# Dick Schaff Math Superbowl XLIII
## Level 1: 7th Grade Blitz – 2016

**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. Translate the following sentence into symbols: "One-third the sum of $x$ and five is four less than $x$."
   a) $\frac{1}{3}x + 5 = x - 4$ b) $\frac{1}{3}x + 5 = 4 - x$ c) $\frac{1}{3}(x + 5) = 4 - x$ d) $\frac{1}{3}(x + 5) = x - 4$ e) N.O.T.

2. Mark has half of a pie. He eats one-third of this half and equally divides the remaining amount among his two friends. What fraction of a pie will each of Mark's friends receive?
   a) 1/8 b) 1/6 c) 1/4 d) 1/3 e) N.O.T.

3. If a bicycle rider travels 2/3 of a mile in 48 minutes, how many miles per hour does she travel?
   a) 8/15 b) 5/6 c) 6/5 d) 15/8 e) N.O.T.

4. If the perimeter of a rectangle is 28 inches and its length is 4 inches, what is its width?
   a) 7 inches b) 10 inches c) 14 inches d) 24 inches e) N.O.T.

5. What is the value of $-\frac{5}{14} - (-\frac{2}{15})$?
   a) 2/7 b) -4/21 c) -2/7 d) -47/210 e) N.O.T.

6. When rolling two dice, which sum below has a greater probability?
   a) 4 b) 5 c) 8 d) 10 e) N.O.T.

7. If the weight of a watermelon is proportional to its width and a 5 pound watermelon is 1 foot wide, then how many pounds would a watermelon weigh that is 8 inches wide?
   a) 2.5 b) 3 c) 3.5 d) 4 e) N.O.T.

8. Which of the following has the smallest probability?
   A) Obtaining "heads" from the flip of a coin
   B) Rolling an even number on a die
   C) Rolling a sum of 6 or less on a pair of dice
   D) Rolling an even sum on a pair of dice
   a) A b) B c) C d) D e) N.O.T.

9. How many different triangles can be drawn that contain a 25 degree angle?

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

10. A 5 pound bag of flour costs \$4.50. At that rate, how much would a 12 pound bag of flour cost?

a) \$9.00 b) \$10.00 c) \$10.80 d) \$13.33 e) N.O.T.

11. What is the surface area of a rectangular prism with a width of 4 inches, a length of 3 inches, and a height of 2 inches?

a) 28 square inches b) 52 square inches c) 56 square inches d) 96 square inches e) N.O.T.

12. Divide 4175 by 45.

a) 92 b) 92.7 c) $92.\overline{7}$ d) 92.8 e) N.O.T.

13. How many units apart are 7/6 and -2/3 on a number line?

a) 1/2 b) 7/9 c) 1 d) 11/6 e) N.O.T.

14. If a right circular cylinder standing on its end is sliced in half from top to bottom, what shape will the cross-section be?

a) rectangle b) circle c) oval d) triangle e) N.O.T.

15. What is the circumference of a circle with a radius of 10 units?

a) $5\pi$ b) $10\pi$ c) $20\pi$ d) $100\pi$ e) N.O.T.

16. Simplify $\dfrac{\frac{2}{5} \div \frac{7}{10}}{\frac{4}{3} \times \frac{9}{8}}$.

a) 14/75 b) 1/3 c) 8/21 d) 2/5 e) N.O.T.

17. If $p$ is the price of an item before sales tax, which of the following represents the total cost after adding 12% sales tax?

a) $.12p$ b) $1.12p$ c) $1 + .12p$ d) $p + .12$ e) N.O.T.

18. What is the decimal equivalent of 19/8?

a) $2\frac{3}{8}$ b) 2.375 c) $2.37\overline{5}$ d) $2.\overline{375}$ e) N.O.T.

19. What is the area of a circle with a circumference of $16\pi$ units?

a) $4\pi$ b) $16\pi$ c) $64\pi$ d) $256\pi$ e) N.O.T.

20. If you flip a coin, roll a die, and randomly choose a letter from the alphabet, what is the probability of getting "tails", a number greater than 2, and a consonant?

a) 5/78 b) 1/15 c) 7/26 d) 105/312 e) N.O.T.

21. If one pie requires 4/3 of a cup of sugar, how many whole pies can be made if 6 cups of sugar are available?

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

22. If an item that is on sale for 20% off has a sale price of \$30, what is the usual price of the item?

a) \$24.00 b) \$34.50 c) \$36.00 d) \$37.50 e) N.O.T.

23. If you have six atoms with a charge of +2 each, how many atoms of charge -3 would you need to add in order to have a charge of 0?

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

24. Let $p$ be the price of an item. After sales tax is added, the cost of the item is $1.095p$. What is the sales tax rate?

a) .95% b) 1.095% c) 9.5% d) 95% e) N.O.T.

25. If $y$ is proportional to $x$ and the graph of $y$ versus $x$ goes through the point $(8, 6)$, which other point does the graph go through?

a) $(12, 9)$ b) $(4, 2)$ c) $(10, 8)$ d) $(1, 1)$ e) N.O.T.

26. What is the value of $-\frac{5}{7} + \left(-\frac{2}{5}\right)$?

a) $-\frac{39}{35}$ b) $-\frac{7}{35}$ c) $\frac{9}{35}$ d) $\frac{39}{35}$ e) N.O.T.

27. Which of the following is equivalent to $\frac{2}{3}\left(\frac{1}{2}x + \frac{1}{3}\right)$?

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

28. Which would be expected to have a greater variation in a sample of 100 randomly selected adults in the U.S.?

A) The ages of those selected
B) The heights in inches of those selected
C) The heights in feet of those selected
D) The shoes sizes of those selected

a) A b) B c) C d) D e) N.O.T.

29. Which of the following is not a probability?

a) 1/2 b) 53% c) 1.0 d) 1.2 e) N.O.T.

30. Which of the following is the value of $-42 \div (-8)$?

a) $-\frac{21}{4}$ b) $-\frac{4}{21}$ c) $\frac{4}{21}$ d) $\frac{21}{4}$ e) N.O.T.

31. A woman currently makes \$20 an hour. After deducting 10% for income tax, she gets to take home \$18 an hour. If she gets a 10% raise but still pays 10% in income tax, how much will she get to take home per hour?

a) \$19.80 b) \$20.00 c) \$20.80 d) \$22.00 e) N.O.T.

32. If you divide a 1 foot long ruler into 30 pieces of equal length, how long will each piece be?

a) 0.4 feet b) $\frac{1}{30}$ inches c) $\frac{2}{5}$ inches d) $\frac{30}{12}$ inches e) N.O.T.

33. What do you call a group selected from a population for the purposes of a statistical study?

a) subject b) sample c) volunteers d) mean e) N.O.T.

34. If a person's weight is proportional to his height and a person who is $h$ inches tall weighs $w$ pounds, which equation below represents the relationship between height and weight?

a) $w = kh$ b) $h = wk$ c) $\frac{h}{w} = k$ d) All of these e) N.O.T.

35. Willy is a salesman who gets paid \$100 per day plus \$8 for each item he sells. How many items does Willy need to sell in order to make between \$150 and \$160 in a day?

a) 7 b) 12 c) 19 d) 20 e) N.O.T.

36. What is the probability of rolling two dice and getting a sum of 9?

a) 1/18 b) 1/12 c) 1/9 d) 1/6 e) N.O.T.

37. A rectangle has a length of 10 inches and an area of 25 square inches. What will the area be if the length and width are both doubled?

a) 50 square inches
b) 100 square inches
c) 500 square inches
d) 2000 square inches
e) N.O.T.

38. A house painter can paint $1\frac{1}{4}$ rooms in a day. At that rate, how many rooms can she paint in 4.5 days?

a) $4\frac{1}{8}$
b) $5\frac{1}{2}$
c) $5\frac{5}{8}$
d) $5\frac{3}{4}$
e) N.O.T.

39. What is the mean of the following list of numbers: 15, 17, 12, 19, 23, 7

a) 15
b) 16
c) 17
d) 19
e) N.O.T.

40. The weight of a bucket of water is proportional to its volume. If 3/4 of a gallon of water weighs 6 pounds, how many pounds does 1/2 of a gallon of water weigh?

a) 1/4
b) 9/4
c) 4
d) 8
e) N.O.T.

41. What is the value of $\frac{16}{15} \div \frac{12}{5}$?

a) 9/4
b) 64/25
c) 64/5
d) 4/9
e) N.O.T.

42. What is the relationship between the two acute angles in a right triangle?

a) congruent
b) complementary
c) supplementary
d) sum to 180°
e) N.O.T.

43. What is the value of $7\frac{1}{12} - 2\frac{1}{3}$?

a) $4\frac{3}{4}$
b) $5\frac{5}{12}$
c) $5\frac{3}{4}$
d) $9\frac{5}{12}$
e) N.O.T.

44. Which of the following cannot be the sides of a right triangle?

a) 3, 4, 5
b) 5, 12, 13
c) 9, 12, 15
d) 7, 24, 25
e) N.O.T.

45. Sarah notices that when a circle is small the circumference is bigger than the area, but when a circle is big the area is bigger than the circumference. She guesses that there must be some size where the circumference and the area are equal. What does the diameter of a circle need to be in order for the circumference and the area to be equal?

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