height 4 cm.

    A. 90π cm^2 B. 120π cm^2 C. 84π cm^2 D. 112π cm^2 E. NOT

46. What is the unit's digit of the product of 5^{17} and 17^5?

    A. 3   B. 0   C. 5   D. 7   E. NOT

47. Each exterior angle of a regular pentagon measures how many degrees?

    A. 60°   B. 120°   C. 72°   D. 108°   E. NOT

48. The following pattern continues. What is the sum of the numbers in Row 9?

Row 1:	1			
Row 2:	3	5		
Row 3:	7	9	11	
Row 4:	13	15	17	19

    ⋮

    A. 636
    B. 792
    C. 693
    D. 729
    E. NOT

49. Jerry and Ralph are in the middle of running a lap around a track. The circumference of the track is 400 feet. Jerry is 60 feet behind Ralph. Ralph is running at 6 feet per second. How fast should Jerry run so that they both complete the lap in 30 seconds?

    A. 9 ft/s   B. 8 ft/s   C. 12 ft/s   D. 4 ft/s   E. NOT

50. For x and y positive integers, if $xy \geq 9$, what is the smallest possible sum of $x + y$?

    A. 6   B. 4   C. 12   D. 3   E. NOT