T M S C A M I D D L E S C H O O L
M A T H E M A T I C S
K I C K - O F F T E S T ©
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GENERAL DIRECTIONS

1. About this test:
   A. You will be given 40 minutes to take this test.
   B. There are 50 problems on this test.
2. 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.
3. If you are using a Chatsworth or Scantron card, please follow the specific instructions given at your particular meet.
4. You may write anywhere on the test itself. You must write only answers on the answer sheet.
5. You may use additional scratch paper provided by the contest director.
6. All problems have **ONE** and **ONLY ONE** correct [BEST] answer. There is a penalty for all incorrect answers.
7. Calculators **MAY NOT** be used on this test.
8. 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.
9. In case of ties, percent accuracy will be used as a tie breaker.

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2020 – 2021 TMSCA Middle School Mathematics Kick-Off Test

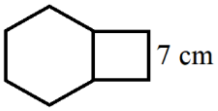
1. $57 + 88 =$ _____
A. 147 B. 155 C. 145 D. 136 E. 175

2. $71 - 38 =$ _____
A. 29 B. 27 C. 37 D. 39 E. 33

3. $47 \times 53 =$ _____
A. 2,731 B. 2,381 C. 2,451 D. 2,491 E. 2,521

4. $1{,}003 \div 17 =$ _____
A. 57 B. 55 C. 53 D. 59 E. 63

5. A regular hexagon and a square share a side. What is the perimeter of the new shape below.



A. 56 cm B. 70 cm C. 63 cm D. 49 cm E. 98 cm

6. 156 cm = _____ mm
A. 15,600 B. 1.56 C. 15.6 D. 1,560 E. 156,000

7. What is 20% of 46?
A. 8.6 B. 9.2 C. 9.6 D. 8.4 E. 8.8

8. $2 + 4 + 6 + 8 + 10 =$ _____
A. 32 B. 36 C. 28 D. 38 E. 30

9. Simplify: $6a + 12a - 9a - 3a + 17a$
A. $29a$ B. $17a$ C. $23a$ D. $11a$ E. $18a$

10. XIV = _____ (Arabic number)
A. 24 B. 104 C. 14 D. 9 E. 19

11. What number when divided by 8 gives a remainder of 4?
A. 70 B. 452 C. 622 D. 78 E. 114

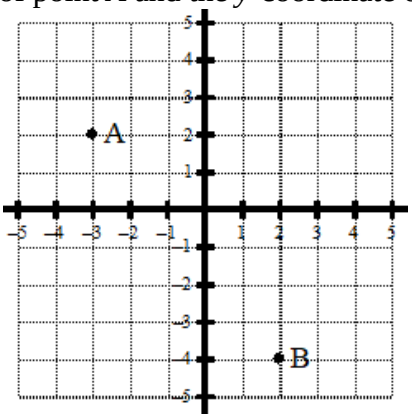
12. What is the median of the set of numbers 87, 11, 26, 35, 91, 91, 91, 35, and 33?
A. 80 B. 35 C. 91 D. 63 E. 33

13. What is the next term in the sequence 2, 18, 34, 50, 66, 82, 98, …?
A. 104 B. 112 C. 118 D. 116 E. 114

14. $57{,}811 \div 9$ has a remainder of _____.
A. 4 B. 5 C. 3 D. 2 E. 6

15. What is the complement of an angle measuring 73°?
A. 27° B. 107° C. 17° D. 117° E. 7°

16. What is the sum of the *x*-coordinate of point *A* and the *y*-coordinate of point *B*?



A. 4 B. -1 C. -3 D. -7 E. -2

17. What is the GCF of the numbers 156 and 36?
A. 4 B. 36 C. 5,616 D. 8 E. 12

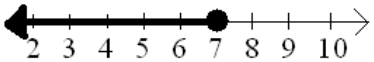
18. $2 \cdot 3^3 \cdot 11$ is the prime factorization of which of the following?
A. 574 B. 714 C. 384 D. 594 E. 564

19. Evaluate $|17h| - 3$ if $h = -23$.
A. -9 B. 37 C. -388 D. 388 E. 394

20. 1.4 hours = _____ minutes
A. 94 B. 84 C. 140 D. 104 E. 64

21. If $\pi = 3$, what is the circumference of a circle with a diameter of 4.5 inches?
A. 7.5 inches B. 27 inches C. 13.5 inches D. 6.75 inches E. 15 inches

22. Which inequality statement describes the graph below?



A. $n < 7$ B. $n > 7$ C. $n \leq 7$ D. $n \geq 7$ E. $n \neq 7$

23. Clinton is buying a slice of pizza for $3.35, a bag of chips for $1.50 and a drink for $1.99. If there is no tax, how much change will Clinton get back if he pays with a $10 bill?
A. $4.85 B. $3.49 C. $5.34 D. $2.86 E. $3.16

24. United Airlines had an average flight delay of 20 minutes. To improve customer service, the airline improved their delay time to only 12 minutes. What is the percent of decrease in their average flight delay time?
A. 80% B. 60% C. 40% D. 20% E. 75%

25. If $x \blacksquare y = -7xy$, then what is the value of $-5 \blacksquare 13$?
A. 455 B. -455 C. 1 D. 48 E. 635

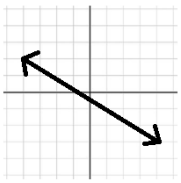
26. 76_{10} = _____ (base 6)
A. 212 B. 204 C. 214 D. 234 E. 252

27. Julia wants to write the number 34,000,000,000 in scientific notation. If she does so correctly, which of the following will Julia write down?
A. 34×10^{9} B. 3.4×10^{-10} C. 34×10^{-9} D. 3.4×10^{10} E. 0.34×10^{11}

28. Suzy is retiling a small space in her bathroom with 2 inch × 2 inch tiles. How many 2 inch × 2 inch tiles can fit inside the space Suzy wants to retile that measure 2 ft × 3 ft?
A. 108 B. 54 C. 324 D. 162 E. 216

29. Jose opens his brand new book and the two page numbers he sees have a sum of 97. What is the product of the two page numbers Jose sees?
A. 9,409 B. 194 C. 2,352 D. 2,304 E. 2,401

30. What type of slope does the line below have?



A. positive slope B. negative slope C. undefined slope D. zero slope E. neutral slope

31. What is the sum of all the interior angles of any hexagon?
A. 720° B. 900° C. 540° D. $1{,}080^{\circ}$ E. $1{,}260^{\circ}$

32. What is the degree of the monomial $24a^4b^2cd^3$?
A. 9 B. 24 C. 34 D. 10 E. 25

33. If *x* must be a positive integer, what is the sum of all the solutions of $x - 5 < 3$?
A. 8 B. 24 C. 36 D. 28 E. 26

34. The angles in a triangle are in a ratio of 2:3:5. What is the measure of the smallest angle?
A. 20° B. 24° C. 32° D. 28° E. 36°

35. If $f(x) = -3x^2$, then what is the value of $f(-6 + (-3))$?
A. 54 B. -54 C. -135 D. -81 E. -243

36. Simplify: $2(3d^3)^2$
A. $36d^6$ B. $36d^9$ C. $18d^9$ D. $18d^6$ E. $25d^9$

37. If $4(x + 2) = -2(12 - 6x)$, then $x + 2$ = _____.
A. 6 B. -2 C. -4 D. 12 E. 4

38. If the sets of numbers below represent side lengths of triangles, which set represents a right triangle?
A. 5, 12, 14 B. 3, 4, 6 C. 7, 15, 19 D. 10, 11, 12 E. 8, 15, 17

39. What is the *y*-intercept of the linear equation $-7x - 4y = 12$?

A. $\frac{7}{4}$ B. -3 C. $\frac{4}{7}$ D. $-\frac{1}{3}$ E. $-\frac{12}{7}$

40. Which of the following is equivalent to $\sqrt{-1}$?

A. π B. 1 C. i D. Σ E. -1

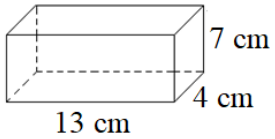
41. $41_5 + 33_5$ = _____ (base 5)

A. 72 B. 74 C. 124 D. 114 E. 122

42. The function $f(x) = \sqrt{x}$ is translated to create the function $g(x) = \sqrt{x-5}$. When comparing the graphs, $f(x)$ was translated to the _____ to create $g(x)$.

A. up 5 units B. down 5 units C. left 5 units D. right 5 units E. no change

43. What is the volume of the rectangular prism below?



A. 364 cm^3 B. 342 cm^3 C. 728 cm^3 D. 147 cm^3 E. 294 cm^3

44. The solution to the system of equations $\begin{cases} x - y = 17 \\ 3x + 2y = -14 \end{cases}$ is (x, y). What is the value of $x + y$?

A. -6 B. -11 C. -7 D. -3 E. -9

45. What is the simple interest accumulated after depositing \$1,500 at 4% for 3 years?

A. \$120 B. \$115 C. \$180 D. \$160 E. \$165

46. If $A = 2\sqrt{6}$ and $B = 8\sqrt{24}$, then what is the value of $A + B$?

A. $10\sqrt{30}$ B. $18\sqrt{6}$ C. $32\sqrt{6}$ D. $16\sqrt{30}$ E. $16\sqrt{6}$

47. Sreyash drew a line from point *A* with coordinates (14, 11) to point *B*. Point *C* is the midpoint of $\overline{AB}$ and has coordinates $(8, -3)$. What are the coordinates of point *B*?

A. $(2, -17)$ B. $(2, 4)$ C. $(11, 4)$ D. $(22, -17)$ E. $(3, 7)$

48. What is the vertex of the parabola with the equation $y = 2x^2 - 8x + 1$?

A. $(-4, 5)$ B. $(-2, 3)$ C. $(6, -7)$ D. $(-2, -4)$ E. $(2, -7)$

49. On 6 tests, Mishal had an average of 82. Her two lowest test scores were identical. If Mishal's two lowest scores are removed, Mishal's average is an 87. What was the score of one of Mishal's lowest grades?

A. 78 B. 84 C. 80 D. 72 E. 68

50. Find the sum of the following matrices. $\begin{bmatrix} 6 & -3 \\ 10 & 5 \end{bmatrix} + \begin{bmatrix} -3 & -5 \\ -2 & 4 \end{bmatrix}$ = _____

A. $\begin{bmatrix} 3 & 8 \\ 12 & 9 \end{bmatrix}$ B. $\begin{bmatrix} 3 & -8 \\ 8 & 9 \end{bmatrix}$ C. $\begin{bmatrix} -3 & -8 \\ -8 & 9 \end{bmatrix}$ D. $\begin{bmatrix} -3 & 8 \\ 12 & 9 \end{bmatrix}$ E. $\begin{bmatrix} 3 & 15 \\ 8 & 9 \end{bmatrix}$

2020 – 2021 TMSCA Middle School Mathematics Kick-Off Test Answer Key

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

2020 – 2021 TMSCA Middle School Mathematics Kick-Off Test Selected Answers

6. Since 1 cm = 10 mm, 156 cm is equal to 156(10) = 1,560 mm.

15. Complementary angles are two angles that sum to 90°. The complement of an angle that measures 73° is therefore 90 – 73 = 17°.

25. If $x \blacksquare y = -7xy$, then the value of $-5 \blacksquare 13 = -7(-5)(13) = 455$.

29. Since we do not know the two pages, let *x* represent the first page and *x* + 1 represent the next page. The sum of the pages is then *x* + *x* + 1 = 97. This simplifies to 2*x* + 1 = 97. Subtract 1 from both sides of the equation to get 2*x* = 96. Divide both sides of the equation by 2 to get *x* = 48. Since *x* = 48, the next page is 49. Therefore, the product of 48 and 49 is equal to 48(49) = 2,352.

32. The degree of a monomial is the sum of all the exponents of the variables. We are given the monomial $24a^4b^2cd^3$. Therefore, the degree of the given monomial is 4 + 2 + 1 + 3 = 10.

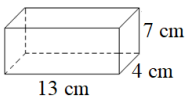
33. To solve the inequality $x - 5 < 3$, you must add 5 to both sides of the inequality. So, the solution to the inequality is *x* < 8. The sum of all the integers that satisfy this statement is 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28.

36. Using the exponent rule $(a^m)^n = a^{m \cdot n}$, $2(3d^3)^2 = 2(9d^{3 \cdot 2}) = 2(9d^6) = 18d^6$.

39. The standard form of a linear function is $Ax + By = C$. To find the *y*-intercept, use $\frac{C}{B}$. We are given the equation $-7x - 4y = 12$, so $A = -7, B = -4$ and *C* = 12. Therefore, the *y*-intercept is $\frac{12}{-4} = -3$.

40. $\sqrt{-1}$ is equal to the imaginary number *i*.

43. The formula for volume of a rectangular prism is *V* = *lwh*, with *l* = the length, *w* = width and *h* = height.



Our prism has dimension of 4 × 7 × 13, so the volume is then *V* = (4)(7)(13) = 364 cm^3.

46. If $A = 2\sqrt{6}$ and $B = 8\sqrt{24}$, then $B = 8\sqrt{4 \cdot 6} = 8 \cdot 2\sqrt{6} = 16\sqrt{6}$. The value of $A + B$ is then $2\sqrt{6} + 16\sqrt{6} = 18\sqrt{6}$.

50. $\begin{bmatrix} 6 & -3 \\ 10 & 5 \end{bmatrix} + \begin{bmatrix} -3 & -5 \\ -2 & 4 \end{bmatrix} = \begin{bmatrix} 6 + (-3) & -3 + (-5) \\ 10 + (-2) & 5 + 4 \end{bmatrix} = \begin{bmatrix} 3 & -8 \\ 8 & 9 \end{bmatrix}$