Dick Schaff Math Superbowl XLI
Level 1: Pre-Algebra Blitz – 2014

Directions: (1) Select the most correct answer for each question and mark it on your answer form.
(2) No calculators of any sort are allowed.
(3) Note that N.O.T. means "None of these."

1. Simplify $6 + 5 \times 4 - 3 \times 2 + 1$.
   a) 21 b) 83 c) 95 d) 33 e) N.O.T.

2. Jonathan drove for four hours at an average speed of 70 miles per hour, took a one hour break for lunch, and then drove for two more hours at an average speed of 55 miles per hour. How far did Jonathan drive?
   a) 280 miles b) 370 miles c) 390 miles d) 460 miles e) N.O.T.

3. What is $3\frac{1}{5} \times 1\frac{2}{3}$?
   a) $4\frac{3}{8}$ b) $4\frac{13}{15}$ c) $5\frac{1}{3}$ d) $3\frac{2}{15}$ e) N.O.T.

4. What is the largest prime factor of 88?
   a) 1 b) 2 c) 8 d) 88 e) N.O.T.

5. What is the least common multiple of 8 and 14?
   a) 112 b) 2 c) 42 d) 56 e) N.O.T.

6. Compute $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32}$.
   a) 1 b) $\frac{31}{32}$ c) $\frac{15}{16}$ d) $\frac{5}{62}$ e) N.O.T.

7. $2^2 + 2^2 \times 2^2 + 2^2 + 2^2 + 2^2 =$
   a) 2^5 b) 3×2^3 c) 12^2 d) 12^{12} e) N.O.T.

8. The perimeter of a circle is 36π inches. What is the diameter of the circle, in inches?
   a) 3 b) 6 c) 18 d) 36 e) N.O.T.

9. How many prime numbers have squares less than 200?
   a) 3 b) 5 c) 7 d) 9 e) N.O.T.

10. A football field is a rectangle 120 yards long and $53\frac{1}{3}$ yards wide. Joseph ran six laps around the football field before the game. How far did Joseph run?

a) 1040 yards b) 1200 yards c) 1272 yards d) 2080 yards e) N.O.T.

11. A dartboard is designed to have two scoring areas, one of which is worth 5 points, and the other is worth 7 points. If an unlimited number of darts are allowed, what is the largest finite score that cannot be attained?

a) 22 b) 23 c) 24 d) 26 e) N.O.T.

12. Simplify the expression $(3-6)(5-9)(6-8)$.

a) -24 b) 24 c) -12 d) 12 e) N.O.T.

13. Which of the following fractions is not equal to the other three?

a) $\frac{14}{21}$ b) $\frac{26}{39}$ c) $\frac{18}{24}$ d) $\frac{32}{48}$ e) All are equal

14. Four men arrive at a restaurant, each accompanied by his wife. Each person in the group shakes hands with everybody else in the group except themselves and their own wife. How many handshakes occur?

a) 12 b) 16 c) 24 d) 28 e) N.O.T.

15. Four homeowners will pay equal shares of a tax bill that totals \$4,510.00. How much does each person pay?

a) \$1,127.50 b) \$902.00 c) \$1,533.33 d) \$2,255.00 e) N.O.T.

16. In the number $1864y92$, what is the largest value that the digit y can be to ensure that $1864y92$ is evenly divisible by 3?

a) 8 b) 9 c) 4 d) 5 e) N.O.T.

17. Divide 15 into 3750.

a) 25 b) 0.04 c) 250 d) 0.004 e) N.O.T.

18. What is the probability of an 70% free throw shooter making 3 free throws in a row? Assume that the free throws are independent.

a) 70% b) 49% c) 39.2% d) 34.3% e) N.O.T.

19. $40!/38! =$

a) 1520 b) 1600 c) 2 d) 40 e) N.O.T.

20. Of 100 people surveyed, 75 like classic rock music, 55 like country music, and 40 like both types of music. How many people surveyed liked one type of music but not the other?

a) 10 b) 25 c) 50 d) 90 e) N.O.T.

21. $3\frac{1}{2} \div 2\frac{3}{4} =$

a) $1\frac{3}{11}$ b) $9\frac{5}{8}$ c) $6\frac{3}{8}$ d) $\frac{3}{4}$ e) N.O.T.

22. Subtract 10.6648 from 18.74.

a) 8.0752 b) 7.9748 c) 8.0848 d) 7.9752 e) N.O.T.

23. To obtain a grade of "A" in a course, a student must have an average of 90 on five tests. A student receives scores of 98, 79, 91, and 88 on the first four tests. What is the minimum score needed on the fifth exam to guarantee an "A" grade for the course?

a) 89 b) 94 c) 96 d) 98 e) N.O.T.

24. Which of the following equations is true?

a) $(x-4)^2 = x^2 - 16$ b) $x(6ab) = (6x)(ax)(bx)$

c) $(x^7)(x^5) = x^{35}$ d) $x^9/x^3 = x^6$ e) N.O.T.

25. A typist makes 5 errors for every 100 characters he types. How many errors does he make in 2 pages of typing if each page contains 25 lines with 70 characters in each line?

a) 50 b) 125 c) 140 d) 250 e) N.O.T.

26. What is the sum of all the factors of 18?

a) 39 b) 28 c) 19 d) 59 e) N.O.T.

27. Simplify the following: $\dfrac{2}{4 + \frac{6}{8+10}} =$

a) $\frac{8}{15}$ b) $\frac{15}{8}$ c) $\frac{6}{13}$ d) $\frac{13}{6}$ e) N.O.T.

28. Sarah makes \$20 per hour at her job, and is paid 150% of that rate for overtime. One week, Sarah works 46 hours, six of which is overtime. How much money is Sarah paid for work that week?

a) \$800 b) \$920 c) \$960 d) \$1040 e) N.O.T.

29. A stack containing twenty dimes is one inch high. How many inches long is a five dollar roll of dimes?

a) 1 inch b) 2 inches c) 2.5 inches d) 5 inches e) N.O.T.

30. Translate the following into a mathematical expression: *The quotient of six times a number and 5 is 3 less than the product of 8 and the number.*

a) $6n + 5 = 3 - 8n$ b) $6n + 5 = 8 - 3n$

c) $\frac{6n}{5} = 3 - 8n$ d) $\frac{6n}{5} = 8 - 3n$ e) N.O.T.

31. Suppose P is directly proportional to Q/R. If $P = 25$ when $Q = 60$ and $R = 15$, what is the value of P when $Q = 18$ and $R = 5$?

a) 45 b) 22.5 c) 12.25 d) 90 e) N.O.T.

32. If $a \mathbin{@} b$ is defined as $(a + 1)(b + 1)$, find $(2 \mathbin{@} 3) \mathbin{@} 4$.

a) 48 b) 60 c) 63 d) 65 e) N.O.T.

33. Which of the following is equaivalent to $0.3\overline{6}$?

a) $\frac{4}{11}$ b) $\frac{11}{30}$ c) $\frac{9}{25}$ d) $\frac{33}{100}$ e) N.O.T.

34. Find the greatest common factor of 48 and 72.

a) 6 b) 144 c) 48 d) 24 e) N.O.T.

35. The number 36 is what percent of 25?

a) 144% b) $69.\overline{4}\%$ c) 150% d) $66.\overline{6}\%$ e) N.O.T.

36. Evaluate $2x^3 - 5x^2y + 3xy^2$ when $x = -3$ and $y = -2$.

a) 198 b) 90 c) 18 d) -90 e) N.O.T.

37. Emily bought a package of stickers at the local store. She put half of the stickers in her room and took the other half to her friend Taylor's house. While there, Emily gave one fourth of her stickers she had with her to Taylor. She then gave two of her remaining stickers to Taylor's little brother. At that point, Emily had seven stickers with her. How many stickers did Emily originally buy at the store?

a) 8 b) 16 c) 24 d) 32 e) N.O.T.

38. Three thousand six-hundred gallons of water occupy thirty percent of a storage tank's capacity. How many gallons of water are needed to fill the rest of the tank?

a) 8,400 b) 10,000 c) 12,000 d) 15,600 e) N.O.T.

39. Jonathan waited patiently for an important phone call from 10:30 a.m. to 1:15 p.m. How many hours did Jonathan wait for the phone call?

a) $2\frac{9}{20}$ b) $2\frac{3}{4}$ c) $3\frac{3}{4}$ d) $3\frac{9}{20}$ e) N.O.T.

40. What is the 50^{th} number in the following arithmetic sequence? 85, 79, 73, 67, 61, ...

a) -215 b) -209 c) -203 d) -197 e) N.O.T.

41. The area of a square is 64 square meters. What is the length of its diagonal, in meters?

a) $8\sqrt{2}$ b) 16 c) $4\sqrt{2}$ d) $64\sqrt{2}$ e) N.O.T.

42. Compute $0.2^2 + \left(\frac{1}{4}\right)^2$.

a) 0.6650 b) 0.4625 c) 0.5400 d) 0.1025 e) N.O.T.

43. Simplify $|-7+4|+|-4+7|$

a) 0 b) 6 c) -6 d) 22 e) N.O.T.

44. What is the last digit in 3^{2014}?

a) 1 b) 3 c) 5 d) 7 e) N.O.T.

45. Carmen purchases a car whose base price is \$12,500. An 8% sales tax is applied to this price. How much does Carmen pay for the car?

a) \$1,000 b) \$12,508 c) \$13,500 d) \$22,500 e) N.O.T.

01 A
02 C
03 C
04 E
05 D
06 B
07 A
08 D
09 E
10 D
11 B
12 A
13 C
14 C
15 A
16 B
17 C
18 D
19 E
20 C
21 A
22 A
23 B
24 D
25 E
26 A
27 C
28 E
29 C
30 E
31 B
32 D
33 B
34 D
35 A
36 E
37 C
38 A
39 B
40 B
41 A
42 D
43 B
44 E
45 C