



**TMSCA MIDDLE SCHOOL
MATHEMATICS
TEST #3 ©
NOVEMBER 9, 2013**

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.

[illegible]

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1. $3\frac{2}{5} + 2\frac{3}{4} =$ _____

- A. 6.15 B. 5.85 C. 6.25 D. 5.95 E. 6.45

2. $0.15 - 8.4 =$ _____

- A. -8.5 B. -7.75 C. -7.25 D. -8.25 E. -8.75

3. $14^2 =$ _____

- A. 169 B. 28 C. 784 D. 256 E. 196

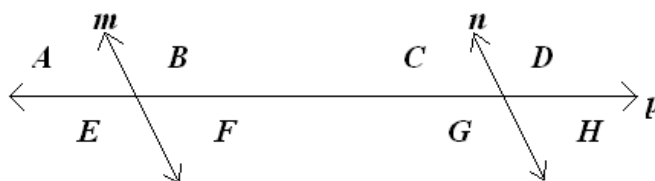
4. $123,456 \div 6 =$ _____

- A. 21,586 B. 20,576 C. 20,596 D. 21,578 E. 20,106

5. 3,976 = _____ (Roman numeral)

- A. MMMXCLXXVI B. MMMXDLXXIV C. DDDXCLVI D. DDDMMCLVI E. MMXCLXVI

6. In the picture below, $m \parallel n$ with transversal p . Name a pair of alternate interior angles.



- A. $\angle B$ & $\angle F$ B. $\angle E$ & $\angle F$ C. $\angle B$ & $\angle G$ D. $\angle D$ & $\angle F$ E. $\angle C$ & $\angle G$

7. The positive root of $\sqrt{734}$ lies between which two integers?

- A. 24 & 25 B. 25 & 26 C. 26 & 27 D. 27 & 28 E. 28 & 29

8. Find the value of the arithmetic mean of the set of numbers 16, 11, 32, 34, 56 and 7.

- A. 32 B. 29 C. 24 D. 19 E. 26

9. What is the degree of the polynomial $4x^3y^2 + 5x^2y^2 + 11xy^2 - 9xy - 2xy^3$?

- A. 5 B. 18 C. 14 D. 4 E. 13

10. A line segment on the interior of a circle that has both endpoints on the circle is called a(n) _____.

- A. Tangent B. Arc C. Radius D. Chord E. Secant

11. $\frac{1}{2}\%$ of 48 = _____

- A. 2.4 B. 24 C. 240 D. 0.24 E. 0.024

12. Which of the following is the multiplicative inverse of $\frac{4}{7}$?

- A. $\overline{0.571428}$ B. -1.75 C. $\frac{7}{4}$ D. 0.571428 E. $-1\frac{3}{4}$

13. The measures of two complementary angles are in a ratio of 2:7. The measure of the complement of the smaller angle is _____°.

- A. 20 B. 160 C. 70 D. 40 E. 88

14. $25^{\circ} C = \text{_____}^{\circ} F$

- A. 77 B. 58 C. 83 D. 82 E. 78

15. The prime factorization of 1,240 has exactly _____ distinct prime factors.

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

16. $(\{1,3,5,7,9,11\} \cap \{1,2,3,4,5\}) \cup \{2,4,6,8\}$ contains _____ elements.

- A. 3 B. 5 C. 7 D. 9 E. 11

17. Solve: $-4n - 8 \leq 20$

- A. $n \leq -13$ B. $n \leq -7$ C. $n \geq -5$ D. $n \geq 13$ E. $n \geq -7$

18. LaToya wants to find the next term in the sequence $2.\overline{6}$, 4, 6, 9, 13.5, 20.25... In order for LaToya to be successful, she must do which of the following to 20.25?

- A. add 1.4 B. multiply by 3.2 C. add 6.75 D. multiply by 1.5 E. add 11.5

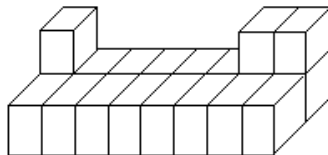
19. *Have it Your Way Pizzeria* has three different sizes of pizza to choose, three choices of crust, ten choices of toppings, and four choices of soda. How many different meals can be created if you are to choose one size, one crust, one topping and one drink?

- A. 36 B. 180 C. 360 D. 540 E. 120

20. What is the volume of a rectangular prism with a height of 8 cm, a width of 6 cm and a length of 24 cm?

- A. $1,152 \text{ cm}^2$ B. $1,254 \text{ cm}^3$ C. 576 cm^3 D. $1,728 \text{ cm}^3$ E. $1,152 \text{ cm}^3$

21. How many blocks were used to create the figure below?



- A. 19 B. 16 C. 21 D. 18 E. 17

22. What is the slope of the linear equation $y = \frac{1}{4}x - 12$?

- A. 48 B. 4 C. -3 D. 3 E. $\frac{1}{4}$

23. Find the next number in the sequence: 4, 14, 44, 134, 404, ...

- A. 1,214 B. 816 C. 808 D. 1,224 E. 1,234

24. $25^3 = \text{_____}$

- A. 15,675 B. 15,625 C. 15,650 D. 15,600 E. 15,700

25. Which of the following expressions is not equivalent to the expression $3x + 9$?

- A. $3(x + 3)$ B. $2x - 9 - (-x) + 18$ C. $0.1(90 + 30x)$ D. $x - 4x - 2 + 11$ E. $\frac{1}{3}(9x + 27)$

26. $221_3 = \underline{\hspace{2cm}}_{10}$

- A. 13 B. 19 C. 27 D. 25 E. 31

27. $a = a$ is an example of the _____ Property.

- A. Symmetric B. Reflexive C. Transitive D. Associative E. Identity

28. Simplify: $(3x - 7y) + (4x + y) - (x - y)$

- A. $7x + 6y$ B. $8x - 6y$ C. $8x - 7y$ D. $6x - 7y$ E. $6x - 5y$

29. Find the GCF of the two monomials $14a^3b^2$ and $21ab^6$.

- A. $7ab$ B. $42ab^2$ C. $7ab^2$ D. $42a^3b^6$ E. $7a^3b^6$

30. The sum of three consecutive positive integers is 27. What is the value of the smallest of these integers once you subtract eight from it?

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

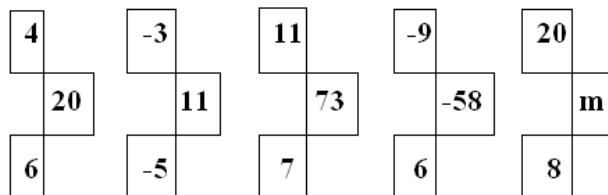
31. What is the largest unattainable sum using the numbers 4 and 5?

- A. 9 B. 1 C. 45 D. 11 E. 13

32. A rectangle has a length of 8 inches and a perimeter of 52 inches. What is the rectangle's width?

- A. 36 inches B. 18 inches C. 44 inches D. 26 inches E. 14 inches

33. Find a pattern using the boxes below and find the value of **m**.



- A. 156 B. 164 C. 132 D. 116 E. 108

34. How many regions in a plane are determined by five lines, no two are parallel and no three are concurrent?

- A. 13 B. 14 C. 15 D. 16 E. 17

35. What is the measure of a diagonal of a square with a side length of 23 meters?

- A. 25 m B. $23\sqrt{2}$ m C. $23\sqrt{3}$ m D. $24\sqrt{3}$ m E. $25\sqrt{2}$ m

36. $250^2 - 50^2 = \underline{\hspace{2cm}}$

- A. 12,500 B. 60,000 C. 37,500 D. 64,000 E. 3,125,000

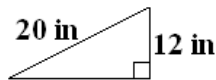
37. What number is 10 more than the value of the fourth hexagonal number?

- A. 48 B. 28 C. 38 D. 35 E. 32

38. Simplify: $w^{2x} \cdot 2w^3 \cdot w \cdot w^{-4}$
 A. $4w^{3x}$ B. $2w^{6x-1}$ C. $2w^{2x}$ D. $4w^{2x}$ E. $2w^{3x}$

39. Find the midpoint between the two points $(a + 4, 3b - 6)$ and $(a - 4, -b - (-6))$.
 A. $(2a + 1, 2b)$ B. $(2a, b - 12)$ C. $(a, b - 12)$ D. $(a, b - 6)$ E. (a, b)

40. Find the measure of the missing side of the right triangle below.



- A. 8 in B. 23 in C. $4\sqrt{34}$ in D. 16 in E. 18 in

41. The set $\{1, 2, 3, 4, 5, 6, 7\}$ has how many proper subsets?
 A. 128 B. 129 C. 127 D. 126 E. 255

42. $45 \text{ mi/hr} = \underline{\hspace{1cm}} \text{ ft/sec}$
 A. 88 B. 60 C. 66 D. 80 E. 78

43. $2^3 = 8$ can be rewritten as which of the following?
 A. $\log_3 2 = 8$ B. $\log_8 2 = 3$ C. $\log_8 3 = 2$ D. $\log_2 3 = 8$ E. $\log_2 8 = 3$

44. Solve the system:
$$\begin{cases} 3x - 4y = 8 \\ 6y = 4.5x - 12 \end{cases}$$

 A. Infinitely many solutions B. No solution C. $(0, 1)$ D. $(2.\bar{6}, 0)$ E. $(0, 2)$

45. $\sqrt{-25} = \underline{\hspace{1cm}}$
 A. 5 B. -5 C. $5i$ D. $-5i$ E. $i\sqrt{5}$

46. If $\begin{bmatrix} -3 & 6 \\ 5 & -7 \end{bmatrix} + \begin{bmatrix} -8 & -4 \\ -7 & 3 \end{bmatrix} - \begin{bmatrix} -5 & -11 \\ -6 & 10 \end{bmatrix} = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, then find the value of $ad - bc$.
 A. -22 B. 32 C. 22 D. 158 E. 136

47. Factor completely: $4x^3 + 4x$
 A. $4x(x^2 + 1)$ B. $4x^3(x + 1)$ C. $4x(x + 1)$ D. $4x(x + 1)(x - 1)$ E. $4x(x + 1)^2$

48. What is the y-coordinate of the vertex of the graph of the quadratic equation $y = 2x^2 - 8x + 1$?
 A. -5 B. 5 C. 2 D. -7 E. -10

49. What is the area of an equilateral triangle with a height of 6 cm?
 A. $12\sqrt{3} \text{ cm}^2$ B. $12\sqrt{6} \text{ cm}^2$ C. $9\sqrt{3} \text{ cm}^2$ D. $9\sqrt{6} \text{ cm}^2$ E. $2\sqrt{6} \text{ cm}^2$

50. The point $(4, 24)$ lies on a direct variation. Using this point, what is the constant of variation?
 A. -6 B. 6 C. $-\frac{1}{6}$ D. $\frac{1}{6}$ E. 20

2013-2014 TMSCA Middle School Mathematics Test #3 Answer Key

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

2013-2014 TMSCA Middle School Mathematics Test #3 Selected Solutions

11. $\frac{1}{2} \% = 0.5\% = 0.005$. So, $\frac{1}{2} \%$ of $48 = 0.005(48) = 0.24$.

24. $25^3 = 25 \cdot 25 \cdot 25 = 15,625$

27. $a = a$ is an example of the Reflexive Property.

28. $(3x - 7y) + (4x + y) - (x - y) = 3x - 7y + 4x + y - x + y = 6x - 5y$

30. Set up an equation, $x + x + 1 + x + 2 = 27$. Simplifying and we have $3x + 3 = 27$. Solving this equation and we get $x = 8$. Thus, 8 is our smallest integer. Now subtract 8 from 8 and our answer is 0.

31. The largest unattainable sum of two number, a and b , is $ab - (a + b)$. We are given the numbers 4 and 5. $4 \cdot 5 - (4 + 5) = 20 - 9 = 11$.

38. One exponent rule that applies to this problem is $a^m \times a^n = a^{m+n}$. Using our given problem, $w^{2x} \cdot 2w^3 \cdot w \cdot w^{-4} = 2w^{2x+3+1-4} = 2w^{2x}$.

50. The direct variation form is $y = kx$, where k is the constant of variation. To solve for k , divide by x , so therefore, $k = \frac{y}{x}$. We are given the point (4, 24) so the constant of variation is equal to $\frac{24}{4} = 6$.