

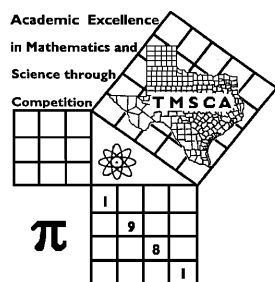
8 1st Score: _____	2nd Score: _____	3rd Score: _____	_____. ____ Final Score
S & G _____	S & G _____	S & G _____	
Grader: _____	Grader: _____	Grader: _____	

PLACE LABEL BELOW

Name: _____ School: _____

SS/ID Number: _____ City: _____

Grade: 5 6 7 8 Classification: 1A 2A 3A 4A 5A 6A



TMSCA MIDDLE SCHOOL CALCULATOR

TEST #9 ©

JANUARY 30, 2016

GENERAL DIRECTIONS

I. About this test:

- A. You will be given 30 minutes to take this test.
- B. There are 80 problems on this test.

II. How to write the answers:

- A. For all problems except stated problem as noted below write three significant digits.
 1. Examples (* means correct, but not recommended)
 Correct: 12.3, 123, 123.*, 1.23x10*, 1.23x10^{0*}, 1.23x10¹, 1.23x10⁰¹, .0190, 1.90x10⁻²
 Incorrect: 12.30, 123.0, 1.23(10)², 1.23·10², 1.230x10², 1.23*10², 0.19, 1.9x10⁻², 19.0x10⁻³, 1.90E-02
 2. Plus or minus one digit error in the third significant digit is permitted.
- B. For stated problems:
 1. Except for integer, dollar sign, and significant digit problems, as detailed below, answers to stated problems should be written with three significant digits.
 2. Integer problems are indicated by (integer) in the answer blank. Integer problems answers must be exact, no plus or minus one digit, no decimal point or scientific notation.
 3. Dollar sign (\$) problems should be answered to the exact cent, but plus or minus one cent error is permitted. The decimal point and cents are required for exact dollar answers.

III. Some symbols used on the test.

- A. Angle measure: rad means radians; deg means degrees.
- B. Inverse trigonometric functions: arcsin for inverse sine, etc.
- C. Special numbers: π for 3.14159 . . . ; e for 2.71828.
- D. Logarithms: Log means common (base 10); Ln means natural (base e).

IV. Scoring:

- A. All problems answered correctly are worth FIVE points. FOUR points will be deducted for all problems answered incorrectly or skipped before the last problem attempted.

2015-2016 TMSCA Middle School Calculator Test #9

1. $1860 + 1650$ ----- 1= _____

2. $18 + 60 - 61$ ----- 2= _____

3. $-115 - 128 + 86$ ----- 3= _____

4. $\pi - 4 - 8 - 7$ ----- 4= _____

5. $936 + 754 + 427 + 669$ ----- 5= _____

6. $133 - 16.8 - 105 + 67.2 + 63.9$ ----- 6= _____

7. $4.81 - \pi + 2.81 - 2.18 - 4.02$ ----- 7= _____

8. $\pi + 8.7 - 9.18 + 8.03 + 8.9$ ----- 8= _____

9. $139 \times 317 \times 181$ ----- 9= _____

10. $181 \times 939 \times 2310 \times 28.8$ ----- 10= _____

11. The charge on Ricky's bill was \$52.85. If he was charged \$1.95 for for each unit of data, calculate the number of units of data he used. --- 11= _____ units

12. The vertices of a right triangle have coordinates (4,10), (4,2) and (10,2). Calculate the area of the triangle in square units. ----- 12= _____ units²

13. Convert 72pi radians to degrees. ----- 13= _____ °

14. $(69/62)[63 - 22]$ -----14= _____

15. $855 - [879/818 + 1.21]$ -----15= _____

16. $(107 + 204)[65 - 296 - 318]$ -----16= _____

17. $\{191/32\} \left[\frac{85}{170 + 137} \right]$ -----17= _____

18. $\frac{(85/52) + (133/16)}{(0.00154 - 9.86 \times 10^{-4})}$ -----18= _____

19. $\left[\frac{(7400/4130) - (3210/5910)}{210/220} \right]$ -----19= _____

20. $\frac{0.265 + 0.196 + 0.158}{(0.0103)(2.43)(0.0379)}$ -----20= _____

21. $\frac{(246)(1060)}{0.0564} (5060 - 1330)$ -----21= _____

22. $\frac{(675 \times 723)/1160}{(1290 \times 48.9) + 26700}$ -----22= _____

23. $\frac{(\pi)(32/68)(59/84)}{(50/68)}$ -----23= _____

24. The mean of four positive integers is twelve. When the greatest number is removed the mean of the remaining three integers is nine. What number was removed? -----24= _____ INT.

25. In a 45-45-90 right triangle, the hypotenuse is 212.12 cm. Calculate the length of one of the sides. -----25= _____ cm

26. The measure of Angle A is twelve less than twice its compliment. Calculate the measure of Angle A in degrees. -----26= _____ °

27. $[925 - (194 + 371)] + [(-0.343)(580 - 905)]$ -----27= _____

28. $(10.7)[(0.00329/0.0029)(198 + 349)]$ -----28= _____

29. $\frac{(9.73 \times 10^7) + (2.11 \times 10^8)}{(-3.78)(4.42) - 11.6}$ -----29= _____

30. $\frac{1}{6.88} + \frac{1}{(\pi)(15.2 - 11.8)}$ -----30= _____

31. $\frac{1}{74.9} + \frac{1}{(222 - 183)}$ -----31= _____

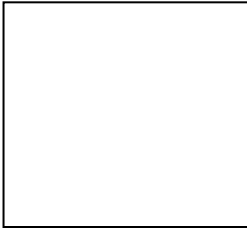
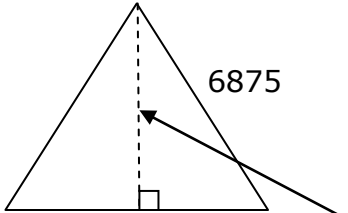
32. $(2.14)[(3.20 \times 10^{11}) - (3.61 \times 10^{11})]$ -----32= _____

33. $\frac{1}{4820} - \frac{1}{4570} + \frac{1}{1030}$ -----33= _____

34. $\left[\frac{1}{74.9}\right] + [0.938]$ -----34= _____

35. Calculate the additive inverse of the multiplicative inverse of the fifth root of pi. -----35= _____

36. Shanghai's magnetic levitation train has a top speed of 270 miles per hour. Calculate this speed in meters per second. -----36= _____ mps

SQUARE	EQUILATERAL TRIANGLE
	
Perimeter = 289 Area = ?	Height = ?
37= _____	38= _____

39. $\left[\frac{28200 + (1/(1.69 \times 10^{-4}))}{(11300/10200) - 0.597} \right]^2$ -----39= _____

40. $(57.1 + 80.4)^2(565 + 497)^2$ -----40= _____

41. $\frac{(21300 + 12500)^2}{(0.00625 - 0.0077)^3}$ -----41= _____

42. $\sqrt{(165/266) + 0.53 - 0.409}$ -----42= _____

43. $\sqrt{2080 - 1340 + 1710} - \sqrt{687}$ -----43= _____

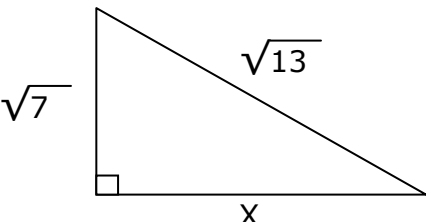
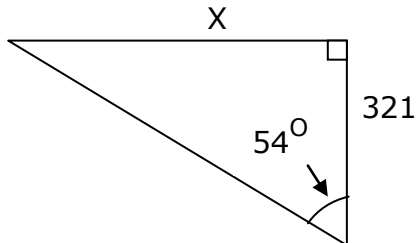
44. $(4300)\sqrt{61.8 + 22.3 + 55.1}$ -----44= _____

45. $(18400)\sqrt[4]{49300 + 46800 - 10600}$ -----45= _____

46. $\frac{1}{\sqrt{95 + 554 + 310}} + \left(\frac{1}{\sqrt{2.07}}\right)^4$ -----46= _____

47. A tire has an outside diameter of 18 inches. Calculate the number of revolutions it will take to cover exactly one mile. -----47= _____ rev.

48. Stan drives to work at 45 mph. and arrives one minute early. If he slows his roll to 40 mph, he arrives one minute late. Calculate the distance he drives to work. -----48= _____ mi.

<p style="text-align: center;">RIGHT TRIANGLE</p>  <p style="text-align: right; margin-right: 50px;">$X = ?$</p> <p>49= _____</p>	<p style="text-align: center;">RIGHT TRIANGLE</p>  <p style="text-align: right; margin-right: 50px;">$X = ?$</p> <p>50= _____</p>
---	--

51. $\sqrt{\frac{10000}{(286)(0.0117)}} + \frac{(67.6 - 79.6)}{(0.038 + 0.155)}$ -----51= _____

52. $\frac{(73200 + 2.61 \times 10^5 - 2.77 \times 10^5)^3}{\sqrt{9660 + 8850 + 15700}}$ -----52= _____

53. $\frac{\sqrt{0.848 + \pi + 2.25}}{(36.4 - 54.1 + 15.5)^3}$ -----53= _____

54. $(0.693)(2.62 \times 10^9)^{1/2} - [(12600)(69900)]^{1/2}$ -----54= _____

55. $(0.9)^2 \sqrt{(63.3)/(248)} - (0.12 + 0.257)$ -----55= _____

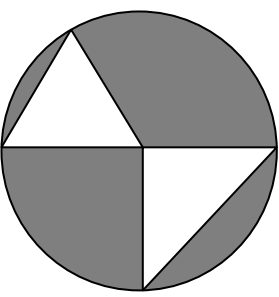
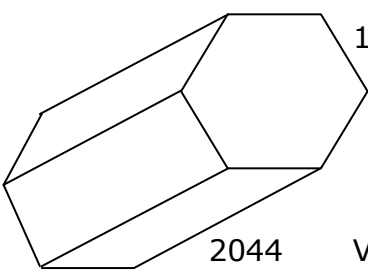
56. $\sqrt{\frac{1/(12.9 - 7.68)}{(110)(523 + 689)^4}}$ -----56= _____

57. $\sqrt{\frac{1/(29.5 - 7.02)}{(33.5)(25.8 + 9.23)^3}}$ -----57= _____

58. $\sqrt{\frac{(3.87)(294)}{(7.92) + (13.1)}} - 10$ -----58= _____

59. Calculate the area of a regular pentagon with a perimeter of 82.1 inches and an apothem of 7.85 inches. -----59= _____ in.²

60. Calculate the odds of rolling a sum greater than 7 on a standard pair of dice. -----60= _____

<p style="text-align: center;">CIRCLE, EQUILATERAL TRIANGLE AND ISOSCELES RIGHT TRIANGLE</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>Radius of circle = Leg right triangle = side of equilateral triangle = 0.0592</p> <p>Shaded Area = ?</p> </div> </div> <p>61= _____</p>	<p style="text-align: center;">RIGHT REGULAR HEXAGONAL PRISM</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>1511</p> <p>2044 Volume = ?</p> </div> </div> <p>62= _____</p>
--	---

63. $\frac{19! - 15!}{17!}$ -----63= _____

64. (deg) $(1220 + 1270)\tan(29.8^\circ)$ -----64= _____

65. $(38.7 - \pi)e^{0.67}$ -----65= _____

66. (deg) $(1370 - 1810)\sin(22.3^\circ) + 158$ -----66= _____

67. (deg) $\cos(9.64^\circ - 14.9^\circ) + 0.831$ -----67= _____

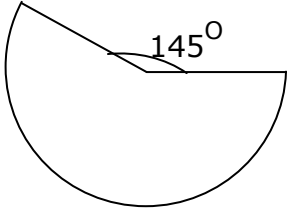
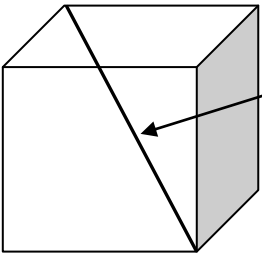
68. (rad) $(2.14)\tan(67)$ -----68= _____

69. (rad) $\cos[(38 - 13.5)(4.42)]$ -----69= _____

70. $(400 - 235)^{0.376 - 0.306}$ -----70= _____

71. Sandra deposits \$5000 and earns $3\frac{7}{8}\%$ compounded semiannually. If she keeps the money in the account for 5 years, calculate the total balance in the account at the end of those 5 years. -----71=\$ _____

72. The sum of the three digits in a three digit integer is 12. The tens digit is 2 less than the hundreds digit and the units digit is 4 less than the sum of the other two digits. Calculate the three digit integer. -----72= _____ INT.

<p style="text-align: center;">SECTOR OF CIRCLE</p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="text-align: left;"> <p>Area = 0.001001</p> <p>Radius = ?</p> </div> </div> <p>73= _____</p>	<p style="text-align: center;">CUBE</p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="text-align: left;"> <p>Inner Diagonal = 615</p> <p>Surface Area = ?</p> </div> </div> <p>74= _____</p>
---	---

75. $\frac{\text{Log}(8.28 \times 10^9 + 5.93 \times 10^9)}{22.5}$ ----- 75= _____

76. $\frac{\text{Log}(1580 + 2250)}{40.4 - 94.7}$ ----- 76= _____

77. $\text{Log}(2460 + 1370 + 1810)$ ----- 77= _____

78. $\frac{\text{Log}[0.196 + (0.913)(0.535)]}{0.19 + \text{Log}[1.5 + 0.954]}$ ----- 78= _____

79. $2 + 4 + 6 + \dots + 866$ ----- 79= _____

80. $1 + \frac{(0.41)^4}{2} - \frac{(0.41)^6}{6} + \frac{(0.41)^8}{24} - \frac{(0.41)^{10}}{120}$ ----- 80= _____

2015-2016 TMSCA Middle School Calculator Test #9

Page 1	Page 2	Page 3	Page 4
1 = 3510 = 3.51×10^3	14 = 45.6 = 4.56×10^1	27 = 471 = 4.71×10^2	39 = 4.46×10^9
2 = 17.0 = 1.70×10^1	15 = 853 = 8.53×10^2	28 = 6640 = 6.64×10^3	40 = 2.13×10^{10}
3 = -157 = -1.57×10^2	16 = -171000 = -1.71×10^5	29 = -1.09×10^7	41 = -3.75×10^{17}
4 = -15.9 = -1.59×10^1	17 = 1.65 = 1.65×10^0	30 = 0.239 = 2.39×10^{-1}	42 = 0.861 = 8.61×10^{-1}
5 = 2790 = 2.79×10^3	18 = 18000 = 1.80×10^4	31 = 0.0390 = 3.90×10^{-2}	43 = 23.3 = 2.33×10^1
6 = 142 = 1.42×10^2	19 = 1.31 = 1.31×10^0	32 = -8.77×10^{10}	44 = 50700 = 5.07×10^4
7 = -1.72 = -1.72×10^0	20 = 653 = 6.53×10^2	33 = 0.000960 = 9.60×10^{-4}	45 = 315000 = 3.15×10^5
8 = 19.6 = 1.96×10^1	21 = 1.72×10^{10}	34 = 1.20 = 1.20×10^0	46 = 0.266 = 2.66×10^{-1}
9 = 7.98×10^6	22 = 0.00469 = 4.69×10^{-3}	35 = - 0.795 = $- 7.95 \times 10^{-1}$	47 = 1120 = 1.12×10^3
10 = 1.13×10^{10}	23 = 1.41 = 1.41×10^0	36 = 121 = 1.21×10^2	48 = 12.0 = 1.20×10^1
11 = 27.1 = 2.71×10^1	24 = 21 INT.	37 = 5220 = 5.22×10^3	49 = 2.45 = 2.45×10^0
12 = 24.0 = 2.40×10^1	25 = 150 = 1.50×10^2	38 = 5950 = 5.95×10^3	50 = 442 = 4.42×10^2
13 = 13000 = 1.30×10^4	26 = 56.0 = 5.60×10^1		

2015-2016 TMSCA Middle School Calculator Test #9

Page 5

51 = -7.51
= -7.51×10^0

52 = 1.01×10^{12}

53 = -0.235
= -2.35×10^{-1}

54 = 5790
= 5.79×10^3

55 = 0.0322
= 3.22×10^{-2}

56 = 2.84×10^{-8}

57 = 0.000176
= 1.76×10^{-4}

58 = -2.64
= -2.64×10^0

59 = 322
= 3.22×10^2

60 = 0.714
= 7.14×10^{-1}

Page 6

61 = 0.00774
= 7.74×10^{-3}

62 = 1.21×10^{10}

63 = 342
= 3.42×10^2

64 = 1430
= 1.43×10^3

65 = 69.5
= 6.95×10^1

66 = -8.96
= -8.96×10^0

67 = 1.83
= 1.83×10^0

68 = 3.54
= 3.54×10^0

69 = 0.0948
= 9.48×10^{-2}

70 = 1.43
= 1.43×10^0

71 = \$6057.73

72 = 534 INT.

Page 7

73 = 0.0231
= 2.31×10^{-2}

74 = 756000
= 7.56×10^5

75 = 0.451
= 4.51×10^{-1}

76 = -0.0660
= -6.60×10^{-2}

77 = 3.75
= 3.75×10^0

78 = -0.284
= -2.84×10^{-1}

79 = 188000
= 1.88×10^5

80 = 1.01
= 1.01×10^0

TMSCA 15-16 MS CA Test #9 Solutions to Word and Geometry Problems

11. $\frac{52.85}{1.95}$

12. The legs of this triangle are 8 and 6. $A = \frac{1}{2}(8 \times 6)$

13. π radians = 180 degrees
 $72(180)$

24. For first 4 #, $12 = \frac{sum}{4}$ so
 $sum = 12(4) = 48$
For last 3 #, $9 = \frac{sum}{3}$ so $sum =$
 $9(3) = 27$. $48 - 27 = 21$

25. $side = \frac{hyp}{\sqrt{2}} = \frac{212.12}{2}$

26. $A = \text{angle } A$
 $90 - A = \text{complement}$
 $A = 2(90 - A) - 12$.
 $A = 180 - 2A - 12$.
 $3A = 168$, so $A = 56.0$

35. $-\frac{1}{\sqrt[5]{\pi}}$

36. RPN calculator will convert 270 miles to km. After doing that, multiply by 1000 and divide by 2600 to change to meters per second.

37. $\left(\frac{289}{4}\right)^2$

38. $h = \frac{side}{2} \sqrt{3}$ $h = \frac{6875}{2} \sqrt{3}$

47. revolutions =
 $\frac{1 \text{ mile}}{circumference} = \frac{5280(12)}{18\pi}$
(Using inches for all units)

48. rate (time) = distance

Fast distance: $45(t - \frac{1}{60})$

Slow distance: $40(t + \frac{1}{60})$

$$45\left(t - \frac{1}{60}\right) = 40\left(t + \frac{1}{60}\right)$$

$$45t - \frac{3}{4} = 40t + \frac{2}{3}$$

$5t = \frac{2}{3} + \frac{3}{4}$ so $t = \frac{17}{12} \div 5$. This is time. Substitute this value into either distance formula above.

49. $\sqrt{(\sqrt{13})^2 - (\sqrt{7})^2}$
 $= \sqrt{13 - 7}$

50. $\frac{\tan 54}{1} = \frac{x}{321}$

$$x = 321(\tan 54)$$

59. $A = \frac{1}{2}ap$
 $A = \frac{1}{2}(11.3)(82.1)$

60. There are 5 ways to get an 8, 4 ways for 9, 3 ways for 10, 2 ways for 11, 1 way for a 12. 36 ways to roll numbers on two dice.

Odds: $= \frac{successes}{failures} =$
 $\frac{5+4+3+2+1}{36-(5+4+3+2+1)} = \frac{15}{21}$

61. Circle - minus 2 triangles

$$\pi r^2 - \frac{s^2}{2} - \frac{s^2\sqrt{3}}{4}$$

$$\pi(.0592)^2 - \frac{(.0592)^2}{2} - \frac{(.0592)^2\sqrt{3}}{4}$$

62. $V = Bh$ where $B = 6$ equilateral triangles. $B = 6\left(\frac{s^2\sqrt{3}}{4}\right) =$
 $6\left(\frac{(1511)^2\sqrt{3}}{4}\right)$ Then multiply by 2044 for Volume.

71. $A = P\left(1 + \frac{r}{n}\right)^{nt}$
 $= A = 5000\left(1 + \frac{.03875}{2}\right)^{(2*5)}$

72. $x + y + z = 12$
 $y = x - 2$, $z = x + y - 4$
 $z = x + (x - 2) - 4 = 2x - 6$
Substitute $x - 2$ for y and $2x - 6$ for z in the 1st equation.
 $x + (x - 2) + (2x - 6) = 12$.
 $x = 5$, so $y = 5 - 2 = 3$ and $z = 2(5) - 6 = 4$. # = 534.

73. Sector of circle is $\frac{360-145}{360} =$
 $\frac{215}{360}$ of the whole circle.
 $\frac{215}{360}r^2\pi = .001001$
 $r = \sqrt{\left(\frac{.001001}{\pi}\right)\left(\frac{360}{215}\right)}$

74. Surface area = $2d^2$
 $SA = 2(615)^2$