



**TMSCA MIDDLE SCHOOL
MATHEMATICS
TEST #8 ©
JANUARY 21, 2017**

GENERAL DIRECTIONS

- About this test:
 - You will be given 40 minutes to take this test.
 - There are 50 problems on this test.
- 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 on Scantrons and Chatsworth cards.
- If you are using a Chatsworth or Scantron card, please follow the specific instructions given at your particular meet.
- You may write anywhere on the test itself. You must write only answers on the answer sheet.
- You may use additional scratch paper provided by the contest director.
- All problems have **ONE** and **ONLY ONE** correct [BEST] answer. There is a penalty for all incorrect answers.
- Calculators **MAY NOT** be used on this test.
- 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.
- In case of ties, percent accuracy will be used as a tie breaker.

1. Which choice below has the least value?

- A. $100 - 100$ B. $16 - 30$ C. $1000 \div 100$ D. $-1 + 19$ E. $500 \div 500$

2. Cassie has five quarters and three dimes. Shakira has eight dimes, three quarters and one penny. Billy has nine nickels, one quarter and one dime. Fatima has eleven dimes and two nickels. Lillian has five dimes, twenty pennies and three quarters. Who has the most money?

- A. Cassie B. Shakira C. Billy D. Fatima E. Lillian

3. Jamal answered 128 questions out of 150 questions correctly. If each question was worth the same amount of points, what was Jamal's score, to the nearest whole percent?

- A. 80% B. 90% C. 82% D. 85% E. 87%

4. Shaunty has 3 dozen comic books and Jordan has three less comic books than Shaunty. Together, how many comic books do Shaunty and Jordan have?

- A. 36 books B. 72 books C. 66 books D. 65 books E. 69 books

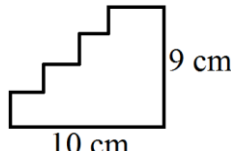
5. What time is 360 minutes before 1:45 am?

- A. 7:45 am B. 6:45 pm C. 6:15 am D. 7:15 pm E. 7:45 pm

6. How many numbers from 1 to 100, inclusive, have the digit 3 in them?

- A. 10 B. 11 C. 19 D. 20 E. 33

7. What is the perimeter of the shape below?



- A. 19 cm B. 29 cm C. 38 cm D. 28 cm E. 76 cm

8. *Tires Unlimited* was having a sale where if someone bought three tires at regular price, they get the fourth tire for half off the regular price. Merta used this deal and paid \$343 total, excluding tax. How much was the regular price of one of the tires Merta bought?

- A. \$98 B. \$104 C. \$108 D. \$94 E. \$116

9. What is the sum of the distinct prime factors of 96?

- A. 5 B. 13 C. 12 D. 10 E. 2

10. Today is Tuesday. What day of the week will it be in 26 days?

- A. Sunday B. Monday C. Tuesday D. Wednesday E. Thursday

11. What is the mean of the number of vertices of a rectangular prism and the number of vertices of a triangular prism?

- A. 8 B. 6 C. 7 D. 9 E. 6.5

12. A spinner is divided into eight equal regions labeled A – H. What is the probability of spinning the spinner and landing on B and rolling a number cube and having a prime number facing up?

- A. $\frac{1}{10}$ B. $\frac{1}{16}$ C. $\frac{1}{4}$ D. $\frac{3}{8}$ E. $\frac{1}{5}$

13. Mr. Nguyen wants to know the range of the set of numbers 32, 43, 92, 11, 44, 7, 11, 102, 39. What is the range Mr. Nguyen will figure out if he does this correctly?

- A. 11 B. 95 C. 109 D. 39 E. 9

14. What is the sum of all the two-digit multiples of 16?

- A. 336 B. 320 C. 352 D. 304 E. 346

15. If $a \blacksquare b = -3|5b - a|$, then find the value of $(6 \blacksquare (-3 \blacksquare 1))$.
 A. -528 B. -378 C. -224 D. -318 E. -612

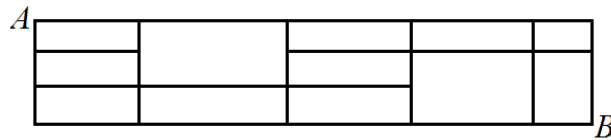
16. Evaluate $ab \div cd$, if $a = -12, b = -2, c = -8$ and $d = 14$.
 A. -42 B. $-\frac{3}{14}$ C. $-\frac{11}{14}$ D. -28 E. -36

17. Twelve fence posts are evenly spaced in a straight line. The distance from the first post to the fifth post is 48 feet. What is the distance between the first and last fence post?
 A. 124 feet B. 264 feet C. 132 feet D. 136 feet E. 144 feet

18. What is the difference of the 45th term and the 20th term of the sequence? -5, 0, 5, 10, 15, ...
 A. 125 B. 115 C. 290 D. 305 E. 110

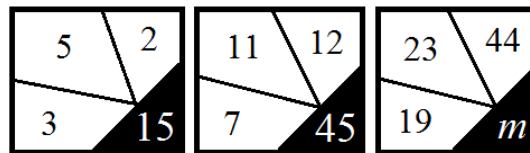
19. Cody is attending a birthday party and puts the gift he will be giving his friend inside a box measuring 8 inches high by 12 inches long by 12 inches wide. After wrapping the gift, Cody decides to create a bow for the top of the gift. The bow requires a length of ribbon that equals one-half the total measure of each edge of the box. What length of ribbon does Cody need?
 A. 62 inches B. 64 inches C. 66 inches D. 124 inches E. 128 inches

20. Moving only to the right or down, how many paths are there from A to B?



A. 18 B. 19 C. 20 D. 21 E. 22

21. Using the examples below, find the value of m .



A. 107 B. 131 C. 123 D. 117 E. 129

22. \overrightarrow{BD} bisects $\angle ABC$ and $m\angle ABD = (7x)^\circ$ and $m\angle ABC = (18x - 36)^\circ$. What is the measure of the supplement of $\angle DBC$?
 A. 117° B. 63° C. 105° D. 36° E. 107°

23. *Flow Easy Plumbing Company* charges \$75 for a house call plus \$45 for each half-hour of labor. If a bill's total amount was \$390, how long did the plumber work at the house?
 A. 4 hours B. 4.5 hours C. 3.5 hours D. 2 hours E. 5.5 hours

24. \overline{AB} has endpoints $A(16, 7)$ and $B(-4, -8)$. \overline{CD} has endpoints $C(18, 3)$ and $D(-6, 7)$. What is the sum of the coordinates of the intersection point of \overline{AB} and \overline{CD} ?
 A. 16 B. 18 C. 12 D. 20 E. 17

25. The median of a set of five different positive integers is 16. The arithmetic mean of the five integers is 14. What is the maximum possible value of the largest of the five integers?
 A. 36 B. 56 C. 16 D. 34 E. 24

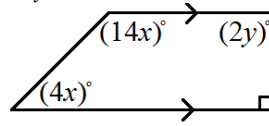
26. There are eight sprinters in a race. Awards are awarded to the top four finishers. In how many different ways can the awards be given out?
 A. 1,680 B. 32 C. 336 D. 840 E. 1,840

27. $45_7 \times 110_3 = \frac{\quad}{10}$
 A. 256 B. 32 C. 396 D. 363 E. 339

28. Muhammed acquired \$96 after 3 years in interest after he deposited a certain amount into a simple interest account that had a rate of 5%. How much money did Muhammed have in his account at the beginning of the 3 years?

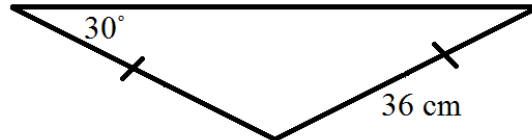
- A. \$720 B. \$580 C. \$660 D. \$640 E. \$600

29. Using the picture below, what is the product of x and y ?



- A. 180 B. 360 C. 540 D. 350 E. 450

30. Find the perimeter of the triangle below.



- A. 108 cm B. 144 cm C. $36 + 72\sqrt{3}$ cm D. $72 + 36\sqrt{3}$ cm E. $72 + 18\sqrt{3}$ cm

31. If $f(x) = x^3$, $g(x) = x^2$ and $h(x) = 21 - x$, find the value of $h(g(f(-3)))$.

- A. -729 B. -708 C. 750 D. -750 E. -827

32. The ratio of boys to girls in a group is 8:11. If six more girls join the group, the ratio of boys to girls changes to 4:7. How many boys are in the group?

- A. 22 B. 16 C. 28 D. 18 E. 20

33. April is at *Ice-Cream Your Way* and orders a cone, but only asks for it to be filled half-full of chocolate ice-cream. If the cone has a diameter of 12 cm and a height of 8 cm, how much chocolate ice-cream will be in April's cone? Let $\pi = 3$.

- A. 216 cm^2 B. 196 cm^2 C. 144 cm^2 D. 132 cm^2 E. 124 cm^2

34. Find the value of $A + B + C$, if $(4x - 11)(5x - 2) - (12x + 32) = Ax^2 + Bx + C$.

- A. -21 B. -1 C. -109 D. -54 E. -65

35. What is the new y -intercept of the linear equation $52x - 13y = 156$ after it is translated five units to the right?

- A. -12 B. -24 C. -32 D. -17 E. -7

36. Alexis scored 86, 88 and 78 on her first three tests. If she wants to have an average of more than an 80 after her fourth test, which of the following choices would not help her obtain her goal?

- A. 68 B. 70 C. 90 D. 69 E. 100

37. The angles in a quadrilateral are in a ratio of 10:11:32:37. What is the supplement of the second smallest of these angles?

- A. 136° B. 140° C. 158° D. 148° E. 152°

38. Find the area of a sector of a circle with a central angle of 60° and a diameter of 24 inches.

- A. $16\pi \text{ in}^2$ B. $32\pi \text{ in}^2$ C. $24\pi \text{ in}^2$ D. $12\pi \text{ in}^2$ E. $576\pi \text{ in}^2$

39. If $\frac{1}{x^2+6} = 0.0\bar{6}$, then x is equal to which of the following?

- A. $\{\pm 15\}$ B. $\{3\}$ C. $\{\pm \frac{1}{3}\}$ D. $\{-9\}$ E. $\{\pm 3\}$

40. How many gallons of a 12% acid solution must be mixed with a 20% acid solution to get 10 gallons of a 14% acid solution?

- A. 3.5 gallons B. 2.5 gallons C. 5.5 gallons D. 8.5 gallons E. 7.5 gallons

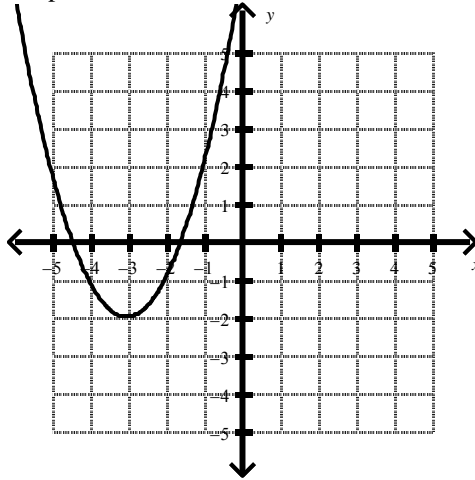
41. If $a - b = 26$, then what is the value of $b - a - 7$?

- A. 19 B. -19 C. -33 D. 12 E. 33

42. At the exact same time, a six feet man standing next to a tree casts an eleven feet shadow. If the tree is twenty-eight feet tall, how long was the tree's shadow?

- A. $51\frac{1}{3}$ ft B. $51\frac{2}{3}$ ft C. $15\frac{3}{11}$ ft D. $51\frac{3}{11}$ ft E. $51\frac{8}{11}$ ft

43. Below, the line $x - y = -3$ would intersect the parabola twice. What is the sum of all four coordinates of the points of intersection?



- A. -6 B. -4 C. -2 D. -1 E. 6

44. Find the value of $3M$, if $\frac{x^2-x-6}{x^2+6x+8} \div \frac{x^2-9}{x+4} = \frac{M}{x+3}$.

- A. 9 B. -6 C. 6 D. 3 E. -3

45. Which of the following is the correct form of the circle equation $x^2 + y^2 + 4x + 6y = 108$ converted into center-radius form?

- I. $(x + 2)^2 + (y + 3)^2 = 108$ II. $(x + 2)^2 + (y + 3)^2 = 121$ III. $(x - 2)^2 + (y - 3)^2 = 121$

- A. I only B. II only C. III only D. I and II E. II and III

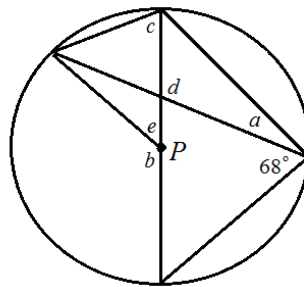
46. If $5^{x-2} = 25$, then what is the value of $x^5 - 2$?

- A. 1,022 B. 64 C. 126 D. 4,094 E. 254

47. A 45-45-90 right triangle is inscribed in a circle with a radius of 11 inches. What is the length of one of the legs?

- A. $\frac{11\sqrt{2}}{2}$ inches B. $\frac{5.5\sqrt{2}}{2}$ inches C. $22\sqrt{2}$ inches D. 5.5 units E. $11\sqrt{2}$ inches

48. Using the picture of $\odot P$ below, which statement is not true?



- A. $\angle a = 22^\circ$ B. $\angle b = 136^\circ$ C. $\angle c = 68^\circ$ D. $\angle d = 130^\circ$ E. $\angle e = 44^\circ$

49. Letter tiles spelling the word ALGEBRA are placed into a bag. How many different sequences of letters can be formed using all the letters in ALGEBRA?

- A. 1,260 B. 3,780 C. 5,040 D. 2,520 E. 4,120

50. Which of the following represents the solution to the inequality? $5(2x + 3) - 2(x - 8) > 3(2x + 4) - 2 + x$

- A. $(-21, \infty)$ B. $[-21, \infty]$ C. $(-21, \infty]$ D. $[-21, \infty)$ E. $[-\infty, 21]$

2016 – 2017 TMSCA Middle School Mathematics Test #8 Answer Key

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

16. If $a = -12$, $b = -2$, $c = -8$ and $d = 14$, then $ab \div cd = (-12)(-2) \div (-8)(14)$. Using order of operations, $(-12)(-2) \div (-8)(14) = 24 \div (-8)(14) = -3(14) = -42$.

28. Simple interest is $I = prt$, where I is the interest acquired, p is the principle amount, r is the rate and t is the time. Set up the equation $96 = (0.05)(3)p$, so $96 = 0.15p$ and $96 \div 0.15 = \$640$.

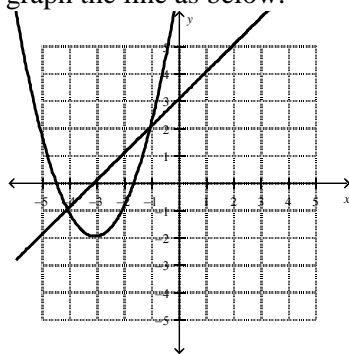
32. There were originally $8n$ boys and $11n$ girls in the group. If 6 more girls are added, then girls become $11n + 6$. We can now create our proportion. $\frac{8n}{11n+6} = \frac{4}{7}$. Cross multiply and we get $44n + 24 = 56n$. Subtract $44n$ from both sides and $24 = 12n$ and $n = 2$. So, $8(2) = 16$ boys being in the group.

34. $(4x - 11)(5x - 2) - (12x + 32) = 20x^2 - 63x + 22 - 12x - 32 = 20x^2 - 75x - 10$. So we know that $A = 20$, $B = -75$ and $C = -10$. Therefore, $A + B + C = 20 + (-75) + (-10) = -65$.

35. First, rewrite the equation $52x - 13y = 156$ into slope-intercept form. $52x - 13y = 156$ becomes $y = \frac{-52}{-13}x + \frac{156}{-13} \rightarrow y = 4x - 12$. To translate a function 5 units to the right, $f(x)$ becomes $f(x - 5)$. Therefore we have $f(x) = 4x - 12$ and translating 5 units to the right, $f(x - 5) = 4(x - 5) - 12 = 4x - 20 - 12 = 4x - 32$. Our equation is now $y = 4x - 32$ and our y -intercept is -32 .

41. Rewrite the expression $b - a - 7$ as $-a + b - 7$. Now you can factor out a -1 from the first two terms to get $-1(a - b) - 7$. We know that $a - b = 26$, so $-1(a - b) - 7 = -1(26) - 7 = -26 - 7 = -33$.

43. First, change $x - y = -3$ into slope-intercept form to graph it easier. $x - y = -3 \rightarrow y = x + 3$. Now graph the line as below.



The points of intersection are $(-1, 2)$ and $(-4, -1)$. Therefore, adding all the coordinates gives $-4 + (-1) + (-1) + 2 = -4$.

44. $\frac{x^2-x-6}{x^2+6x+8} \div \frac{x^2-9}{x+4} = \frac{x^2-x-6}{x^2+6x+8} \cdot \frac{x+4}{x^2-9} = \frac{(x-3)(x+2)}{(x+2)(x+4)} \cdot \frac{x+4}{(x-3)(x+3)} = \frac{1}{x+3}$, so $M = 1$. Thus, $3M = 3(1) = 3$.

45. Rewrite the equation in order to group the variables together. $x^2 + y^2 + 4x + 6y = 108$ can be rewritten as $x^2 + 4x + y^2 + 6y = 108$. Using completing the square, $x^2 + 4x + 4 + y^2 + 6y + 9 = 108 + 4 + 9$. Now we factor and get $(x + 2)^2 + (y + 3)^2 = 121$.