Dick Schaff Math Superbowl XLVII
Level 2: 8th Grade Blitz

Directions:

(1) Select the most correct answer for each question and bubble it in on your Scantron™.
(2) No calculating devices of any sort are allowed.
(3) N.O.T. stands for "None of These."

1. A line passes through the points $(-2,3)$ and $(3,1)$. What is the slope of this line?

a) $\frac{-5}{2}$ b) $\frac{3}{-2}$ c) $\frac{2}{5}$ d) $\frac{-2}{5}$ e) N.O.T.

2. A line passes through the points $(-2,3)$ and $(3,1)$. What is the y-intercept of this line?

a) $2\frac{1}{5}$ b) $y = \frac{-2}{5}x + \frac{11}{5}$ c) $\frac{-2}{5}$ d) $\left(0, 2\frac{1}{5}\right)$ e) N.O.T.

3. A line passes through the points $(-2,3)$ and $(3,1)$. What is the x-intercept of this line?

a) $\left(2\frac{1}{2}, 0\right)$ b) $\left(3\frac{1}{2}, 0\right)$ c) $\left(4\frac{1}{2}, 0\right)$ d) $\left(5\frac{1}{2}, 0\right)$ e) N.O.T.

4. Two lines are perpendicular and share the same y-intercept. $y = -x + 5$ is the equation of one the lines. What is the x-intercept of the other line?

a) $(5,0)$ b) $(-5,0)$ c) $(4,0)$ d) $(-4,0)$ e) N.O.T.

5. The distance between the points $(-2,3)$ and $(3,1)$ is less than 5.4 units.

a) True b) False c) N.O.T.

6. Solve for x: $|3x - 2| \geq 4$

a) $\{x|x \geq 2\}$ b) $\left\{x|x \geq 2 \cap x \leq \frac{-2}{3}\right\}$ c) $\left\{x|x \geq 2 \cup x \leq \frac{-2}{3}\right\}$ d) N.O.T.

7. What is the product of two numbers whose GCF is 14 and whose LCM is 210?

a) 2930 b) 2940 c) 2950 d) 2960 e) N.O.T.

8. Solve for x: $\frac{-1}{x} + 1 = -1$

a) $\frac{1}{4}$ b) $\frac{1}{3}$ c) $\frac{1}{2}$ d) 1 e) N.O.T.

9. Find the sum of the solutions to $(x - 3)^2 = 4$.

a) 5 b) 6 c) 7 d) 8 e) N.O.T.

10. Find the sum of the solutions to $3x^2 - 2x - 2 = 0$.

a) $\frac{2}{5}$ b) $\frac{2}{4}$ c) $\frac{1}{2}$ d) $\frac{2}{3}$ e) N.O.T.

11. Solve for x: $\sqrt{x + 1} + 3 = 2$

a) 1 b) 0 c) -1 d) -2 e) N.O.T.

12. What is the numerator of the fraction, in lowest terms, equivalent to the repeating decimal number $.242424\cdots$?

a) 6 b) 7 c) 8 d) 9 e) N.O.T.

13. What is the units digit of 2^{2020}?

a) 6 b) 4 c) 8 d) 2 e) N.O.T.

14. Simplify: $\frac{2 \cdot 673}{2019}$

a) $\frac{1346}{2019}$ b) $\frac{3}{4}$ c) $\frac{3}{5}$ d) $\frac{5}{7}$ e) N.O.T.

15. If Jose can paint a room in 6 hours working alone, and Julie can paint the same room in 3 hours working alone, how many hours will it take them to paint the room working together?

a) 4.5 b) 9 c) 2.5 d) 2 e) N.O.T.

16. Which two of the following three quantities are identically equal?

I. $\sqrt{x^2}$ II. x III. $|x|$

a) I & II b) I & III c) II & III d) N.O.T.

17. Three numbers which are in a ratio of 2: 3: 5 add up to 75. What is the average of these numbers?

a) 7.5 b) 10 c) 25 d) $\frac{85}{4}$ e) N.O.T.

18. Which of the following is not a factor of $x^3 - 9x^2 + 26x - 24$?

a) $x - 1$ b) $x - 2$ c) $x - 3$ d) $x - 4$ e) N.O.T.

19. Simplify: $(4x^2 - 5x - 6) - (x^2 - 3x + 8)$

a) $3x^2 - 8x + 2$ b) $3x^2 - 8x - 14$ c) $3x^2 - 2x - 14$ d) N.O.T.

20. Find the sum of the solutions to $(x-4)(x+5)=0$

a) 1 b) 0 c) -1 d) -2 e) N.O.T.

21. The last 2 digits of the product of 5,672 and 8,756 are:

a) 12 b) 22 c) 32 d) 42 e) N.O.T.

22. The area of a circle is 121π square feet. The circumference is

a) 10π feet b) 11π feet c) 12π feet d) 13π feet e) N.O.T.

23. Simplify: $\sqrt{3}(\sqrt{12}+\sqrt{75})$

a) 11 b) 21 c) 31 d) 41 e) N.O.T.

24. How many subsets can you make from the set $\{a, b, c, d\}$?

a) 14 b) 15 c) 16 d) 17 e) N.O.T.

25. Simplify: $3+7\cdot 5(2^2)$

a) 200 b) 152 c) 143 d) 703 e) N.O.T.

26. Simplify: $.\overline{3}+\frac{2}{9}$

a) $\frac{1}{3}$ b) $\frac{4}{9}$ c) $\frac{5}{9}$ d) $\frac{2}{3}$ e) N.O.T.

27. Write the product of 5×10^{30} and 6×10^{-32} in scientific notation.

a) 30 b) 30×10^{-2} c) 3 d) 3×10^{-1} e) N.O.T.

28. Round 6.344999999 to the nearest hundredth place.

a) 6.34 b) 6.35 c) N.O.T.

29. Which of the two numbers $4\sqrt{5}$ and 9 is the largest?

a) $4\sqrt{5}$ b) 9 c) N.O.T.

30. How many zeros are at the end of $1 \times 2 \times 3 \times \cdots \times 74 \times 75$?

a) 15 b) 16 c) 17 d) 18 e) N.O.T.

31. Let $f(x) = 10x - 5$. Find a number n such that $f(n) = n$.

a) $\frac{1}{3}$ b) $\frac{4}{9}$ c) $\frac{5}{9}$ d) $\frac{2}{3}$ e) N.O.T.

32. What is the last digit of the sum $2020! + 2019! + \cdots + 3! + 2! + 1!$?

a) 0 b) 2 c) 3 d) 5 e) N.O.T.

33. What is the mean of 2^5 and 2^7?

a) 2^6 b) 64 c) 32 d) 80 e) N.O.T.

34. Simplify $(-2^7)^{-\frac{1}{7}}$

a) -2 b) $\frac{-1}{2}$ c) 2 d) $\frac{1}{2}$ e) N.O.T.

35. The average of 20 numbers is 15. The average of 15 of those numbers is 10. What is the average of the remaining five numbers?

a) 12.5 b) 30 c) 17.5 d) 50 e) N.O.T.

36. What is the probability that a randomly selected two-digit number is a multiple of 12?

a) $\frac{4}{45}$ b) $\frac{1}{10}$ c) $\frac{1}{9}$ d) $\frac{8}{89}$ e) N.O.T.

37. While walking on a flat surface in California, a hiker first headed 13 miles north, then 22 miles west, then 8 miles south and finally 10 miles east. How many miles from was the hiker from her starting point?

a) 53 b) 13 c) 17 d) 18 e) N.O.T.

38. Find the smallest digit to replace the "n" so that the number 234,7n1 is divisible by 9.

a) 0 b) 1 c) 2 d) 3 e) N.O.T.

39. The basement of a new home will be 27 feet long, 30 feet wide and 9 feet deep. If the dirt is hauled away in loads of 3 cubic yards, how may loads must be hauled away?

a) 80 b) 90 c) 100 d) 110 e) N.O.T.

40. What is the sum of the reciprocals of the three smallest odd prime numbers?

a) $\frac{70}{105}$ b) $\frac{2}{3}$ c) $\frac{71}{105}$ d) $\frac{69}{105}$ e) N.O.T.

41. Find the smallest natural number n such that $0.8\overline{3}\cdot n$ is an integer.

a) 6 b) 4 c) 8 d) 2 e) N.O.T.

42. Given that m and n are positive integers, $m \neq n$ and $m^n = n^m$, find $m + n$.

a) 3 b) 4 c) 5 d) 6 e) N.O.T.

43. Given that $2x - 3y = 8$ and $4x + 3y = -2$, what is the product of x and y?

a) -1 b) -2 c) -3 d) -4 e) N.O.T.

44. What reduced common fraction has a reciprocal of 3.6?

a) $\frac{3}{11}$ b) $\frac{3}{10}$ c) $\frac{2}{7}$ d) $\frac{5}{16}$ e) N.O.T.

45. At Best Buy, the price of all stereos was reduced 25%. Store employees are given an additional 10% discount on sale prices. What would be the cost in dollars a store employee would pay for a stereo originally priced at $320?

a) 208 b) 216 c) 224 d) 232 e) N.O.T.