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 #1 ©

O C T O B E R 2 4, 2 0 1 5

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.

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1. Maria bought three shirts that cost $15.63, $22.10 and $17.98. What was Maria's total?
A. $55.74　　　　　B. $55.37　　　　　C. $54.91　　　　　D. $55.71　　　　　E. $54.63

2. Marco has 648 pieces of candy and he wants to divide amongst himself and two friends. How many pieces of candy will one of Marco's friends receive?
A. 162 pieces　　　B. 216 pieces　　　C. 324 pieces　　　D. 281 pieces　　　E. 242 pieces

3. Monee started out with one hundred forty-four flowers walking home. As she walked, thirty-eight fell on the ground and were lost. How many flowers did Monee end up with when she made it home?
A. 106 flowers　　B. 6 flowers　　　C. 182 flowers　　　D. 98 flowers　　　E. 104 flowers

4. While walking past a farm, Pauline saw eight cows and twelve pigs. How many animal legs did Pauline see?
A. 80 legs　　　　B. 20 legs　　　　C. 28 legs　　　　D. 40 legs　　　　E. 124 legs

5. What is the prime factorization of the number 200?
A. $2^3 \cdot 5^2$　　　B. $2 \cdot 100$　　　C. $2^2 \cdot 50$　　　D. $2^3 \cdot 5^3$　　　E. $2 \cdot 5^4$

6. How many diagonals can be drawn from one vertex of a regular pentagon with a side length of 10 inches?
A. 15　　　　B. 5　　　　C. $15\sqrt{3}$　　　D. $3\sqrt{10}$　　　E. 2

7. Which of the following numbers below is rational?
A. π　　　B. -2.22222222　　　C. $6\sqrt{3}$　　　D. $\sqrt{5}$　　　E. 1.101001000100001000001…

8. What is the GCF of the numbers 54 and 36?
A. 18　　　　B. 108　　　　C. 54　　　　D. 27　　　　E. 9

9. What is the perimeter of a regular pentagon with a side length of 4.5 inches?
A. 27 inches　　　B. 22.5 inches　　　C. 18 inches　　　D. 31.5 inches　　　E. 20.5 inches

10. Timothy wants to buy a shirt that has an original price of $45.00. If the shirt is on sale for 30% off, how much will Timothy save?
A. $15.50　　　　B. $15.00　　　　C. $18.50　　　　D. $4.50　　　　E. $13.50

11. Which inequality below matches the graph?

A. $x \geq 7$　　　B. $x \leq 7$　　　C. $x > 7$　　　D. $x < 7$　　　E. $x \pm 7$

12. In terms of π, what is the circumference of a circle with a radius of 17 inches?
A. 106.76 inches　　B. 107 inches　　C. 34π inches　　D. 17π inches　　E. 289π inches

13. What are the new coordinates of the point (2, 7) by a translation of $(x, y) \rightarrow (x - 14, y - 5)$?
A. (-16, 2)　　　B. (-16, -12)　　　C. (-12, 2)　　　D. (-12, 7)　　　E. (-3, -7)

14. $-7^2 =$ _____
A. -49　　　　B. -14　　　　C. 14　　　　D. 49　　　　E. -72

15. What is the degree of the following polynomial?　　　$4x^3y - 6xy + 8$
A. 3　　　　B. 4　　　　C. 2　　　　D. 6　　　　E. 7

16. $\angle A = 51.4°$. What is the supplement of $\angle A$?
A. 38.6°   B. 128.6°   C. 308.2°   D. 39.6°   E. 138.6°

17. 546 = _____ (Roman numeral)
A. *CCCCCXXXXXVI*   B. *DXLIV*   C. *DXLVI*   D. *CLXVI*   E. *CXLVI*

18. $42_{10} = $ _____ $_6$
A. 110   B. 66   C. 115   D. 120   E. 112

19. Find the median of the data give in the stem-and-leaf plot.

1	7 7 8
2	2 6 7 9
3	3 4 5
4	1 1

Key: 4/1 = 41
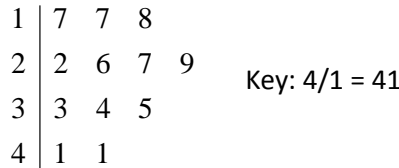
A. 27   B. 28   C. 29   D. 33   E. 41

20. What is the perimeter of an equilateral triangle with a side length of $(3p + 2)$?
A. $6p + 4$ B. $12p + 2$ C. $12p + 8$ D. $9p + 4$ E. $9p + 6$

21. Use the examples below to find the value of n.
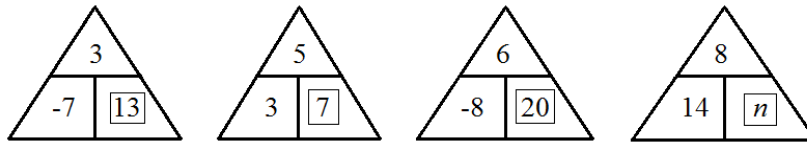
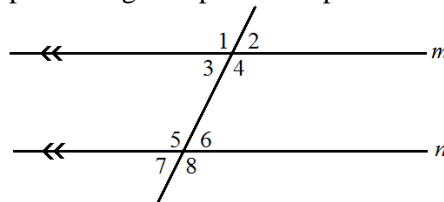A. 30   B. 28   C. -1   D. -12   E. 2

22. What number below is the multiplicative inverse of the number $5\frac{3}{8}$?
A. $\frac{43}{8}$ B. $-\frac{43}{8}$ C. $-\frac{8}{43}$ D. $\frac{8}{43}$ E. $-5\frac{3}{8}$

23. How many lines of symmetry can be drawn in a regular pentagon?
A. 5   B. 4   C. 10   D. 15   E. 2

24. Using the picture below, choose which pair of angles represents a pair of alternate interior angles.

A. $\angle 1$ & $\angle 8$ B. $\angle 2$ & $\angle 7$ C. $\angle 3$ & $\angle 6$ D. $\angle 3$ & $\angle 7$ E. $\angle 4$ & $\angle 7$

25. Let n equal the digit in the ten-thousand's place in the number 345,687. Find the value of $5n - 28$.
A. 18   B. -8   C. -3   D. 12   E. -13

26. Clint wants to convert $\frac{5}{6}$ into a decimal. Which of the following is $\frac{5}{6}$ converted as a decimal?
A. $0.\overline{83}$ B. 0.83 C. $0.8\overline{3}$ D. 0.833 E. $0.8\overline{3}$

27. What is the sum of all the positive integral divisors of the number 24?
A. 35   B. 59   C. 60   D. 5   E. 64

28. $(4m^2 + 6m - 8) - (11 - 3m + 4m^2) = $ _____
A. -4m^2 + 9m – 4   B. -4m^2 + 9m + 4   C. 9m – 3   D. 9m – 19   E. 8m^2 + 9m – 19

29. What is the 9th term in the sequence?   -2, 3, 1, 4, 5, 9, …
A. 14   B. 23   C. 37   D. 60   E. 51

30. 45,000 + 129,000 = _____(scientific notation)
A. 174,000   B. 1.74×10^3 C. 1.64×10^5 D. 1.64×10^4 E. 1.74×10^5

31. What is the total surface area of a rectangular prism that measure 5 cm wide, 8 cm long and 3 cm high?
A. 120 cm^2 B. 158 cm^2 C. 126 cm^2 D. 240 cm^2 E. 79 cm^2

32. What is the unit rate per pencil, if one-gross pencils cost $64.80?
A. $0.45   B. $0.65   C. $1.18   D. $0.25   E. $1.10

33. {a, b, c, D, E, F}∩{A, B, C, D, e, f} has how many elements?
A. 12   B. 11   C. 10   D. 0   E. 1

34. Solve the inequality: $5n - 2 > 3n + 14$
A. $n > 16$ B. $n > 2$ C. $n < 2$ D. $n < 4$ E. $n > 8$

35. 7,920 feet = _____ miles
A. 0.5   B. 1   C. 1.5   D. 2   E. 2.5
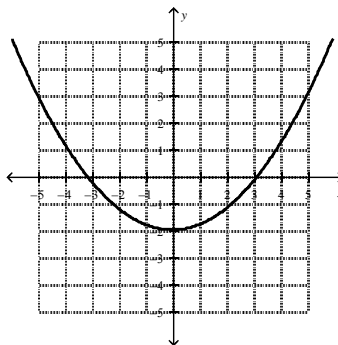
36. Faith has four and five-cent stamps. What is the largest sum she cannot create using her stamps?
A. 9   B. 11   C. 13   D. 21   E. 33

37. Which formula below can be used to find the area of an equilateral triangle when given its height?
A. $A = \frac{h^2\sqrt{3}}{3}$ B. $A = \frac{h^2\sqrt{4}}{3}$ C. $A = \frac{h^2\sqrt{3}}{4}$ D. $A = \frac{h^2\sqrt{4}}{4}$ E. $A = \frac{2h^2\sqrt{4}}{3}$

38. Which type of function is graphed below?

A. linear   B. quadratic   C. cubic   D. exponential   E. radical

39. Simplify: $5\sqrt{24}$
A. $7\sqrt{6}$ B. $42\sqrt{6}$ C. $20\sqrt{6}$ D. $3\sqrt{6}$ E. $10\sqrt{6}$

40. Triangle *ABC* has vertices *A*(-2, 8), *B*(4, 4) and *C*(1, -6). If triangle *ABC* is dilated by a scale factor of ¾, what are the new coordinates of *B*?
A. (1, 1) B. (2, 2) C. (3, 3) D. (5, 5) E. (3.75, 3.75)

41. $(x^2 + 3x - 28) \div (x + 7) = $ _____
A. $x + 4$ B. $x + 21$ C. $x - 21$ D. $x - 4$ E. $x^2 + 2x - 21$

42. Calculate the slope of the line with the equation $2x - 32y = 16$.
A. ½ B. -½ C. $\frac{1}{16}$ D. 16 E. -2

43. If $g(x) = 11x - 5$, find $g(x + 1)$.
A. $11x^2 + 1$ B. $11x^2 + 11$ C. $11x + 6$ D. $11x - 5$ E. $11x^2 + 6$

44. What are the coordinates of the vertex of the quadratic equation $4x = -x^2 + 3$?
A. (0, 4) B. (-2, -7) C. (0, 3) D. (2, -1) E. (-2, 1)

45. To convert a radian measure to a degree measure, you must multiply by which of the following?
A. 2π B. $\frac{\pi}{2}$ C. $\frac{360}{\pi}$ D. $\frac{180}{\pi}$ E. $\frac{\pi}{180}$

46. $\begin{bmatrix} -5 & -9 \\ 8 & -11 \end{bmatrix} - \begin{bmatrix} 7 & 9 \\ -7 & 9 \end{bmatrix} =$
A. $\begin{bmatrix} -12 & -18 \\ 15 & -20 \end{bmatrix}$ B. $\begin{bmatrix} 2 & 0 \\ 1 & -2 \end{bmatrix}$ C. $\begin{bmatrix} -12 & 0 \\ 1 & -2 \end{bmatrix}$ D. $\begin{bmatrix} -2 & -18 \\ -15 & -20 \end{bmatrix}$ E. $\begin{bmatrix} 2 & -18 \\ 15 & -2 \end{bmatrix}$

47. Five more than the *x*-coordinate of the solution of the system of linear equations below is equal to _____.
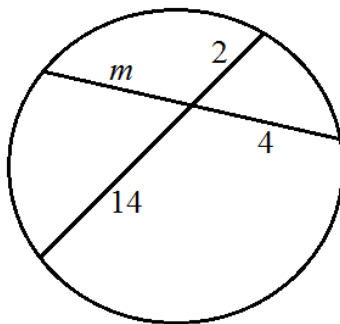$$\begin{cases} 3x + y = 18 \\ -2x - y = 12 \end{cases}$$
A. 35 B. 30 C. -72 D. -77 E. -67

48. $2^6 = 64$ can be rewritten as which of the following?
A. $\log_6 2 = 64$ B. $\log_{64} 2 = 6$ C. $\log_{64} 6 = 2$ D. $\log_2 6 = 64$ E. $\log_2 64 = 6$

49. Find the length of *m* in the picture below.

A. 12 units B. 7 units C. 11 units D. 6 units E. 8 units

50. Simplify: $\dfrac{m^{14}n^{-2}}{m^2(m^2n^{-2})^2}$

A. m^8n^2 B. m^6n^6 C. m^8n^6 D. m^6n^4 E. m^6n^2

2015 – 2016 TMSCA Middle School Mathematics Test #1 Answer Key

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

20. An equilateral triangle has a side length of $(3p + 2)$. To find the perimeter, we must add all three sides together, $3p + 2 + 3p + 2 + 3p + 2 = 9p + 6$.

22. The multiplicative inverse is another name for reciprocal. To find the multiplicative inverse of the number $5\frac{3}{8}$, we must first change it into an improper fraction. $5\frac{3}{8} = \frac{8\cdot5+3}{8} = \frac{43}{8}$. The multiplicative inverse, or reciprocal, of $\frac{43}{8}$ is $\frac{8}{43}$.
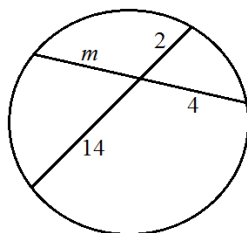
41. $(x^2 + 3x - 28) \div (x + 7) = \frac{x^2+3x-28}{x+7} = \frac{(x+7)(x-4)}{x+7} = x - 4$.

43. If $g(x) = 11x - 5$, $g(x + 1) = 11(x + 1) - 5 = 11x + 11 - 5 = 11x + 6$.

49. If two chords in a circle intersect, such as in the circle below, $AE \cdot EC = BE \cdot ED$.
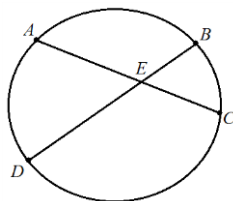
We are given,

so, $2 \cdot 14 = 4m \rightarrow 28 = 4m$ and after dividing both sides by 4, $m = 7$.