

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

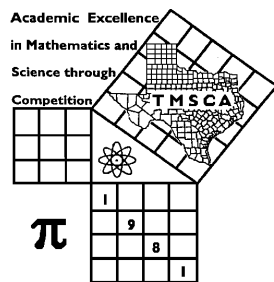
PLACE LABEL BELOW

Name: _____ School: _____

SS/ID Number: _____ City: _____

Grade: 5 6 7 8

Classification: 1A 2A 3A 4A 5A 6A



TMSCA MIDDLE SCHOOL CALCULATOR REGIONAL TEST © MARCH 5, 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 Regional Qualifier

1. $405 + 1640$ ----- 1= _____

2. $30 + 53 - 32$ ----- 2= _____

3. $745 - 1590 + 731$ ----- 3= _____

4. $11 + 39 + 22 + 32$ ----- 4= _____

5. $197 + 754 + 297 + 477$ ----- 5= _____

6. $71.2 - 146 - 122 - 61.5 + 114$ ----- 6= _____

7. $(1.34 - 0.288) + (1.19 - 0.305 - 0.262)$ ----- 7= _____

8. $(1.7 + 1.23 - 1.24) - (0.36 + 1.61)$ ----- 8= _____

9. $203 \times 266 \times 141$ ----- 9= _____

10. $58.8 \times 895 \times 172 \times 1410$ ----- 10= _____

11. A tank contains 150.8 gallons of gasoline. The gasoline is used up in three days. If one-seventh is used on the first day and twice that on the second day, calculate the number of gallons used on the third day. 11= _____ gal.

12. The race was around a circular track for twenty-two laps. Calculate the number of radians a racer would travel from start to finish of the race. ----- 12= _____ rad.

13. A shipping container weighs in at 852 kg. How many tons does this container weigh? ----- 13= _____ tons

14. $(22/90)[62 - 22]$ -----14= _____

15. $259/[643 \times 112 \times 551]$ -----15= _____

16. $\left[\frac{384}{366}\right] [(393/229) + 0.472]$ -----16= _____

17. $\{138/78\} \left[\frac{49}{189 + 74}\right]$ -----17= _____

18. $\left[\frac{(22.3 + 18.7)}{655/364}\right] \left[\frac{0.00107}{4.9}\right]$ -----18= _____

19. $\frac{(18/70) + (89/41)}{(121 - 91)}$ -----19= _____

20. $\frac{(14.8)(0.233)}{5.59 \times 10^{-4}} (2610 - 2570)$ -----20= _____

21. $\frac{5530 + 6460 + 2090}{(0.0553)(3.6)(4370)}$ -----21= _____

22. $\frac{(\pi)(309/555)(508/604)}{(374/259)}$ -----22= _____

23. $\frac{(29.6 + 98 - 86.1)}{\{(47.2 - 118)/(0.00248)\}}$ -----23= _____

24. Calculate the harmonic mean of the first five prime numbers. -----24= _____

25. Eight hundred fifty-six people attended the event today. This was a seven percent increase from a week ago. How many more people attended the event this week than last? -----25= _____ INT.

26. Angle A measures 8.5° less than three times its supplement. Calculate the measure of Angle A in degrees. -----26= _____ $^\circ$

27. $(2.49)[(272/205)(577 + 226)]$ -----27= _____

28. $\frac{(1.1 + 2.81)(10.8 + 6.95)}{(9.41 \times 10^{11})}$ -----28= _____

29. $(10.3)[(0.136/0.177)(0.0023/0.00191)]$ -----29= _____

30. $(0.00233)\left[\frac{0.0129}{(8.98 \times 10^{10})}\right]$ -----30= _____

31. $\frac{(2.17 + 6.7)}{(1.42 \times 10^{12})}$ -----31= _____

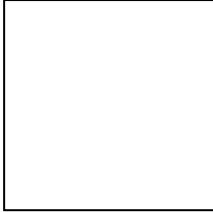
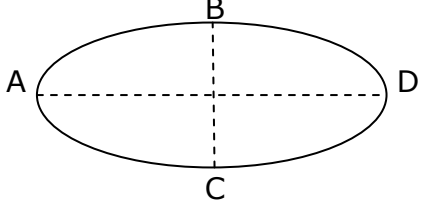
32. $[0.71]\left[\frac{1/1360}{1/3530}\right]$ -----32= _____

33. $\left[\frac{1/360}{1/224}\right][1.45 \times 10^6]$ -----33= _____

34. $\frac{1}{387} - \frac{1}{176} + \frac{1}{488}$ -----34= _____

35. Calculate the number of distinct diagonals in a polygon with sixty-one sides. -----35= _____ INT.

36. A plot of land in the shape of a rectangle measures 6,282 feet by 25,815 feet. Calculate the number of acres in this plot of land. -----36= _____ acres

SQUARE	ELLIPSE
	
Perimeter = 6.27×10^7	BC = 0.818
Diagonal = ?	Area = 1.47
37= _____	AD = ?
38= _____	38= _____

39. $\sqrt[4]{\frac{30.7 + 92.4}{125 - 124}}$ -----39= _____

40. $\frac{(10600 + 19800)^2}{(0.00343 - 0.0088)^3}$ -----40= _____

41. $\left[\frac{1.34}{8.2}\right](1.08 + 1.74)^3$ -----41= _____

42. $\sqrt{(2960/1390) + 1.83 - 1.59}$ -----42= _____

43. $(1/(0.00322))(4220 - 1480)^2$ -----43= _____


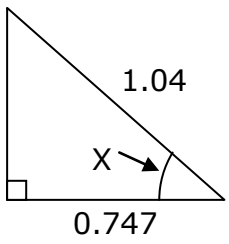
44. $\sqrt{1740} + \sqrt{2150 + 2590} - (\pi)\sqrt{467}$ -----44= _____

45. $\left[3\sqrt{(0.628/0.713)(10.6)}\right]^4$ -----45= _____

46. $\frac{(23500 + 10700)^{1/4}}{(92.4 - 72.7)^{1/2}}$ -----46= _____

47. A 5 inch by 7 inch photograph is enlarged proportionally so that the area triples in size. Calculate the perimeter of the new photo. -----47= _____ in.²

48. Given $f(x) = 3 + 4x^3$, calculate $f^{-1}(5.3)$. -----48= _____

<p style="text-align: center;">RIGHT TRIANGLE</p>  <p style="text-align: right;">Perimeter = ?</p> <p>49= _____</p>	<p style="text-align: center;">RIGHT TRIANGLE</p>  <p style="text-align: right;">X = ? radians</p> <p>50= _____</p>
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51. $\left[\frac{7.7 + 7.48 + \sqrt{193 + 210}}{40.4/38.5} \right]^3$ -----51= _____

52. $\sqrt{\frac{1.20 \times 10^{13}}{(0.0653)(15700)} + \frac{(12400 - 5640)}{(0.0418 + 0.018)}}$ -----52= _____

53. $\frac{\sqrt{45.5 + \pi + 9.17}}{(7.17 - 13 + 7.19)^2}$ -----53= _____

54. $56200 + \sqrt{(39900)(29200)} - (22100 + 34500)$ -----54= _____

55. $\sqrt{\frac{(5280)(4740)}{(1.25 \times 10^5)(2650)}} - 0.0568 + 0.165$ -----55= _____

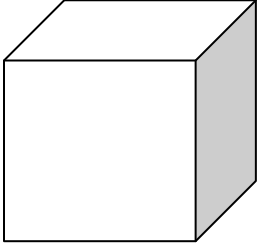
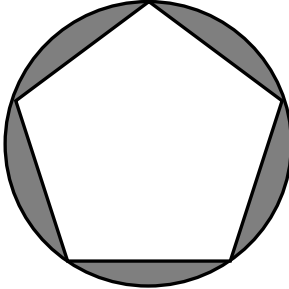
56. $1.01 + \sqrt{(2860)/(102)} - (0.983 + 1.08)^2$ -----56= _____

57. $\sqrt{\frac{(2.59)(6.12)}{(345) + (49.8)}} - 0.221$ -----57= _____

58. $\sqrt{\frac{1/(1500 - 1370)}{(8.28)(5420 + 6510)^{-6}}}$ -----58= _____

59. A pyramid with a square base has a volume of 37.52 cubic inches. The height of the pyramid is 8.22 inches. Calculate the surface area of the pyramid in square inches. -----59= _____ in.²

60. A bag contains two hundred twenty-eight marbles. The probability of drawing out a red marble is one fourth. Calculate the odds of drawing out a red marble. -----60= _____

<p style="text-align: center;">CUBE</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: left;"> <p>Volume = 7005</p> <p>Inner Diagonal = ?</p> </div> </div> <p>61= _____</p>	<p style="text-align: center;">CIRCLE AND INSCRIBED REGULAR PENTAGON</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: left;"> <p>Radius = 0.8215</p> <p>Shaded Area = ?</p> </div> </div> <p>62= _____</p>
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63. $\frac{28! + 29!}{26!}$ -----63= _____

64. $(81.5 - \pi)e^{0.409}$ -----64= _____

65. $(\text{deg}) (11300 + 25600)\sin(552^\circ)$ -----65= _____

66. $(\text{deg}) \sin(33.5^\circ - 35.4^\circ) + 0.0313$ -----66= _____

67. $(\text{rad}) \frac{\tan(5.47)}{509/113}$ -----67= _____

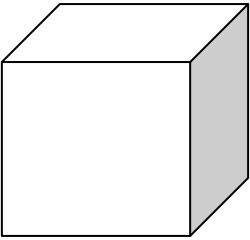
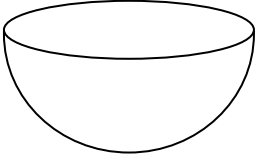
68. $(\text{deg}) \frac{\sin(14.2^\circ)}{\tan(14.2^\circ)} [70.8]$ -----68= _____

69. $(\text{deg}) \frac{\tan(142^\circ)}{588 + 710}$ -----69= _____

70. $\left[(37.3) \left(\frac{21.2}{(1650)(\pi)} \right) \right]^{3/2}$ -----70= _____

71. Dr. Henry gave his students a 20/20 quiz, 20 True/False questions and 20 multiple choice questions with 3 different choices A, B, or C. Calculate how many different possible outcomes there are. -----71= _____

72. In a given triangle, the measure of angle B is twice the measure of angle A. The measure of angle C is 30° less than the sum of the measures of the first two. Calculate the measure of the smallest angle. -----72= _____^o

CUBE	HEMISPHERE
	
Surface Area = 782115	Circumference of Great Circle = 8500
Inner Diagonal = ?	Volume = ?
73 = _____	74 = _____

75. $\ln\left[\frac{27.2 + 55.4 + 172}{22.8 + 144 - 75.1}\right]$ ----- 75 = _____

76. $\frac{0.0491 + \sqrt{(0.21)(0.11)} + (0.181)(0.274)}{\sqrt{\sqrt{25.5 + 15.2}}}$ ----- 76 = _____

77. $2\text{Log}\sqrt{\frac{(19.5)(6.34)}{153 + 45.7}}$ ----- 77 = _____

78. $\frac{(e^{0.605})(e^{0.841})(e^{0.813})}{\ln(15.8 + 8.36)}$ ----- 78 = _____

79. $1 + 2 + 3 + \dots + 589$ ----- 79 = _____

80. $-\frac{1}{(6.3)} + \frac{1}{3(6.3)^3} - \frac{1}{5(6.3)^5} + \frac{1}{7(6.3)^7}$ ----- 80 = _____

2015-2016TMSCA Middle School Calculator Regional Qualifier Answer Key

Page 1

1 = 2050
= 2.05×10^3

2 = 51.0
= 5.10×10^1

3 = -114
= -1.14×10^2

4 = 104
= 1.04×10^2

5 = 1730
= 1.73×10^3

6 = -144
= -1.44×10^2

7 = 1.68
= 1.68×10^0

8 = -0.280
= -2.80×10^{-1}

9 = 7.61×10^6

10 = 1.28×10^{10}

11 = 86.2
= 8.62×10^1

12 = 138
= 1.38×10^2

13 = 0.939
= 9.39×10^{-1}

Page 2

14 = 9.78
= 9.78×10^0

15 = 6.53×10^{-6}

16 = 2.30
= 2.30×10^0

17 = 0.330
= 3.30×10^{-1}

18 = 0.00498
= 4.98×10^{-3}

19 = 0.0809
= 8.09×10^{-2}

20 = 247000
= 2.47×10^5

21 = 16.2
= 1.62×10^1

22 = 1.02
= 1.02×10^0

23 = -0.00145
= -1.45×10^{-3}

24 = 3.95
= 3.95×10^0

25 = 56 INT.

26 = 133
= 1.33×10^2

Page 3

27 = 2650
= 2.65×10^3

28 = 7.38×10^{-11}

29 = 9.53
= 9.53×10^0

30 = 3.35×10^{-16}

31 = 6.25×10^{-12}

32 = 1.84
= 1.84×10^0

33 = 902000
= 9.02×10^5

34 = -0.00105
= -1.05×10^{-3}

35 = 1769 INT.

36 = 3720
= 3.72×10^3

37 = 2.22×10^7

38 = 2.29
= 2.29×10^0

Page 4

39 = 3.33
= 3.33×10^0

40 = -5.97×10^{15}

41 = 3.66
= 3.66×10^0

42 = 1.54
= 1.54×10^0

43 = 2.33×10^9

44 = 42.7
= 4.27×10^1

45 = 19.7
= 1.97×10^1

46 = 3.06
= 3.06×10^0

47 = 41.6
= 4.16×10^1

48 = 0.832
= 8.32×10^{-1}

49 = 14.3
= 1.43×10^1

50 = 0.769
= 7.69×10^{-1}

2015-2016 TMSCA Middle School Calculator Regional Qualifier Answer Key

Page 5

$$\begin{aligned} 51 &= 37900 \\ &= 3.79 \times 10^4 \\ 52 &= 221000 \\ &= 2.21 \times 10^5 \\ 53 &= 4.11 \\ &= 4.11 \times 10^0 \\ 54 &= 33700 \\ &= 3.37 \times 10^4 \\ 55 &= 0.383 \\ &= 3.83 \times 10^{-1} \\ 56 &= 2.05 \\ &= 2.05 \times 10^0 \\ 57 &= -0.0206 \\ &= -2.06 \times 10^{-2} \\ 58 &= 5.18 \times 10^{10} \\ 59 &= 76.1 \\ &= 7.61 \times 10^1 \\ 60 &= 0.333 \\ &= 3.33 \times 10^{-1} \end{aligned}$$

Page 6

$$\begin{aligned} 61 &= 33.1 \\ &= 3.31 \times 10^1 \\ 62 &= 0.516 \\ &= 5.16 \times 10^{-1} \\ 63 &= 22700 \\ &= 2.27 \times 10^4 \\ 64 &= 118 \\ &= 1.18 \times 10^2 \\ 65 &= -7670 \\ &= -7.67 \times 10^3 \\ 66 &= -0.00186 \\ &= -1.86 \times 10^{-3} \\ 67 &= -0.235 \\ &= -2.35 \times 10^{-1} \\ 68 &= 68.6 \\ &= 6.86 \times 10^1 \\ 69 &= -0.000602 \\ &= -6.02 \times 10^{-4} \\ 70 &= 0.0596 \\ &= 5.96 \times 10^{-2} \\ 71 &= 3.66 \times 10^{15} \\ 72 &= 35.0 \\ &= 3.50 \times 10^1 \end{aligned}$$

Page 7

$$\begin{aligned} 73 &= 625 \\ &= 6.25 \times 10^2 \\ 74 &= 5.19 \times 10^9 \\ 75 &= 1.02 \\ &= 1.02 \times 10^0 \\ 76 &= 0.0992 \\ &= 9.92 \times 10^{-2} \\ 77 &= -0.206 \\ &= -2.06 \times 10^{-1} \\ 78 &= 3.01 \\ &= 3.01 \times 10^0 \\ 79 &= 174000 \\ &= 1.74 \times 10^5 \\ 80 &= -0.157 \\ &= -1.57 \times 10^{-1} \end{aligned}$$