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 # 5 ©

N O V E M B E R 2 3 , 2 0 1 3

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.

2013-2014 TMSCA Middle School Mathematics Test #5

1. 85 + (-95) = _____

A. -180 B. -10 C. -160 D. 170 E. 110

2. $100 - 254 - 37 - 28 =$ _____

A. -219 B. -119 C. 781 D. -154 E. -328

3. $4.25 \times 7.6 =$ _____

A. $32\frac{1}{5}$ B. $32\frac{3}{10}$ C. $32\frac{1}{3}$ D. $32\frac{4}{15}$ E. $32\frac{3}{8}$

4. $64.28 \div ¼ =$ _____

A. 257.12 B. 192.84 C. 514.24 D. 6.428 E. 1,607

5. 3 gallons = _____ ounces

A. 384 B. 192 C. 768 D. 576 E. 256

6. Which of the following has the smallest value?

A. 0.5 B. $\frac{5}{9}$ C. 45% D. $0.4\overline{9}$ E. 1.2

7. $11.1 \times 67 =$ _____

A. 743.7 B. 7,437 C. 74.37 D. 7.347 E. 734.7

8. What is the perimeter of a regular quadrilateral with a side length of 16 inches?

A. 32 inches B. 32 inches C. 64 inches D. 256 inches E. 128 inches

9. The complement of a 37° angle is equal to _____ degrees.

A. 143 B. 323 C. 53 D. 63 E. 8

10. Mike and Molly start a movie at 9 pm. The movie is 2.4 hours long. While they are watching their movie, the take a 15 minute break to make some popcorn and then another 15 minute break to go to the restroom. At what time will they have completed watching the movie?

A. 11:54 pm B. 10:59 pm C. 11:24 pm D. 11:39 pm E. 12:09 am

11. 12 is what percent of 80?

A. 20% B. 8% C. 10% D. 15% E. 12.5%

12. What is the value of five more than the third triangular number?

A. 6 B. 11 C. 10 D. 15 E. 26

13. $43_5 =$ _____$_{10}$

A. 86 B. 32 C. 27 D. 23 E. 18

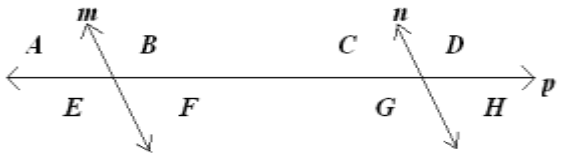
14. 76 + 119 = _____ (Roman numeral)

A. VC B. CXCX C. CXCV D. CXCL E. CXCIIIII

15. Any two points on a circle are said to be _____ from the center.
A. Equiangular B. Inscribed C. Equidistant D. Radial E. Diametrical

16. Which of the following is the reciprocal of $1\frac{2}{3}$?
A. $-1.\overline{6}$ B. -0.6 C. $\frac{5}{3}$ D. $1.\overline{6}$ E. $\frac{3}{5}$

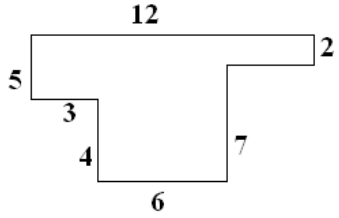
17. In the picture below, $m \| n$ with transversal *p*. Name a pair of vertical angles.



A. $\angle B \& \angle F$ B. $\angle A \& \angle F$ C. $\angle D \& \angle C$ D. $\angle H \& \angle F$ E. $\angle B \& \angle H$

18. $105^\circ C$ = _____ $^\circ F$
A. 212 B. 219 C. 221 D. 224 E. 227

19. What is the perimeter of the shape in the picture below?



A. 18 units B. 24 units C. 39 units D. 42 units E. 45 units

20. Jackson is buying a fishing pole that costs $35.00 and is on sale for 40% off. How much will Jackson save buying the fishing pole on sale?
A. $11.00 B. $45.00 C. $24.00 D. $12.00 E. $14.00

21. Calculate the midpoint between the points (16, -8) and (-4, 2).
A. (10, 5) B. (10, -5) C. (12, -6) D. (6, -6) E. (6, -3)

22. $14.35 = _____ nickels
A. 287 B. 315 C. 980 D. 175 E. 256

23. What is the product of the GCF of 12 and 34 and the LCM of 14 and 22?
A. 2 B. 154 C. 156 D. 234 E. 308

24. 1 + 3 + 5 + … + 17 + 19 + 21 = _____
A. 121 B. 131 C. 113 D. 118 E. 117

25. Find the median for the following set of numbers. 11, 13, 21, 13, 16, 16, 22, 23, 9
A. 11 B. 14 C. 15 D. 16 E. 15.5

26. Today is Saturday. What day will it be in 27 days?
A. Monday B. Wednesday C. Sunday D. Wednesday E. Friday

27. If you have a square and triple the side lengths, its area is increased by how many times?
A. 3 B. 6 C. 12 D. 21 E. 9

28. $11011_2 =$ _____$_4$
A. 122 B. 132 C. 123 D. 131 E. 112

29. What is the sum of all the distinct prime factors of 234?
A. 5 B. 3 C. 21 D. 18 E. 9

30. What is the probability, in ratio form, of rolling a pair of dice and a sum of 4 faces up?
A. 1:36 B. 1:4 C. 1:12 D. 5:36 E. 1:9

31. If $g(x) = 5x - 7$, find the value of $g(3) + g(-1)$.
A. 3 B. -4 C. -12 D. 8 E. -3

32. What is the slope of the line that passes through the points (4, -2) and (10, 4)?
A. -1 B. 0 C. 1 D. ½ E. -½

33. Which of the following is the correct formula to calculate the volume of a sphere?
A. $V = \frac{4}{3}\pi r^3$ B. $V = \frac{r^3\sqrt{2}}{12}$ C. $V = \pi r^2 h$ D. $V = 2\pi r^2 + 2\pi rl$ E. $V = 4\pi r^2$

34. How many regions in a plane are determined by four lines, no two are parallel and only three are concurrent?
A. 9 B. 10 C. 11 D. 12 E. 16

35. Which of the following pairs of numbers are relatively prime?
A. 2 & 6 B. 13 & 39 C. 14 & 15 D. 5 & 30 E. 32 & 34

36. Markus has an action figure collection of 80 figurines. If 3 out 5 are villains, how many are not villains?
A. 30 B. 48 C. 36 D. 32 E. 42

37. What is the value of the *y*-intercept of the linear equation $y = ¼ x - 6$?
A. 6 B. -6 C. ¼ D. -¼ E. 24

38. Multiply: $(2n-3)(n^2)$
A. $2n^3 - 3n^2$ B. $4n^2 - 6n^2$ C. $4n^3 - 9n^2$ D. $2n^3 - 9n^2$ E. $-n^3$

39. What is the 21st term in the arithmetic sequence 2, 5, 8, 11, …?
A. 62 B. 64 C. 65 D. 68 E. 70

40. What is the domain of the graph of the quadratic equation $7x^2 - 14x - 8 = 0$?
A. all real numbers B. $x > -8$ C. $x \geq 8$ D. $x < 8$ E. $x \leq -8$

41. If $x^n = M \rightarrow \log_x M = n$, then find *w* if $\log_4 1024 = w$.
A. 6 B. ¼ C. 2 D. 7 E. 5

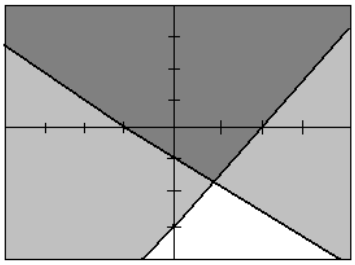
42. 30° =_____(radians)

A. $\frac{1}{4}\pi$ B. $\frac{1}{6}\pi$ C. $\frac{1}{5}\pi$ D. $\frac{1}{3}\pi$ E. $\frac{1}{10}\pi$

43. Simplify: $12i^5 + 7i^9$

A. $12i^2 + 7i^3$ B. $19i$ C. $12i^2 + 7i^2$ D. -19 E. 19

44. Which of the following points is not a solution to the system of linear inequalities graphed below?



A. (3, 3) B. (-4, 1) C. (0, 0) D. (0, 4) E. (1, 10)

45. Find the value of *m*, if $6\begin{bmatrix} -3 & -12 \\ 6 & 7 \end{bmatrix} = m\begin{bmatrix} -6 & -24 \\ 12 & 14 \end{bmatrix}$.

A. ½ B. ¼ C. 3 D. 2 E. -½

46. Solve the system: $\begin{cases} 5x = -9y + 12 \\ 18y + 10x = 1 \end{cases}$

A. Infinitely many solutions B. No solution C. (1, 1) D. (0, 0) E. (-3, 1)

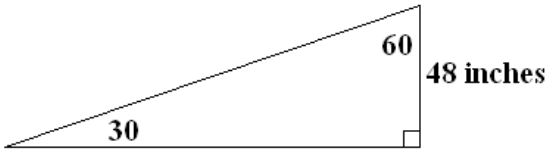
47. The area of a hexagon can be found using the formula $A = \frac{3s^2\sqrt{3}}{2}$. What is the area of a hexagon with a side length of $4\sqrt{5}$ inches?

A. $120\sqrt{3}$ in^2 B. $24\sqrt{15}$ in^2 C. $48\sqrt{15}$ in^2 D. $150\sqrt{3}$ in^2 E. $150\sqrt{15}$ in^2

48. Find *M*, if $\frac{2}{x} + \frac{3}{y} = \frac{M}{xy}$.

A. $3x + 2y$ B. $5xy$ C. $6xy$ D. $2x + 3y$ E. $5x + 6y$

49. What is the length of the hypotenuse in the triangle below? (Numbers inside the triangle are in degrees.)



A. $96\sqrt{3}$ inches B. 72 inches C. 96 inches D. $48\sqrt{3}$ inches E. 24 inches

50. What is $a^2 + 7$, if *a* is the smallest root of $x^2 + x - 20 = 0$?

A. 23 B. 25 C. 32 D. 88 E. 81

2013-2014 TMSCA Middle School Mathematics Test #5 Answer Key

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

2013-2014 TMSCA Middle School Mathematics Test #5 Selected Solutions

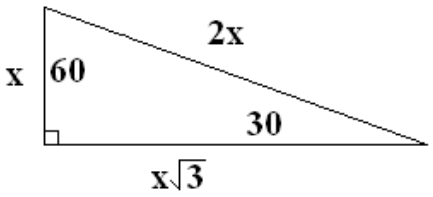
15. Any two points on a circle are said to be equidistant from the center.

29. $234 = 2 \cdot 3^2 \cdot 13$. We see there are only the prime factors of 2, 3 and 13, so the sum of them is equal to 2 + 3 + 13 = 18.

31. We are given $g(x) = 5x - 7$. We must now find each of: $g(3) = 5(3) - 7 = 15 - 7 = 8$ and $g(-1) = 5(-1) - 7 = -5 - 7 = -12$. Now, $g(3) + g(-1) = 8 + (-12) = -4$.

48. $\frac{2}{x} + \frac{3}{y} = \frac{M}{xy} \rightarrow \frac{2}{x} \cdot \left(\frac{y}{y}\right) + \frac{3}{y} \cdot \left(\frac{x}{x}\right) = \frac{2y}{xy} + \frac{3x}{xy} = \frac{3x + 2y}{xy}$ and we see that $M = 3x + 2y$.

49. The triangle given is a 30-60-90 triangle that has side lengths in ratios as in the picture below.



We see from the picture the hypotenuse is twice the length of the short side, so $2 \cdot 48 = 96$ inches.

50. Root is another word for solution, so you must first solve the equation. $x^2 + x - 20 = 0$ can be solved using factoring to get $(x + 5)(x - 4) = 0$. We must set each factor equal to zero and solve and see that $x + 5 = 0$; $x = -5$ and $x - 4 = 0$; $x = 4$. -5 is our smallest root, so therefore $(-5)^2 + 7 = 25 + 7 = 32$.