



**TMSCA MIDDLE SCHOOL
MATHEMATICS
TEST #8 ©
JANUARY 25, 2014**

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]

2013-2014 TMSCA Middle School Mathematics Test #8

1. $\sqrt{\frac{361}{16}} = \underline{\hspace{2cm}}$
 A. 4.25 B. 4.5 C. 4.75 D. 22.5625 E. 5.64

2. $(1.2)(2.3)(3.4) = \underline{\hspace{2cm}}$ (nearest tenth)
 A. 9.1 B. 9.2 C. 9.3 D. 9.4 E. 9.5

3. $1,590,030 - 987,995 - 601,989 = \underline{\hspace{2cm}}$
 A. 46 B. 148 C. 71 D. 446 E. 6

4. If $9,864,248,264 \div 4 = 2,466,06a,066$, what is the value of a ?
 A. 1 B. 2 C. 3 D. 4 E. 6

5. $-7^2 = \underline{\hspace{2cm}}$
 A. -49 B. 49 C. 14 D. -14 E. 9

6. 1.5 gallons = $\underline{\hspace{2cm}}$ cubic inches
 A. 346.5 B. 462.5 C. 462 D. 346 E. 356.5

7. If the exterior angle of a regular polygon is 30° , how many sides does the polygon have?
 A. 12 B. 10 C. 11 D. 9 E. 8

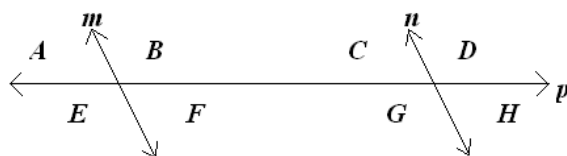
8. If $A = 4,549 + 98,107$, what is the sum of the digits of A ?
 A. 20 B. 47 C. 40 D. 37 E. 28

9. Jason has the equivalent of 2 gross pencils. If he lets a friend borrow a dozen, how many pencils does Jason have remaining?
 A. 300 B. 294 C. 276 D. 264 E. 288

10. What is the range of the following set of numbers? $\frac{1}{2}, \frac{3}{8}, \frac{4}{5}, \frac{2}{5}$ and $\frac{1}{8}$
 A. $\frac{3}{40}$ B. $\frac{9}{10}$ C. $\frac{3}{5}$ D. $\frac{5}{8}$ E. $\frac{27}{40}$

11. The complement of a 23.74° angle measures $\underline{\hspace{2cm}}^\circ$.
 A. 156.26 B. 111.26 C. 66.26 D. 71.26 E. 76.26

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



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

13. A(n) $\underline{\hspace{2cm}}$ line is a line which passes through at least two points of a curve.
 A. Tangent B. Cotangent C. Lateral D. Secant E. Transversal

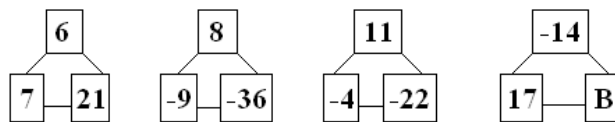
14. Clay is four feet tall and casts a seven foot shadow. How long will Cleves cast a shadow if he is five feet tall?
 A. 8 ft B. 8.5 ft C. 8.75 ft D. 9 ft E. 9.25 ft

15. If the numbers 1 through 12, inclusive, were each written on pieces of paper and placed in a bag, what is the probability of reaching in the bag and drawing an even number and then reaching in again and drawing another even number without replacing the first draw (in ratio form)?
 A. 5:22 B. 5:11 C. 5:6 D. 1:2 E. 2:3

16. Which of the following numbers would not be a stem for a stem-and-leaf plot of the numbers 11, 13, 14, 25, 34, 36, 21, 13, 40 and 35?
 A. 1 B. 2 C. 3 D. 4 E. 5

17. Lacey is buying a shirt that costs \$42.00 and there is a 6.5% tax. How much tax will Lacey pay?
 A. \$2.73 B. \$2.52 C. \$2.64 D. \$2.77 E. \$2.83

18. What is the value of **B** in the rectangle below?



A. -56 B. -1.5 C. -119 D. -69.5 E. -238

19. Which of the following pairs of numbers is not relatively prime?
 A. 6 & 13 B. 3 & 8 C. 12 & 15 D. 11 & 16 E. 22 & 29

20. $2,148 \div 4 =$ _____ (Roman numeral)
 A. DXXXII B. CLXXXVII C. DXXLVII D. DXXXVII E. DXXXIIIX

21. $1010011_2 =$ _____₄
 A. 1122 B. 1301 C. 1111 D. 1203 E. 1103

22. The angles in a triangle are in a ratio of 2:3:5. What is the measure of the second largest angle?
 A. 18° B. 36° C. 48° D. 54° E. 62°

23. A triangle has sides measuring 5, 7 and n units. What is the largest integral value of n ?
 A. 10 units B. 11 units C. 12 units D. 13 units E. 14 units

24. What is the value of the upper quartile for the list of numbers, 16, 17, 22, 24, 21, 11, 28, 32 and 40?
 A. 30 B. 28 C. 22 D. 40 E. 29

25. *ItJust Fits* offers five different colored shirts that could go with four different pairs of pants and seven different pairs of socks. How many outfits could be bought that had one shirt, one pair of pants and one pair of socks?
 A. 16 B. 27 C. 33 D. 140 E. 39

26. How many minutes are there in two days?
 A. 172,800 B. 144 C. 1,440 D. 48 E. 2,880

27. What is the degree of the polynomial that is the sum of $(4x^4y - 8x) + (5x^3y^3 + 9xy + 6)$?

- A. 11 B. 6 C. 5 D. 2 E. 1

28. Simplify: $-3|4 - 18| - (-9) - 48$

- A. -81 B. -99 C. 3 D. -3 E. -28

29. How much simple interest will acquire depositing \$1,000 at 6% for 8 years?

- A. \$460 B. \$480 C. \$500 D. \$520 E. \$510

30. Find the next number in the sequence: -519, -488, -457, -426, ...

- A. -401 B. -402 C. -397 D. -395 E. -391

31. What is the surface area of a cube with a side length of 13 cm?

- A. $1,004 \text{ cm}^2$ B. $1,006 \text{ cm}^2$ C. $1,124 \text{ cm}^2$ D. $1,014 \text{ cm}^2$ E. $1,116 \text{ cm}^2$

32. Theresa interviewed students on which pizza they like best. If 3 out of 20 said they liked pepperoni best of all the choices, how many would you expect to like pepperoni out of 500 students?

- A. 45 B. 55 C. 60 D. 65 E. 75

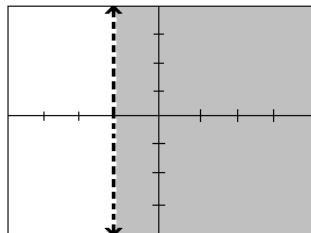
33. Simplify the expression: $4(6y - 9) - 7(2y + 4) - 11$

- A. $10y - 54$ B. $-4y - 54$ C. $10y - 75$ D. $22y - 16$ E. $-4y - 16$

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

- A. 26 B. 27 C. 28 D. 29 E. 30

35. Which inequality matches the graph below?



- A. $y \geq -1$ B. $x < -1$ C. $y < -1$ D. $x > -1$ E. $x \geq -1$

36. $140^\circ F = \underline{\hspace{1cm}}^\circ C$

- A. 65 B. 64 C. 68 D. 62 E. 60

37. The graph of which of the following would be perpendicular to the graph of $y = -4x + 7$?

- A. $4x - y = 1$ B. $20x + 5y = 13$ C. $x + 4y = 8$ D. $2x - 8y = 5$ E. $x - 2y = 10$

38. A recipe calls for 5 ounces of water, 11 ounces of chicken broth, 4 ounces of lemon juice and 1 cup of flour. How many cups of liquid does the recipe call for?

- A. 2.5 B. 20 C. 10 D. 1.75 E. 4.5

39. What is the percent of decrease if \$50.00 drops to \$32.00?

- A. 36% B. 32% C. 38% D. 54% E. 42%

40. Student tickets to a school play were \$1 each and adult tickets were \$2 each. If 40 people attending the school play and the total sales of tickets was \$65.00, how many more adults attended the play than students?

- A. 12 B. 10 C. 25 D. 8 E. 15

41. The area of a polygon with vertices located at (2, 4), (5, 7), (8, 0) and (4, 1) is equal to _____ units².

- A. 20 B. 32 C. 40 D. 24 E. 36

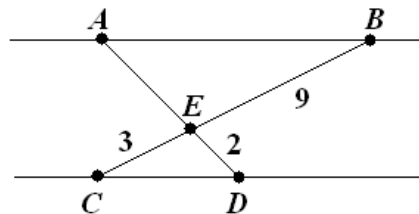
42. Simplify: $4i^2 \cdot 5i$

- A. $20i$ B. $-4 + 5i$ C. $-20i$ D. $-4 - 5i$ E. 20

43. Cindy was driving her car when she passed a farm. As she drove by, she only saw chickens and pigs running around. If Cindy counted a total of 18 heads and 52 feet, how many more chickens did she see than pigs?

- A. 6 B. 2 C. 4 D. 8 E. 7

44. Using the picture below, if $\overline{AB} \parallel \overline{CD}$, what is the length of \overline{AE} ?



- A. 4 B. 5 C. 6 D. 7 E. 8

45. When solving systems of linear equations using matrices, if the value of the determinant of a matrix is nonzero, the system has _____.

- A. no solutions B. infinitely many solutions C. one solution D. two solutions E. zero solutions

46. An exponential function is in the form $y = a \cdot b^x$. If it is an exponential growth function, $b = 1 + r$ where r is the rate, and then an exponential growth function is $y = a \cdot (1 + r)^x$. What is the growth rate of the function $y = 3 \cdot 1.56^x$?

- A. 156% B. 3,156% C. 1.56% D. 56% E. 15.6%

47. What is the circumference of a circle with an equation of $(x + 2)^2 + (y - 7)^2 = 25$, in terms of π ?

- A. 25π units B. 50π units C. 5π units D. 625π units E. 10π units

48. $343^{\frac{2}{3}} =$ _____

- A. 7 B. 14 C. 49 D. 98 E. 28

49. Simplify: $2\sqrt{18}(3\sqrt{6} + 5\sqrt{2})$

- A. $36\sqrt{3} + 60$ B. $96\sqrt{3}$ C. $36\sqrt{2} + 30$ D. $54\sqrt{3} + 30$ E. $18\sqrt{3} + 30$

50. What is the sum of the roots of the quadratic equation $y = \frac{1}{2}x^2 - 5x + 3$?

- A. 2.5 B. 10 C. -2.5 D. 1.5 E. 6

2013-2014 TMSCA Middle School Mathematics Test #8 Answer Key

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

2013-2014 TMSCA Middle School Mathematics Test #8 Selected Solutions

6. 1 gallon = 231 cubic inches, so $1.5(231) = 346.5$ cubic inches.

22. The angles in a triangle are in a ratio of 2:3:5. Now, using our ratio, create the equation $2x + 3x + 5x = 180 \rightarrow 10x = 180$ and $x = 18$. We want the measure of the middle angle, so substitute 18 in for x and $3(18) = 54^\circ$.

37. The equation $y = -4x + 7$ has a slope of -4. If a line is perpendicular, then we want a line with a slope of $\frac{1}{4}$. Find the slopes of each of our choices, A has a slope of 4, B has a slope of -4, C has a slope of $-\frac{1}{4}$, D has a slope of $\frac{1}{4}$, and E has a slope of $\frac{1}{2}$. Therefore the only choice that has a slope perpendicular to our line $y = -4x + 7$ is answer choice D, which is the line with the equation $2x - 8y = 5$.

38. We are given 5 ounces of water, 11 ounces of chicken broth and 4 ounces of lemon juice. We will not need the information of 1 cup of flour because flour is not a liquid. Therefore,
 $5 + 11 + 4 = 20$ ounces. Since there are 8 ounces in a cup, $20 \div 8 = 2.5$ cups of liquid.

46. An exponential growth function is $y = a \cdot (1 + r)^x$, where r is the rate. We are given the equation $y = 3 \cdot 1.56^x$, so $1 + r = 1.56$. If we solve for r , we get $r = 0.56 = 56\%$.

50. The standard form of a quadratic equation is $Ax^2 + Bx + C = y$. To find the sum of the roots, use $-\frac{B}{A}$. We are given the equation $y = \frac{1}{2}x^2 - 5x + 3$, so our $A = \frac{1}{2}$ and $B = -$

5. Therefore, $-\frac{B}{A} = \frac{-(-5)}{\frac{1}{2}} = \frac{5}{\frac{1}{2}} = 5 \div \frac{1}{2} = 5 \cdot 2 = 10$, and so 10 is the sum of the roots.