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

T E S T # 2 ©

N O V E M B E R 1 , 2 0 1 4

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.
3. If using a scantron answer form be sure to correctly denote the number of problems not attempted.
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.

2014-2015 TMSCA Middle School Mathematics Test #2

1. 567 + 729 + 1,858 = _____

A. 3,514 B. 3,451 C. 3,145 D. 3,154 E. 3,264

2. 981 – 597 – 186 = _____

A. 198 B. 208 C. 178 D. 188 E. 218

3. $8 \cdot 12 \cdot 14 =$ _____

A. 34 B. 44 C. 1,324 D. 1,374 E. 1,344

4. $1{,}760 \div 4 \div 11 =$ _____

A. 16 B. 60 C. 40 D. 12 E. 14

5. Simplify: $4 - (3 + 2)^2 + 1^5 =$ _____

A. 24 B. -20 C. -16 D. -15 E. 6

6. Let *n* equal the sum of all the prime factors of 120. Find the value of n^2.

A. 196 B. 169 C. 144 D. 100 E. 256

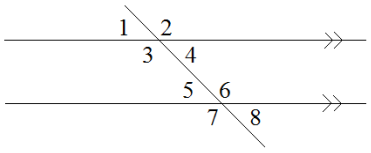
7. \$24.55 = _____ nickels + 32 dimes

A. 248 B. 427 C. 369 D. 393 E. 431

8. Which of the following is not a rational number?

A. $\sqrt{5}$ B. 4.6 C. $123.\overline{7}$ D. ¼ E. $\sqrt{169}$

9. Using the picture below, name a pair of corresponding angles.



A. $\angle 1$ & $\angle 2$ B. $\angle 2$ & $\angle 4$ C. $\angle 3$ & $\angle 8$ D. $\angle 4$ & $\angle 5$ E. $\angle 1$ & $\angle 5$

10. The point (23, -17) lies in which Quadrant?

A. I B. II C. III D. IV E. V

11. Jeffry has at most \$360 in his bank account. Which inequality statement models Jeffry's bank account?

A. $J < 360$ B. $J > 360$ C. $J \leq 360$ D. $J \geq 360$ E. $J = 360$

12. Let *m* equal the GCF of 14 and 21. Let *n* equal the LCM of 21 and 24. Find the prime factorization of the sum of *m* and *n*.

A. $3 \cdot 7^2 \cdot 13$ B. $5^2 \cdot 7$ C. $3 \cdot 5 \cdot 13$ D. $5 \cdot 7^2 \cdot 11$ E. $2^3 \cdot 3 \cdot 7$

13. 2 miles = _____ yards

A. 3,520 B. 5,280 C. 4,640 D. 2,640 E. 4,280

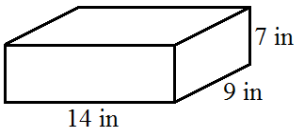
14. 4! – 3! + 2! – 1! = _____

A. 6 B. 12 C. 13 D. 18 E. 19

15. What is the unit rate of 56 apples costing $12.88?

A. $0.31 per apple B. $0.17 per apple C. $0.18 per apple D. $0.27 per apple E. $0.23 per apple

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



A. 574 in^3 B. 882 in^3 C. 1,764 in^3 D. 644 in^3 E. 776 in^2

17. 199 + 231 = _____ (Roman numeral)

A. *CDXXX* B. *DCXXX* C. *CCCCXXX* D. *CMVVV* E. *CMXXX*

18. Change the number 73,000,000,000,000 into scientific notation.

A. 73×10^{12} B. 7.3×10^{12} C. 0.73×10^{13} D. 7.3×10^{13} E. 7.3×10^{-12}

19. Solve: $4 + 3x - 9 < 20 - 1$

A. $x < \frac{14}{3}$ B. $x > \frac{32}{3}$ C. $x < 8$ D. $x > 6$ E. $x < -6$

20. 1.5 pints = _____ cups

A. 6 B. 3 C. 4 D. 5 E. 7

21. Using the stem-and-leaf plot below, find the range of the values.

1	0 1 3
2	5 9
3	1 1 1 1 1
4	4 9 9 9 9 9 9 9

key: 4|9 = 49

A. 49 B. 31 C. 29 D. 39 E. 25

22. 1 + 2 + 3 + 4 + … + 12 + 13 + 14 = _____

A. 104 B. 105 C. 106 D. 107 E. 102

23. 1,920 acres = _____ square miles

A. 3 B. 2.5 C. 2 D. 1.5 E. 4.5

24. What is the 6^{th} triangular number?

A. 21 B. 28 C. 15 D. 18 E. 36

25. The supplement of a 13.79° is equal to _____$^\circ$.

A. 193.79 B. 76.21 C. 71.21 D. 166.21 E. 167.21

26. Each letter of the words *MANIAC MATHEMATICIAN* is separately written on a tile and placed in a box. What is the probability of reaching in the box and drawing an *M*?

A. $\frac{3}{13}$ B. $\frac{1}{4}$ C. $\frac{5}{19}$ D. $\frac{1}{5}$ E. $\frac{3}{19}$

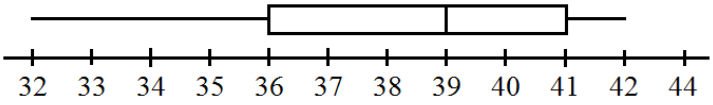
27. If $\pi = 3$, the circumference of a circle with a diameter of 17 inches is equal to _____ inches.

A. 51 B. 20 C. 25.5 D. 867 E. 216.75

28. $\overline{AB}$ has endpoints $A(16, 4)$ and $B(-8, -22)$. What are the coordinates of point C if point C is the midpoint of $\overline{AB}$?

A. (4, -9) B. (12, -13) C. (8, -18) D. (8, -13) E. (-4, -13)

29. Identify the first-quartile in the box-and-whisker plot below.



A. 32 B. 36 C. 39 D. 41 E. 42

30. If $g(x) = 4x - 3$, find the value of $g(-7)$.

A. -6 B. -14 C. -25 D. -28 E. -31

31. What is the sum of the eight terms in the sequence -6, -2, 2, …, 22?

A. 48 B. 72 C. 56 D. 64 E. 84

32. What is the maximum number of erasers that cost \$0.37 each that Taha can buy with a \$20 bill?

A. 56 B. 55 C. 54 D. 53 E. 52

33. Multiply: $(3m - 2)(2m + 7)$

A. $6m^2 - 14$ B. $6m^2 - 17m - 5$ C. $6m^2 - 6m - 14$ D. $6m^2 + 6m + 14$ E. $6m^2 + 17m - 14$

34. Which equation below is an example of a direct variation equation?

A. $y = 3x - 1$ B. $3x + 2y = 9$ C. $y = 12x$ D. $11x = 6y - 4$ E. $y - 1 = 7(x + 1)$

35. During baseball season, Sue swung at 120 pitches and made contact with 36. What percent of the swings did Sue make contact with?

A. 30% B. 35% C. 25% D. 40% E. 36%

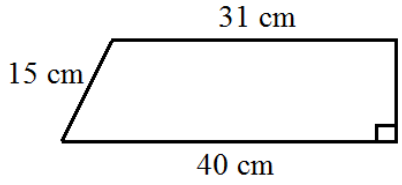
36. Simplify: -7^0

A. -7 B. 0 C. -1 D. 1 E. 7

37. How much simple interest will there be depositing \$400 at 5% for 3 years?

A. \$60.00 B. \$600.00 C. \$6.00 D. \$66.00 E. \$660.00

38. The area of the trapezoid below is equal to _____ cm^2.



A. 852 B. 620 C. 426 D. 532.5 E. 1,065

39. What is the sum of the coordinates of the midpoint that lies between the points (10, -12) and (16, 8)?

A. 30 B. 11 C. 46 D. 17 E. 9

40. Which of the following is an example of an exponential function?
A. $f(x) = 12x^{10}$ B. $f(x) = 3x^2 + 4x$ C. $f(x) = 4x - 8$ D. $f(x) = 4(x)^7$ E. $f(x) = 3^x$

41. What is the *y*-intercept of the linear equation $3x - 7y = 42$?
A. 14 B. -6 C. -10.5 D. 49 E. -39

42. $\{2, 4, 6, 8, 10, 12, 14\} \cap \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}$ has _____ elements.
A. 7 B. 23 C. 29 D. 8 E. 15

43. Alisha has a $50 bill. She buys items that cost $17.26, $15.33, $9.97 and $2.78. If there is no tax, how much change will Alisha receive from her $50 bill?
A. $5.32 B. $7.19 C. $2.81 D. $2.78 E. $4.66

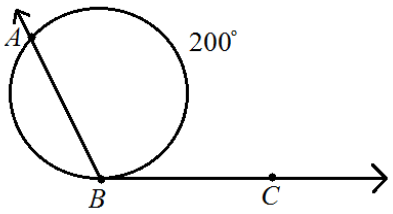
44. Daisy scored a 92, 84 and 86 on her first three tests. What must she score on the next test to have an average of 90?
A. 95 B. 96 C. 97 D. 98 E. 99

45. What is the range of the relation {(3, 4), (7, -9), (10, -2), (-12, 7)}?
A. {16} B. {-12, 3, 7, 10} C. {22, 16} D. {-9, -2, 4, 7} E. {7, -2, 8, -5}

46. Which of the following is the equation of a circle with its center located at (-5, 9) with a diameter of 8 units?
A. $(x + 5)^2 + (y - 9)^2 = 64$ B. $(x + 5)^2 + (y - 9)^2 = 16$ C. $(x - 5)^2 + (y + 9)^2 = 8$ D. $x^2 + y^2 = 8$ E. $x^2 + y^2 = 64$

47. 45_8 = _____$_{10}$
A. 44 B. 41 C. 39 D. 37 E. 32

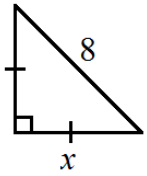
48. In the picture below, major arc AB $= 200^\circ$. What is the measure of $\angle ABC$?



A. 100° B. 400° C. 200° D. 160° E. 80°

49. Simplify: $\sqrt{24}$
A. $3\sqrt{8}$ B. $6\sqrt{2}$ C. $8\sqrt{3}$ D. $2\sqrt{6}$ E. $6\sqrt{4}$

50. Find the value of *x* in the picture below.



A. $8\sqrt{2}$ B. 4 C. $4\sqrt{2}$ D. $8\sqrt{3}$ E. $4\sqrt{3}$

2014-2015 TMSCA Middle School Mathematics Test #2 Answer Key

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

2014-2015 TMSCA Middle School Mathematics Test #2 Selected Answers

8. A rational number is one which, as a decimal, is either a terminating decimal or a repeating decimal. From what we are given, 4.6 is a terminating decimal, $123.\overline{7}$ is a repeating decimal, ¼ = 0..25 and is terminating, $\sqrt{169}$ = 13 and a terminating decimal. $\sqrt{5}$ = 2.23607…, which is a non-terminating, non-repeating decimal. Therefore, $\sqrt{5}$ is not a rational number.

23. Since 1 square mile = 640 acres, $\frac{1920}{640} = 3$ and 1,920 acres = 3 square miles.

24. The n^{th} triangular number can be found using the formula $\frac{n(n+1)}{2}$. So, we get $\frac{6(7)}{2} = 21$.

30. If $g(x) = 4x - 3$, then $g(-7) = 4(-7) - 3 = -28 - 3 = -31$. So, $g(-7) = -31$.

37. Simple interest can be found using the formula, $I = prt$, where p is the principle amount, r is the rate and t is time, in years. We are given \$400 at 5% for 3 years, so $I = (400)(0.05)(3)$ = \$60.00.

41. To find the y-intercept of a function, substitute 0 in for x and solve for y. We are given, $3x - 7y = 42$, so substituting 0 in for x we get $3(0) - 7y = 42$. The simplifies to $-7y = 42$ and we solve this one-step equation to get $y = -6$, which is the y-intercept.

45. The range of a function is the set of y-values from the ordered pairs. We are given the relation {(3, 4), (7, -9), (10, -2), (-12, 7)}, so therefore the range of the relation is {-9, -2, 4, 7}, when listed least to greatest.