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 # 1 1 ©

F E B R U A R Y 1 5 , 2 0 1 4

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 #11

1. $12\frac{3}{8}+7\frac{3}{4}=$ _____

A. $20\frac{1}{4}$ B. $20\frac{1}{8}$ C. $20\frac{1}{2}$ D. $20\frac{3}{16}$ E. $19\frac{11}{16}$

2. $16-5\frac{6}{11}=$ _____

A. $11\frac{5}{11}$ B. $10\frac{5}{11}$ C. $11\frac{4}{11}$ D. $10\frac{4}{11}$ E. $\frac{126}{11}$

3. $17.4\times 0.13=$ _____ (nearest tenth)

A. 2.249 B. 2.25 C. 2.24 D. 2.2 E. 2.3

4. $0.84\div 12=$ _____ (nearest hundredth)

A. 0.1 B. 0.08 C. 0.07 D. 0.078 E. 0.081

5. Evaluate $2a+3b\div c$, if a = 4, b = 12 and c = -9.

A. -2 B. 2 C. $-4.\overline{8}$ D. 6 E. 4

6. A(n) _____ _____ is how much is paid for the use of money, as a percent.

A. Interest Rate B. Fixed Income C. Percent Ratio D. Contract Ratio E. Contract Price

7. If $\angle A+\angle B=146^\circ$, what is the complement of $\angle A$ if $\angle B=81^\circ$?

A. 65° B. 35° C. 25° D. 115° E. 9°

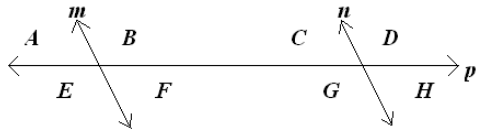
8. If the perimeter of a square is 92 inches, what is the measure of twice its side length?

A. 23 inches B. 46 inches C. 11.5 inches D. 57.5 inches E. 69 inches

9. If you double 450 centimeters, it is equal to _____ meters.

A. 4.5 B. 0.45 C. 45 D. 9 E. 90

10. In the picture below, $m\|n$ with transversal p. Name a pair of corresponding angles.



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

11. Which pair of integers below is relatively prime?

A. 12 & 33 B. 7 & 12 C. 8 & 24 D. 9 & 18 E. 32 & 34

12. Find M, if $12\cdot 45=270\cdot M$.

A. 2 B. 4 C. 3 D. 5 E. 9

13. Solve: $-5n+8\geq -47$

A. $n\geq 11$ B. $n>11$ C. $n<11$ D. $n\leq -11$ E. $n\leq 11$

14. In Coach Hamilton's gym class, 14 out of 35 boys have shoe sizes larger than an 8. What percent of boys in Coach Hamilton's class don't have a shoe size larger than an 8, as a percentage?
A. 20% B. 40% C. 60% D. 75% E. 25%

15. The function $f(x) = (x+3)^2$ represents which type of function?
A. linear B. quadratic C. cubic D. binomial E. polynomial

16. A pancake recipe uses 5 eggs to make 8 jumbo gigantic pancakes. How many eggs are needed to make 2 dozen jumbo gigantic pancakes?
A. 12 B. 9 C. 10 D. 15 E. 21

17. Which type of figure has 15 edges, 7 faces and 10 vertices?
A. pentagonal pyramid B. hexagonal prism C. octagonal prism D. pentagonal prism E. cube

18. If $\frac{x+1}{5} = \frac{3}{4}$, then find the value of $\frac{2}{5}x$.
A. 1.1 B. 1.2 C. 2.1 D. 3.2 E. 4.4

19. What is the product of the mode and range of the data in the stem-and-leaf plot?

1	1 1 5
2	2 7
3	2 3 5

$key: 3|1 = 31$

A. 23 B. 385 C. 264 D. 525 E. 770

20. Use the picture below and find a pattern, then find the value of **m**.

3	7	
2	4	13

5	-3	
-2	7	-1

6	8	
-3	7	69

11	-6	
10	-4	m

A. -116 B. -26 C. 86 D. 64 E. -76

21. $45{,}000 \div 0.02 =$ _____ (scientific notation)
A. 9×10^{8} B. 2.25×10^{-4} C. 2.25×10^{8} D. 2.25×10^{6} E. 9×10^{10}

22. Simplify: ½ (4*x* – 18) + ¼ (16*x* + 20) – (4*x* + 7) – (*x* – 9)
A. *x* – 2 B. 9*x* – 6 C. 16*x* D. *x* – 9 E. 2*x* – 2

23. What is the LCM of the numbers 63, 70, 180?
A. 900 B. 1,260 C. 11,340 D. 4,410 E. 1,890

24. Point *A* has coordinates (-7, 18) and is reflected across the *y*-axis and then it is reflected across the *x*-axis. What are the coordinates of point *A*'s new location?
A. (18, -7) B. (18, 7) C. (-18, 7) D. (7, -18) E. (7, 18)

25. Two pencils and four pens cost $3.20. Four pencils and two pens cost $2.80. How much does it cost to buy one pencil and one pen?
A. $1.10 B. $1.05 C. $1.00 D. $0.95 E. $1.20

26. $\angle A$ is a central angle of a circle. If the measure of $\angle A$ is 45% of the circle, what is the measure of $\angle A$?
A. 132° B. 45° C. 95° D. 162° E. 174°

27. If $(4n + 7)(3n – 2) = ax^2 + bx + c$, find the value of $a + b + c$.

A. 11 B. 25 C. 31 D. 33 E. 39

28. The probability of a particular event happening is $\frac{3}{8}$. What are the odds against it occurring?

A. 5:8 B. 5:11 C. 5:3 D. 3:11 E. 3:5

29. 1,540,200 = _____ (Roman numeral)

A. $\overline{MDXL}CC$ B. $\overline{MCDXLCC}$ C. $\overline{M}DXLCC$ D. $\overline{M}DCCXLCC$ E. $\overline{MDXL}CC$

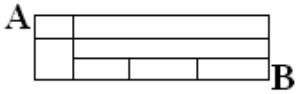
30. How many regions in a plane are determined by seven lines, no two are parallel and only three are concurrent?

A. 28 B. 27 C. 26 D. 25 E. 24

31. The distance from point $A(4, 3)$ to point $B(7, 5)$ is equal to _____ units.

A. 6 B. $6\sqrt{2}$ C. $3\sqrt{2}$ D. $\sqrt{11}$ E. $\sqrt{13}$

32. Moving only down or to the right, how many paths are there form point *A* to point *B*?



A. 15 B. 12 C. 10 D. 8 E. 7

33. Solve for *B*: $\frac{1}{4}(B-C)=5D+1$

A. $B = 4(5D – 1) + 4C$ B. $B = 4(5D + 1 + C)$ C. $B = 20D + C + 4$ D. $B = ¼ (5D + 1) + C$ E. $B = 20CD + 1$

34. Find the slope of the linear equation $\frac{2}{3}x-\frac{2}{5}y=1$.

A. $\frac{5}{3}$ B. $-\frac{3}{5}$ C. $-\frac{4}{15}$ D. $\frac{16}{15}$ E. $\frac{1}{2}$

35. If 48 gallons fill a container 60% full, how many more gallons are needed to fill the container?

A. 128 B. 52 C. 122 D. 28.8 E. 32

36. What is the decay factor in the exponential decay function $y=1.4\cdot(0.55)^x$?

A. 1.4 B. 45 C. 0.55 D. 55 E. 5.5

37. $23_4 + 31_4 =$ _____$_4$

A. 54 B. 103 C. 102 D. 120 E. 112

38. Convert $\frac{7}{4}\pi$ radians into degrees.

A. 315° B. 345° C. 275° D. 270° E. 360°

39. Find $x + 34$, if $\log_x 729 = 6$

A. 18 B. 40 C. 39 D. 27 E. 37

40. $210^\circ C =$ _____ $^\circ F$

A. 405 B. 415 C. 420 D. 395 E. 410

41. What is the sum of the first 21 positive even numbers?

A. 441 B. 484 C. 462 D. 456 E. 444

42. The first term in a geometric series is 200 and the common ratio is ½ . What is the 4th term of the series?

A. 75 B. 150 C. 12.5 D. 25 E. 175

43. What property is illustrated by the example $4x = 4x$?

A. Reflexive B. Symmetric C. Identity D. Commutative E. Transitive

44. What is the sum of all the positive integers of x that satisfy $-4 < 3x - 7 < 26$?

A. 55 B. 66 C. 65 D. 54 E. 64

45. When factored completely, the polynomial $2x^8 - 2$ has _____ factors.

A. 8 B. 2 C. 3 D. 4 E. 5

46. If $\begin{bmatrix} 1 & 2 \\ 3 & -5 \end{bmatrix} \cdot \begin{bmatrix} 10 & 0.75 \\ 0.5 & 0.25 \end{bmatrix} = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, then $c - b =$ _____.

A. 28.75 B. 26.25 C. 16.5 D. 26.5 E. 14.25

47. Simplify: $8i^5(2i + 4)$

A. $-16 + 32i$ B. $16 - 32i$ C. $-16 - 32i$ D. -48 E. $-48i$

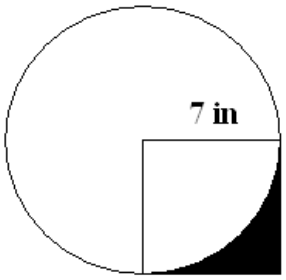
48. *AMSee* movie theater charges \$8 for adult tickets and \$4 for child tickets. At a showing where 200 tickets were sold, the theater collected \$1,304. How many more adults attended the showing than children?

A. 126 B. 74 C. 48 D. 52 E. 60

49. Find the area of the pentagon with vertices located at (1, 0), (2, 2), (0, 6), (-1, 5) and (-8, 0).

A. 44 units^2 B. 80 units^2 C. 60 units^2 D. 64 units^2 E. 30 units^2

50. A square has a side length of 7 inches and is also the radius of a circle. What is the area of the shaded region in the picture below, let $\pi = 3$?



A. 18.25 in^2 B. 36.75 in^2 C. 10.25 in^2 D. 12.25 in^2 E. 8.75 in^2

2013-2014 TMSCA Middle School Mathematics Test #11 Answer Key

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

2013-2014 TMSCA Middle School Mathematics Test #11 Selected Solutions

26. A circle has 360°. If $\angle A$ measures 45% of 360°, then $\angle A = 0.45(360) = 162^\circ$.

27. $(4n + 7)(3n - 2) - 4n \cdot 3n - 4n \cdot 2 + 3n \cdot 7 - 7 \cdot 2 = 12n^2 + -8n + 21n - 14 =$
$12n^2 + 13n - 14$. So, a = 12, b = 13 and c = -14. $a + b + c = 12 + 13 - 14 = 11$.

42. The formula to find the n^{th} term of a geometric sequence is $a_n = a_1 \cdot r^{n-1}$, where a_n is the term we are looking for, a_1 is the first term, r is the common ratio and n is the position of the term we are looking for. We are given the first term of 200, the common ratio of ½ and are asked to find the 4^{th} term. Substitute and get $a_4 = 200\left(\frac{1}{2}\right)^{(4-1)} = 200\left(\frac{1}{2}\right)^3 =$
$200\left(\frac{1}{8}\right) = 25$. Therefore, the 4^{th} term is 25.

44. Solve this by adding 7 to all sides first. $-4 < 3x - 7 < 26 = -4 + 7 < 3x - 7 + 7 < 26 + 7$.
Now we have $3 < 3x < 33$. Dividing all sides by 3 and we have $\frac{3}{3} < \frac{3x}{3} < \frac{33}{3} = 1 < x < 11$.
Since only positive integers satisfy the inequality, you add them.
2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = 54.

45. $2x^8 - 2 = 2(x^8 - 1) = 2(x^4 + 1)(x^4 - 1) = 2(x^4 + 1)(x^2 + 1)(x^2 - 1) = 2(x^4 + 1)(x^2 + 1)(x + 1)(x - 1)$
So, there are 5 factors of $2x^8 - 2$.

50. The area of the shaded region can be found by subtracting the area of ¼ of the circle from the area of the square. So, we will use $s^2 - \frac{\pi r^2}{4} = 7^2 - \frac{3 \cdot 7^2}{4} = 49 - 36.75 = 12.25$.
So, the area of the shaded region is 12.25 in^2.