



TMSCA MIDDLE SCHOOL MATHEMATICS TEST #11 © FEBRUARY 14, 2015

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. $-11 - 245 - 64 =$ _____

- A. -320 B. -298 C. -192 D. -384 E. -170

2. $22 + 99 + 88 =$ _____

- A. 210 B. 209 C. 187 D. 189 E. 230

3. $2\frac{1}{2} \cdot \frac{8}{14} \cdot 2\frac{8}{10} =$ _____

- A. $4\frac{1}{2}$ B. $4\frac{1}{4}$ C. 4 D. $4\frac{3}{4}$ E. $4\frac{1}{8}$

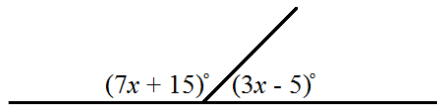
4. $84.6 \div 0.5 \div 0.2 =$ _____

- A. 84,600 B. 846 C. 8,460 D. 0.0846 E. 0.846

5. What is the arithmetic mean of $\frac{3}{4}$ and $\frac{2}{3}$?

- A. $\frac{7}{12}$ B. $\frac{5}{12}$ C. $\frac{1}{2}$ D. $\frac{7}{48}$ E. $\frac{17}{24}$

6. What is the value of x , using the picture below?



- A. 10 B. 17 C. 51 D. 46 E. 13

7. What number is 64% of 2,400?

- A. 1,584 B. 1,536 C. 1,648 D. 1,724 E. 1,716

8. Find the LCM of the numbers 18, 12 and 42.

- A. 504 B. 3,528 C. 126 D. 252 E. 324

9. \$0.06 = 12 quarters + 23 dimes + _____ nickels + 6 pennies

- A. 10 B. 11 C. 12 D. 14 E. 16

10. What is the area of a right triangle with legs of 10 and 24 inches and a hypotenuse of 26 inches?

- A. 240 in^2 B. 130 in^2 C. 312 in^2 D. 156 in^2 E. 120 in^2

11. 26 decameters = _____ decimeters

- A. 0.26 B. 260 C. 2.6 D. 2,600 E. 26

12. What is the next term in the following sequence? 3, 12, 27, 48, ...

- A. 68 B. 70 C. 75 D. 84 E. 59

13. A batch of cookies was placed in the oven at 5:15 pm. If it takes the batch $\frac{8}{15}$ of an hour to bake, at what time should the cookies be taken out of the oven?

- A. 5:42 pm B. 6:17 pm C. 6:04 pm D. 5:47 pm E. 5:51 pm

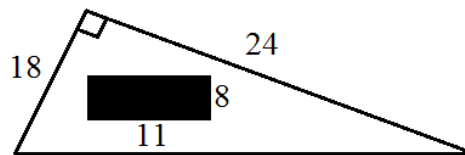
14. What is the value of the third quartile of the set of data {42, 46, 54, 77, 77, 79, 94}?
- A. 77 B. 78 C. 79 D. 86.5 E. 52
15. What is the sum of the number of vertices and edges of a nonagonal prism?
- A. 45 B. 38 C. 18 D. 29 E. 56
16. $45,000,000,000,000,000,000,000,000 = \underline{\hspace{2cm}}$ (scientific notation)
- A. 45×10^{25} B. 45×10^{24} C. 4.5×10^{24} D. 4.5×10^{-24} E. 4.5×10^{25}
17. If $m \diamond n = 5mn - m + n$, then what value is $4 \diamond (-1 \diamond 1)$?
- A. -67 B. -3 C. 58 D. -52 E. 47
18. A square and a regular dodecagon share a common side. If the perimeter of the square is 52 cm, what is the perimeter of the dodecagon?
- A. 143 cm B. 182 cm C. 156 cm D. 676 cm E. 520 cm
19. $\sqrt{560}$ lies between the two integers A and B . What is the product of A and B ?
- A. 552 B. 529 C. 576 D. 600 E. 506
20. Solve: $-3w \leq 45$
- A. $w \leq -15$ B. $w > -15$ C. $w \leq 10.\bar{3}$ D. $w \geq -10.\bar{3}$ E. $w \geq -15$
21. $MMDXL + CDXIX = \underline{\hspace{2cm}}$ (Arabic number)
- A. 2,959 B. 759 C. 789 D. 2,759 E. 2,789
22. A fair coin is flipped five times. What is the probability of getting all heads (ratio form)?
- A. 1:16 B. 1:32 C. 1:8 D. 3:16 E. 1:5
23. Milo and Tito had a lunch bill of \$18.00. If they wanted to leave an 18% tip and wanted to split the total of their lunch evenly, how much did Milo pay?
- A. \$21.24 B. \$10.52 C. \$10.48 D. \$10.62 E. \$9.09
24. A bicycle lock uses a combination that requires a letter in the first spot and single digits (0 – 9) in the 2nd and 3rd spots. If a digit may repeat, how many lock combinations are possible?
- A. 2,340 B. 2,430 C. 2,600 D. 1,872 E. 5,200
25. What is the y-intercept of the linear equation $2y = \frac{1}{2}x + \frac{1}{4}$?
- A. 8 B. $\frac{1}{4}$ C. 4 D. -4 E. $\frac{1}{8}$
26. If $f(x) = 3x - 7$ and $g(x) = 2x + 5$, find the value of $-2f(g(6))$.
- A. 44 B. -22 C. 51 D. -44 E. -88
27. 1.5 miles = yards
- A. 2,640 B. 7,920 C. 880 D. 3,520 E. 3,080

28. On her first three tests, Shayna averaged an 88. What must Shayna score on her next test to average a 91?
 A. 97 B. 99 C. 94 D. 91 E. 100

29. If the side lengths of rectangle A were tripled, by how many times greater would the new area be increased by?
 A. 3 B. 6 C. 9 D. 12 E. 4

30. Using the set of numbers $\{3, 4, 5, 7, 8, 9, 11, 25\}$, if you were to multiply all the numbers to get one product, how many zeroes would be at the end of the number?
 A. 0 B. 2 C. 3 D. 4 E. 5

31. Find the area of the unshaded region below.



A. 256 units² B. 224 units² C. 128 units² D. 394 units² E. 138 units²

32. What is the slope of any line parallel to the line with the linear equation $5x + 6y + 7 = -9x - y + 11$?
 A. $-\frac{1}{2}$ B. $\frac{1}{2}$ C. 2 D. -2 E. $\frac{1}{4}$

33. What is the sum of the coordinates of the midpoint between the points $(54, 3)$ and $(-19, 17)$?
 A. 46.5 B. 27.5 C. 29.5 D. 36.5 E. 46

34. If the point $(4, -5)$ is rotated 90° counter-clockwise about the origin, what are its new coordinates?
 A. $(5, 4)$ B. $(5, -4)$ C. $(-4, 5)$ D. $(-4, -5)$ E. $(4, 5)$

35. Simplify: $\sqrt{18} + \sqrt{12} + \sqrt{72} + \sqrt{48}$
 A. $5\sqrt{6}$ B. $15\sqrt{10}$ C. $9\sqrt{2} + 4\sqrt{3}$ D. $6\sqrt{2} + 6\sqrt{3}$ E. $9\sqrt{2} + 6\sqrt{3}$

36. How much money will be in a bank account if \$2,550 were deposited at 5% for 6 years (simple interest)?
 A. \$2,550.00 B. \$3,755.50 C. \$3,315.00 D. \$3,275.50 E. \$3,250.50

37. What is the area of a heptagon with its vertices located at $(-3, -1)$, $(1, -1)$, $(5, 0)$, $(5, 2)$, $(1, 5)$, $(0, 2)$ and $(-3, 1)$?
 A. 56 units² B. 34 units² C. 28 units² D. 32 units² E. 33.5 units²

38. What is the value of the mean absolute deviation of the data set 52, 27, 38, 61 and 72?
 A. 12 B. 14 C. 16 D. 18 E. 17

39. The mosquito population is 36 in Julia's backyard and is increasing at a of 3% per day. Which exponential function below models this situation, where x equals the number of days?
 A. $y = 36(3)^x$ B. $y = 36(1.3)^x$ C. $y = 36(97)^x$ D. $y = 36(1.03)^x$ E. $y = 3(36)^x$

40. One side length of a triangle is $\frac{1}{5}$ of the triangle's total perimeter, another side length is $\frac{1}{7}$ of the perimeter and the third side measures 46 inches. What is the perimeter of the triangle?

- A. 81 in B. 70 in C. 80 in D. 64 in E. 78 in

41. $44_5 + 55_6 + 66_7 = \underline{\hspace{2cm}}_9$

- A. 107 B. 114 C. 117 D. 127 E. 128

42. Calculate the value of the discriminant for the quadratic equation $y = 4x^2 - 3x + 11$.

- A. 67 B. -167 C. -38 D. -35 E. -189

43. Find M , if $\frac{6}{3x} + \frac{4}{2y} = \frac{M}{xy}$.

- A. $2x + 2y$ B. $12x + 12y$ C. $6x + 6y$ D. $x + y$ E. $3x + 3y$

44. Find the value of x , if $4^{x+1.5} = 64$

- A. 2.5 B. 14.5 C. 1.5 D. 5 E. 0.5

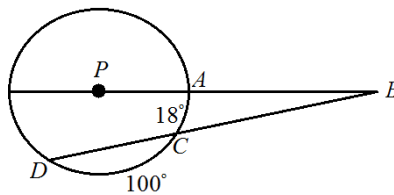
45. How many combinations can be made from 9 objects taken 6 at a time?

- A. 6,480 B. 48 C. 168 D. 84 E. 54

46. Find the value of $a^2 + b^2$, if $2a + 3b = 106$ and $a - 2b = -38$.

- A. 944 B. 850 C. 872 D. 80 E. 800

47. In the picture below, arc $AC = 18^\circ$ and arc $CD = 100^\circ$. The measure of $\angle ABC$ is equal to $\underline{\hspace{2cm}}^\circ$.



- A. 40 B. 22 C. 36 D. 62 E. 18

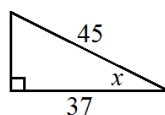
48. Simplify by rationalizing the denominator: $\frac{5}{3+\sqrt{18}}$

- A. $\frac{5-5\sqrt{2}}{-3}$ B. $\frac{15+15\sqrt{2}}{-9}$ C. $\frac{8-3\sqrt{2}}{-9}$ D. $\frac{8-3\sqrt{2}}{-3}$ E. $\frac{5+\sqrt{2}}{-3}$

49. Solve: $|4x - 10| = 34$

- A. $\{-6\}$ B. $\{11\}$ C. $\{6, -11\}$ D. $\{-6, -11\}$ E. $\{-6, 11\}$

50. Using the picture below, which of the following equations could be used to find the measure of $\angle x$?



- A. $x = \sin^{-1}\left(\frac{37}{45}\right)$ B. $x = \cos^{-1}\left(\frac{37}{45}\right)$ C. $x = \tan^{-1}\left(\frac{37}{45}\right)$ D. $x = \cos^{-1}\left(\frac{45}{37}\right)$ E. $x = \sin^{-1}\left(\frac{45}{37}\right)$

2014-2015 TMSCA Middle School Mathematics Test #11 Answer Key

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

2014-2015 TMSCA Middle School Mathematics Test #11 Selected Answers

6. The two angles showing in the picture are supplementary angles, which mean they sum to 180 degrees. So, you can create an equation and then solve: $7x + 15 + 3x - 5 = 180$.
 $7x + 15 + 3x - 5 = 180 \rightarrow 8x + 10 = 180$. Subtract 10 from both sides and $10x = 170$. Divide by 10 to both sides and $x = 17$.

18. 1 hour = 60 minutes. $\frac{8}{15}$ of 60 minutes is equal to $\frac{8}{15} \cdot 60 = 32$ minutes. If the cookies were placed in the oven at 5:15 pm, 32 minutes later is 5:47 pm. The cookies should be taken out of the oven at 5:47 pm.

24. The lock has three spots in its combination. If a letter must be in the first spot, then there are 26 choices. If digits 0-9 can be in the second and third spots and may repeat, then we have ten choices for both spots. Therefore, $26 \cdot 10 \cdot 10 = 2,600$ different locker combinations.

$$35. \sqrt{18} + \sqrt{12} + \sqrt{72} + \sqrt{48} = \sqrt{9 \cdot 2} + \sqrt{4 \cdot 3} + \sqrt{36 \cdot 2} + \sqrt{16 \cdot 3} = 3\sqrt{2} + 2\sqrt{3} + 6\sqrt{2} + 4\sqrt{3} = 9\sqrt{2} + 6\sqrt{3}.$$

$$43. \text{ First find the common denominator, which is } 6xy: \frac{6}{3x} + \frac{4}{2y} = \frac{M}{xy} \rightarrow \frac{6}{3x} \cdot \frac{2y}{2y} + \frac{4}{2y} \cdot \frac{3x}{3x} = \frac{12y}{6xy} + \frac{12x}{6xy} = \frac{12x+12y}{6xy} = \frac{2x+2y}{xy}. \text{ Thus, } M = 2x + 2y.$$

44. If $4^{x+1.5} = 64$, then $4^{x+1.5} = 4^3$. So, we are left with the equation $x + 1.5 = 3$. After subtracting 1.5 from both sides, $x = 1.5$.