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

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

1. A rectangular box is 10 m long, 6 m wide, and 2.5 m tall. What is the volume of this box?

a) 18.5 m^3 b) 120 m^3 c) 125 m^3 d) 150 m^3 e) N.O.T.

2. What is the last digit of 3^{2018}?

a) 1 b) 3 c) 7 d) 9 e) N.O.T.

3. Alex starts off the month with no money. Then Alex receives \$100 as a birthday gift. Alex also earns \$20/week for doing chores around the house. A new game console costs \$330. How many weeks will it take until Alex has enough money for the console?

a) 11 b) 12 c) 16 d) 17 e) N.O.T.

4. What is the slope of the line passing through (7, ¾) and (12, ½)?

a) – 0.05 b) 0.05 c) – 1.25 d) 1.25 e) N.O.T.

5. Which of the following is equivalent to $\frac{3}{11}$?

a) 0.27 b) $0.2\overline{7}$ c) $0.27\overline{2}$ d) $0.\overline{2}$ e) N.O.T.

6. Solve $6(2x - 5) + 7(3x + 5) = 0$ for x.

a) $\frac{5}{33}$ b) $\frac{-5}{33}$ c) $\frac{33}{5}$ d) $\frac{-33}{5}$ e) N.O.T.

7. Let $f(x) = 17x + 17$. Find a number p such that $f(p) = p$.

a) $\frac{16}{17}$ b) $\frac{-16}{17}$ c) $\frac{17}{16}$ d) $\frac{-17}{16}$ e) N.O.T.

8. A triangle is plotted on the coordinate system so its vertices are at (5, 2), (8, 2), and (8, 13). This triangle is then reflected about the x-axis. Which of the following would be coordinates for one of the vertices of the reflected triangle?

a) (5, 2) b) (– 5, 2) c) (– 8, – 2) d) (8, – 13) e) N.O.T.

9. Solve $\begin{cases} 2x & +3y & = 10 \\ 5x & -6y & = 16 \end{cases}$

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

10. Frozen hamburger patties are sold in packages of 15. Veggie burger patties are sold in packages of 4. Chris buys a total of 53 patties for a barbeque. How many veggie burger patties did Chris buy?

a) 2 b) 8 c) 3 d) 45 e) N.O.T.

11. A right circular cylinder is 10 inches tall, and the diameter of the base is 6 inches. What is the volume of the cylinder? Use 3.14 for π.

a) 282.6 in^3 b) 471.0 in^3 c) 1130.4 in^3 d) 1884.0 in^3 e) N.O.T.

12. Simplify $\frac{(pq^3)^{-2}}{(pq^{-2})^3}$. Write your final answer without any negative exponents.

a) 1 b) p^5 c) $\frac{q^{12}}{p^5}$ d) $\frac{1}{p^5}$ e) N.O.T.

13. It costs \$10 to have a single word engraved on a piggybank, and \$3 for each additional word. Which of the following equations models the total cost of having x words engraved on a piggybank?

a) C = 13x b) C = 10x + 3 c) C = 3x + 10 d) C = 3x + 7 e) N.O.T.

14. What is the distance between the points (3, – 5) and (– 1, – 2)?

a) – 5 units b) 5 units c) 7 units d) 9 units e) N.O.T.

15. Which of the following numbers is largest?

a) 0.009 b) 0.01 c) 0.0099 d) – 0.09 e) N.O.T.

16. Solve $2(6x + 9) = 3(4x + 6)$ for x.

a) 0 b) 18 c) All Real Numbers d) No Solution e) N.O.T.

17. Solve $81^{2x-5} = 27^{3x+2}$ for x.

a) -26 b) -14 c) -7 d) 7 e) N.O.T.

18. Which pair of integers does $\sqrt{210}$ fall between?

a) 5, 6 b) 13, 14 c) 14, 15 d) 15, 16 e) N.O.T.

19. A raised garden bed is 18 inches wide, 4 inches deep, and six feet long. Alex has three of these garden beds. Soil is sold in bags that hold 2 cubic feet. How many bags must Alex buy to have enough soil to fill the beds?

a) 2 b) 3 c) 4 d) 5 e) N.O.T.

20. Pat starts a new business selling artwork on Etsy. Pat has to buy $200 worth of tools, and it costs $12 to make an item. Pat can sell the items for $20 each. How many items must Pat sell before breaking even?

a) 8 b) 10 c) 20 d) 25 e) N.O.T.

21. A rectangular box is 10 m long, 6 m wide, and 2.5 m tall. What is the surface area of this box?

a) 18.5 m^2 b) 100 m^2 c) 185 m^2 d) 200 m^2 e) N.O.T.

22. Divide $3*10^5$ by $6*10^7$. Write your final answer in scientific notation.

a) $2*10^2$ b) $2*10^{-2}$ c) $5*10^{-3}$ d) $5*10^{-1}$ e) N.O.T.

23. Bobby has to peel a LOT of potatoes. At first, Bobby is careful, and peels one potato every two minutes. Then, after half an hour, Bobby gets impatient, and starts peeling two potatoes a minute. How long will it take until 55 potatoes are peeled?

a) 35 minutes b) 50 minutes c) 55 minutes d) 110 minutes e) N.O.T.

24. Which of the following is the same line as $y = \frac{1}{4}x - 8$?

a) $x = 4y + 8$ b) $x = 4y - 32$ c) $x + 4y = -8$ d) $x + 4y = -32$ e) N.O.T.

25. Which of the following fractions is equivalent to $0.0\overline{18}$?

a) $\frac{9}{50}$ b) $\frac{2}{11}$ c) $\frac{2}{9}$ d) $\frac{1}{45}$ e) N.O.T.

26. Solve $4(x - 5) + 3(2x + 7) = 0$ for x.

a) -0.1 b) 0.1 c) All Real Numbers d) No Solution e) N.O.T.

27. What is the supplement of 27°?

a) 27° b) 63° c) 73° d) 153° e) N.O.T.

28. A gamer wins 36% of the time when they play a particular free-for-all video game online. How many wins would they have if they played 75 matches one month?

a) 27 b) 36 c) 39 d) 48 e) N.O.T.

29. A rectangular park with an area of 31,250 square meters is twice as long as it is wide. Alex walks once around the perimeter of this park. How far did Alex walk?

a) 125 m b) 250 m c) 375 m d) 500 m e) N.O.T.

30. Tickets to a small zoo cost \$5 for adults and \$3 for children. One extended family pays \$77 for tickets, and there are twice as many children as adults. Which of the following equations could be used to determine the number of adults in this family?

a) $77 = 5x + 3x$
b) $77 = 5x + 3(x + 2)$
c) $77 = 5(2x) + 3x$
d) $77 = 5x + 3(2x)$
e) N.O.T.

31. A right circular cone is 10 inches tall, and the diameter of the base is 6 inches. What is the volume of the cylinder? Use 3.14 for π.

a) 94.2 in^3 b) 282.6 in^3 c) 376.8 in^3 d) 1130.4 in^3 e) N.O.T.

32. Add $4.5*10^5$ and $3.7*10^4$. Write your final answer in scientific notation.

a) $8.2*10^9$ b) $4.87*10^4$ c) $4.87*10^5$ d) $8.2*10^5$ e) N.O.T.

33. It costs \$3 to rent a video game for two nights, and \$1/night for each night after that. Alex rents the game, and accidentally forgets about it for a while. Which of the following equations best models the cost of Alex renting the game for n nights?

a) $C = n$ b) $C = 1 + n$ c) $C = 2 + n$ d) $C = 3 + n$ e) N.O.T.

34. Which of the following lines does not pass through (3, 7)?

a) $2x + 3y = 27$ b) $7x - 3y = 0$ c) $7x + y = 28$ d) $3x - 7y = 0$ e) N.O.T.

35. Which of the following is NOT equivalent to $\frac{4^2}{4^{-3}}$?

a) 4^5 b) $\frac{2^4}{2^{-6}}$ c) $\frac{1}{2^{-10}}$ d) 1024 e) N.O.T.

36. Solve $2(4x + 5) = 4(2x + 5)$ for x.

a) 0 b) 10 c) All Real Numbers d) No Solution e) N.O.T.

37. What is the complement of 52°?

a) 38° b) 48° c) 52° d) 128° e) N.O.T.

38. For function g, $g(7) = 17$. Which of the following MUST be true?

a) The input value of seven corresponds only with the output value of seventeen.
b) The input value of seven corresponds with an infinite number of output values.
c) The output value of seventeen corresponds only with the input value of seven.
d) The output value of seventeen corresponds with an infinite number of input values.
e) N.O.T.

39. Erin mows lawns in the neighborhood to earn spare cash. One weekend Erin mowed five lawns and made an average of \$6.40 per lawn. Erin was paid \$6, \$5, \$8, and \$5 for mowing the first four lawns. How much was Erin paid to mow the fifth lawn?

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

40. Dale pays $66.69 for pizzas for a party. This includes 8% sales tax. How much did the pizzas cost before tax?

a) $4.94 b) $61.75 c) $72.02 d) $72.03 e) N.O.T.

41. A helium balloon is essentially spherical, with a radius of 30 cm. What is the exact volume of this sphere?

a) $3{,}375\pi$ cm^3 b) $4{,}500\pi$ cm^3 c) $27{,}000\pi$ cm^3 d) $36{,}000\pi$ cm^3 e) N.O.T.

The following information is needed for problems 42 – 45:

Some junior high students were asked about their reading habits. Specifically, they were asked how many books they read for fun each week. The results are shown in the table below.

	Fewer than 1 book/week	About 1 book/week	More than 1 book/week
7th Graders	8	10	2
8th Graders	15	9	6

42. What is the relative frequency that a 7th grader reads fewer than one book per week?

a) 8% b) 16% c) 20% d) 40% e) N.O.T.

43. What is the relative frequency that an 8th grader reads at most one book per week?

a) 80% b) 50% c) 48% d) 40% e) N.O.T.

44. What is the relative frequency that a student reads at least one book per week?

a) 54% b) 27% c) 16% d) 8% e) N.O.T.

45. What is the relative frequency that an 8th grader reads at least one book per week?

a) 50% b) 30% c) 20% d) 12% e) N.O.T.