



**TMSCA MIDDLE SCHOOL
MATHEMATICS
TEST #4 ©
NOVEMBER 10, 2018**

GENERAL DIRECTIONS

- About this test:
 - You will be given 40 minutes to take this test.
 - There are 50 problems on this test.
- All answers must be written on the answer sheet/Scantron form/Chatsworth card provided. If you are using an answer sheet be sure to use **BLOCK CAPITAL LETTERS**. Clean erasures are necessary for accurate grading on Scantrons and Chatsworth cards.
- If you are using a Chatsworth or Scantron card, please follow the specific instructions given at your particular meet.
- You may write anywhere on the test itself. You must write only answers on the answer sheet.
- You may use additional scratch paper provided by the contest director.
- All problems have **ONE** and **ONLY ONE** correct [BEST] answer. There is a penalty for all incorrect answers.
- Calculators **MAY NOT** be used on this test.
- All problems answered correctly are worth **FIVE** points. **TWO** points will be deducted for all problems answered incorrectly. No points will be added or subtracted for problems not answered.
- In case of ties, percent accuracy will be used as a tie breaker.

1. $78 - 319 =$ _____
 A. -261 B. -241 C. -397 D. -387 E. -361

2. $-84 + (-346) =$ _____
 A. -430 B. -262 C. 262 D. -448 E. -230

3. $2,312 \div 3.4 =$ _____
 A. 6,800 B. 680 C. 68,000 D. 68 E. 6,080

4. $4\frac{1}{2} \times 7\frac{1}{3} =$ _____
 A. $28\frac{1}{6}$ B. $32\frac{5}{6}$ C. $33\frac{1}{6}$ D. 30 E. 33

5. On a coordinate grid, which ordered pair describes a point that is located nine units to the left of the y-axis and eleven units above the x-axis?
 A. (-9, 11) B. (-9, -11) C. (9, -11) D. (-11, 9) E. (11, -9)

6. What is the LCM of the numbers 48 and 30?
 A. 240 B. 120 C. 6 D. 18 E. 360

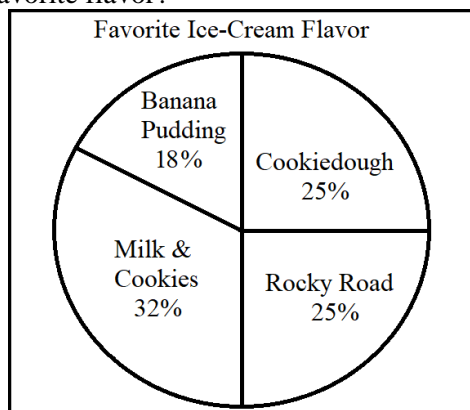
7. The sum of two numbers is 47. One number is 15. What is the product of the two numbers?
 A. 17 B. 32 C. 705 D. 480 E. 420

8. Tabatha had \$30 to buy school supplies. She bought 4 spirals that cost \$3.75 each, a highlighter for 89¢, a pack of pencils for \$4.55, a pack of pens for \$5.79 and an eraser for 55¢. Assuming there was no tax, how much money does Tabatha have remaining?
 A. \$4.12 B. \$14.47 C. \$4.47 D. \$3.22 E. \$3.56

9. 3.5 gallons = _____ quarts
 A. 18 B. 22 C. 28 D. 10 E. 14

10. What is the units digit of the sum $1 + 2 + 3 + 4 + \dots + 13 + 14 + 15$?
 A. 0 B. 1 C. 2 D. 3 E. 5

11. 200 students were asked what their favorite ice-cream flavor was. The graph below shows the results. How many students said banana pudding was their favorite flavor?



A. 50 B. 18 C. 64 D. 36 E. 32

12. Simplify: $3^2(8^1 - 5) + (2^4 - 4^2)$
 A. 18 B. 27 C. -20 D. -21 E. 43

13. $\frac{8}{5} \neq$ _____

- A. 1.6 B. $1\frac{3}{5}$ C. 16% D. $\frac{24}{15}$ E. 160%

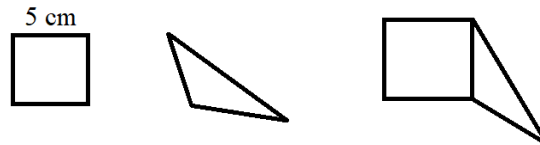
14. What is the perimeter of a right triangle with legs measuring 5 cm and 12 cm?

- A. 22 cm B. 30 cm C. 32 cm D. 27 cm E. 34 cm

15. What value of n makes the proportion $\frac{5}{14} = \frac{n}{98}$ true?

- A. 42 B. 41 C. 35 D. 31 E. 25

16. The perimeters of the square and triangle below are equal. One side of the triangle has the same measure as a side of the square. What is the perimeter of the pentagon formed when the shapes are adjacent to each other as shown?



- A. 20 cm B. 30 cm C. 40 cm D. 50 cm E. 60 cm

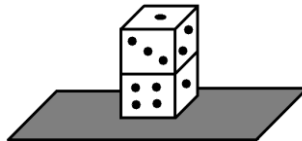
17. Solve: $\frac{a}{12} \geq -8$

- A. $a \leq -96$ B. $a \geq -96$ C. $a \leq -\frac{2}{3}$ D. $a \geq -\frac{2}{3}$ E. $a \leq -0.\bar{6}$

18. 768 ounces = _____ gallons

- A. 6 B. 8 C. 14 D. 9 E. 12

19. Two dice are stacked on top of each other on a desk. If a student were asked to walk around the desk, what is the sum of all the visible faces of the stacked dice?



- A. 11 B. 36 C. 14 D. 29 E. 24

20. What is the sum of the reciprocals of the numbers 7 and 8?

- A. $\frac{15}{56}$ B. $\frac{5}{14}$ C. $\frac{1}{56}$ D. $\frac{1}{15}$ E. $\frac{15}{28}$

21. What is the sum of the largest two positive integral divisors of the number 34?

- A. 51 B. 19 C. 54 D. 34 E. 20

22. $544 \div 4 =$ _____ (Roman numeral)

- A. CXXVI B. CLXII C. CLVI D. XCLXVI E. CXXXVI

23. Suma writes down ♠, ☺, ☀, ►, ♥, ♪, ♣, ☹, ☀, ►, ♥, ♪, ♣, ☹, ☀, ►, ♥, ♪, ... If Suma continues the pattern, what will be the 93rd symbol Suma writes down?

- A. ♠ B. ☺ C. ☀ D. ► E. ♥

24. A spinner is divided into 8 equal portions numbered 1 – 8. If the spinner is spun twice, what is the probability of getting a composite number on both spins?

- A. $\frac{9}{64}$ B. $\frac{3}{64}$ C. $\frac{3}{8}$ D. $\frac{1}{8}$ E. $\frac{5}{32}$

25. How many subsets does the set $\{2, 4, 6, 8, 10\}$ have?
 A. 32 B. 10 C. 16 D. 20 E. 64
26. If 1 meemee's = 6 deedee's and 7 deedee's = 5 reeree's, how many meemee's are equal to 30 reeree's?
 A. 7 B. 8 C. 42 D. 12 E. 3
27. What is the slope of a line parallel to the line that passes through the points $(42, 37)$ and $(30, -11)$?
 A. $\frac{1}{4}$ B. $\frac{1}{2}$ C. 8 D. 6 E. 4
28. If $\frac{3}{4} = \frac{m}{36} = \frac{33}{n}$, then what is the value of $m + n$?
 A. 63 B. 71 C. 84 D. 57 E. 65
29. If $f(x) = 14x^2$, then find the value of $f(-13)$.
 A. 33,124 B. -2,548 C. 2,548 D. 2,366 E. 3,124
30. What is the value of x , if $2x - 5x + 6x = 120$?
 A. 120 B. 30 C. 20 D. 40 E. 60
31. What is the decay factor of the exponential decay function $y = 5.6(0.07)^x$?
 A. 5.6 B. 560 C. 93 D. 0.07 E. 0.392
32. Point A has coordinates $(19, 24)$ and point B has coordinates $(-17, 38)$. If point C is the midpoint of \overline{AB} , what are the coordinates of point C ?
 A. $(18, 31)$ B. $(2, 14)$ C. $(2, 31)$ D. $(1, 31)$ E. $(1, 14)$
33. In Paris, the temperature is $35^\circ C$. What would this temperature be in degrees Fahrenheit?
 A. $87^\circ F$ B. $95^\circ F$ C. $97^\circ F$ D. $90^\circ F$ E. $102^\circ F$
34. In 7th grade, each student has blue eyes or wears glasses, $\frac{1}{4}$ of students with blue eyes wear glasses and $\frac{1}{3}$ of the students that wear glasses have blue eyes. In total, what percentage of the class wear glasses?
 A. 25% B. $33\frac{1}{3}\%$ C. 50% D. 30% E. $8\frac{1}{3}\%$
35. Samuel bought a dozen pens, six pencils and four permanent markers. Pens cost \$2.25 each, pencils cost \$0.50 each and permanent markers cost \$3.75 each. If there is a 6% sales tax, how much was Samuel's total bill?
 A. \$47.50 B. \$46.06 C. \$46.30 D. \$47.10 E. \$47.70
36. How many zeros does the product of $2^3 \times 3^3 \times 5^4$ end with?
 A. 1 B. 2 C. 3 D. 4 E. 5
37. A line passes through the points $(16, 12)$ and $(-4, y)$. If the slope of the line is $\frac{3}{4}$, what is the value of y ?
 A. 6 B. $-\frac{44}{3}$ C. $-\frac{3}{44}$ D. -4 E. -3
38. $11_2 + 101_2 = \underline{\hspace{2cm}}_{10}$
 A. 8 B. 12 C. 10 D. 112 E. 6
39. Factor completely: $3m^3 - 24m^2 - 99m$
 A. $3m(m - 11)(m + 3)$ B. $(3m - 33)(m + 3)$ C. $(3m + 9)(m - 11)$ D. $3(m^2 - 11)(m + 3)$ E. $m^2(3m - 3)(m - 11)$
40. How many positive two-digit integers can be written in such a way that the first digit is greater than the second digit?
 A. 50 B. 45 C. 49 D. 25 E. 99

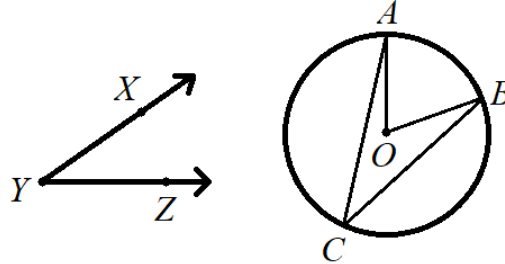
41. What is the equation of a circle with its center coordinates $(0, 7)$ and a radius of 9 units?

- A. $x^2 + (y + 7)^2 = 9$ B. $x^2 + (y + 7)^2 = 81$ C. $x^2 + (y - 7)^2 = 9$ D. $x^2 + (y - 7)^2 = 18$ E. $x^2 + (y - 7)^2 = 81$

42. Three consecutive odd integers have a sum of -255 . What is the absolute value of the largest of these integers?

- A. 89 B. 87 C. 85 D. 83 E. 81

43. If $m\angle XYZ = 36^\circ$ and is the complement measure to $\angle AOB$, find $m\angle ACB$.



- A. 34° B. 54° C. 27° D. 18° E. 17°

44. What is an equation of the line that passes through the points $(5, -3)$ and $(-3, 9)$?

- A. $3x - 2y = -9$ B. $y - 3 = -\frac{3}{2}(x - 5)$ C. $y = -1.5x - 4.5$ D. $3x - 2y = 9$ E. $y - 9 = -\frac{3}{2}(x + 3)$

45. The solution to the system $\begin{cases} 8x - 2y = 36 \\ x + y = 12 \end{cases}$ is (x, y) . Find the value of $x - y$.

- A. 0 B. 4 C. -2 D. -1 E. 3

46. What is the sum of $C + D$, if $(x + 3)^3 = x^3 + 9x^2 + Cx + D$.

- A. 36 B. 27 C. 45 D. 54 E. 63

47. $\frac{7}{4m} - \frac{2}{5n} =$ _____

- A. $\frac{35n-8m}{20mn}$ B. $\frac{5}{-mn}$ C. $\frac{8m-35n}{20mn}$ D. $\frac{35m-8n}{-mn}$ E. $\frac{5}{4m-5n}$

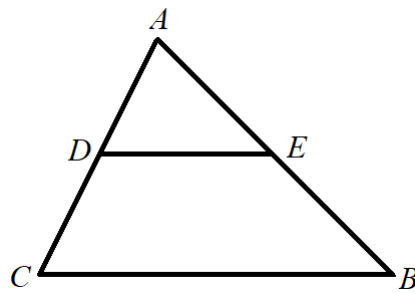
48. Solve for m : $-3|2m| = 75$

- A. 12.5 B. ± 12.5 C. 39 D. 112.5 E. no solution

49. $\log_{10}(7 \cdot 12)$ is equivalent to which of the following?

- A. $7 \log_{10} 12$ B. $12 \log_{10} 7$ C. $\log_{10} 7 - \log_{10} 12$ D. $\log_{10} \left(\frac{7}{12}\right)$ E. $\log_{10} 7 + \log_{10} 12$

50. In the picture below, $\overline{DE} \parallel \overline{CB}$, $AD = 4 \text{ cm}$, $AC = 9 \text{ cm}$, and $AE = 12 \text{ cm}$. What is the measure of \overline{EB} ?



- A. 27 cm B. 15 cm C. 18 cm D. 21 cm E. 17 cm

2018 – 2019 TMSCA Middle School Mathematics Test #4 Answer Key

1. B	18. A	35. E
2. A	19. D	36. C
3. B	20. A	37. E
4. E	21. A	38. A
5. A	22. E	39. A
6. A	23. C	40. B
7. D	24. A	41. E
8. D	25. A	42. D
9. E	26. A	43. C
10. A	27. E	44. E
11. D	28. B	45. A
12. B	29. D	46. D
13. C	30. D	47. A
14. B	31. D	48. E
15. C	32. D	49. E
16. B	33. B	50. B
17. B	34. C	

2018-2019 TMSCA Middle School Mathematics Test #4 Selected Answers

18. There are 128 ounces in 1 gallon, so $768 \div 128 = 6$. Therefore, 768 ounces = 6 gallons.

20. The sum of the reciprocals of two numbers a and b is equal to the sum of the two numbers divided by the product of the two numbers; $\frac{a+b}{ab}$. We are given the numbers 7 and 8, so the sum of their reciprocals is $\frac{a+b}{ab} = \frac{7+8}{7 \cdot 8} = \frac{15}{56}$.

23. There are 6 symbols, so 93 divided by 6 = 15 with a remainder of 3. Since ☼ is in the third position, it will also be in the 93rd position.

24. The composite numbers on the spinner are 4, 6 and 8. If the spinner is spun twice, the chances of getting a composite number on both spins is equal to $\frac{3}{8} \cdot \frac{3}{8} = \frac{9}{64}$.

26. Since 1 meemee's = 6 deedee's, then 7 meemee's = 42 deedee's and if 7 deedee's = 5 reeree's, then 42 deedee's = 30 reeree's. Therefore, 7 meemee's = 30 reeree's.

33. To change a temperature from Celsius to Fahrenheit, use the formula $F = \frac{9}{5}C + 32$. We are given the temperature $35^\circ C$ and asked what it would be in Fahrenheit. So, substituting into the formula and $F = \frac{9}{5}C + 32 = \frac{9}{5} \cdot 35 + 32 = 63 + 32 = 95^\circ F$.

35. One dozen = 12. So, $12 \times 2.25 + 6 \times 0.5 + 4 \times 3.75 = 45$. Since there is a 6% sales tax, the total bill will come out to be $45 \times 1.06 = \$47.70$.

36. $2 \times 5 = 10$, so we are looking at how many 2×5 pairs we can form from $2^3 \times 3^3 \times 5^4$. Since we have 2^3 and 5^4 , we can form 3 pairs of 2×5 . Since we can form 3 pairs, $2^3 \times 3^3 \times 5^4$ will end in 3 zeros.

40. Start by making a list. There is only 1 two-digit number with 1 as the tens digit that is greater than the ones digit, which is 10. There are 2 two-digit numbers where 2 as the tens digit is greater than 0, or 1, which are 20 and 21. There are 3 two-digit numbers where 3 as the tens digit is greater than 0, 1, or 2, which are 30, 31, and 32. If you follow the pattern, we can see the number of positive two-digit integers where the first digit is greater than the second is found by $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 = 45$.

46. $(x + 3)^3 = (x + 3)(x + 3)(x + 3) = (x^2 + 6x + 9)(x + 3) = x^3 + 3x^2 + 6x^2 + 18x + 9x + 27 = x^3 + 9x^2 + 27x + 27$. This gives us $C = 27$ and $D = 27$ and $C + D = 27 + 27 = 54$.

49. If $\log_x(a \cdot b) = \log_x a + \log_x b$, then $\log_{10}(7 \cdot 12) = \log_{10} 7 + \log_{10} 12$.

50. From the picture, if $\overline{DE} \parallel \overline{CB}$, then we have two similar triangles, $\triangle AED \sim \triangle ABC$. Since the triangles are similar, the sides are proportional and we can create the proportion $\frac{AD}{AC} = \frac{AE}{EB}$ which gives us $\frac{4}{9} = \frac{12}{x+12}$, where $x = EB$. Cross multiplying and we get $4x + 48 = 108$. Subtracting 48 from both sides and $4x = 60$. Dividing by 4 and we get $x = 15$, so $EB = 15$ cm.