8

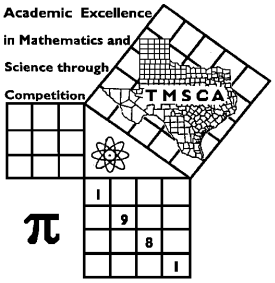
1st Score: _____	2nd Score: _____	3rd Score: _____	
S & G _____	S & G _____	S & G _____	_____. _____
Grader: _____	Grader: _____	Grader: _____	**Final Score**

PLACE LABEL BELOW

Name:_____ School:_____

SS/ID Number:_____ City:_____

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



T M S C A M I D D L E S C H O O L

C A L C U L A T O R

T E S T # 8 ©

J A N U A R Y 2 1 , 2 0 2 3

GENERAL DIRECTIONS

I. About this test:
  A. You will be given 30 minutes to take this test. There are 80 problems on this test.

II. **Calculators limited to the types specified by UIL. <u>Calculators are no longer required to be cleared.</u>**

III. 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*, $1.23x10^{0}$*, $1.23x10^{1}$, $1.23x10^{01}$, .0190, $1.90x10^{-2}$
      Incorrect: 12.30, 123.0, $1.23(10)^{2}$, $1.23 \cdot 10^{2}$, $1.230x10^{2}$, $1.23*10^{2}$, 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.

IV. 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).

V. 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.

2022 – 2023 TMSCA Middle School Calculator Test 8

1. 1930 – 4170 ---------- 1=_____

2. 20 – 20 + 26 ---------- 2=_____

3. 98.3 + 195 + 31.3 ---------- 3=_____

4. 21 – π – 37 – 19 ---------- 4=_____

5. 2920 – 3480 – 3270 + 1540 ---------- 5=_____

6. 161 + 416 – 188 – 306 – 227 ---------- 6=_____

7. (1.88 + 0.975 – 0.985) – (1.94 + 0.233) ---------- 7=_____

8. –0.649 – 0.274 + 0.405 – 0.453 – 0.315 ---------- 8=_____

9. 43 x 126 x 71.5 ---------- 9=_____

10. 443 x 1240 x 2630 x 2730 ---------- 10=_____

11. William completed nine-tenths of his TMSCA calculator test starting with number one and in order. He missed one-sixth of the problems he did. Calculate his score. ---------- 11=_____INT.

12. Tamara purchased 12 pizzas for $8.99 each, 3 orders of bread sticks for $3.99 each and 6 2-liter bottles of soda for $1.99 each. Calculate the cost to feed the Math/Science Team, not including tax. ------- 12=$_____

13. The volume of a box is 345 cubic inches. Calculate the volume of the box in cubic centimeters. ---------- 13=_____cm^3

14. $(77)[167 \times 130/87]$ ---------- 14=_____

15. $(530)[613 \times 271 \times 193]$ ---------- 15=_____

16. $\{(-154)(38 - 191)(176)\} - 2.20 \times 10^{6}$ ---------- 16=_____

17. $\left[\frac{97}{133}\right][(185/135) + \pi]$ ---------- 17=_____

18. $\left[\frac{(14.2 + 36.7)}{357/82}\right]\left[\frac{155}{0.259}\right]$ ---------- 18=_____

19. $\left[\frac{(189/1080) - (1420/612)}{2.61 \times 10^{-4}/6.39 \times 10^{-4}}\right]$ ---------- 19=_____

20. $\frac{0.00199 + 0.00529 + 0.0136}{(3180)(0.00914)(0.00249)}$ ---------- 20=_____

21. $(0.547)[107/214 \times 241/207] - 0.0572$ ---------- 21=_____

22. $\left[\frac{2540 + 972}{2850 - 2460}\right]\left[\frac{2950}{1880}\right]$ ---------- 22=_____

23. $\frac{(1230 \times 977)/1050}{(3170 \times 0.0432) + 101}$ ---------- 23=_____

24. An inch worm expanded and contracted one billion times, traveling a total of one billion inches. Calculate the number of miles it traveled. ---------- 24=_____mi.

25. Sandy cut a 12-foot piece of pipe into two pieces. One piece is one foot 2 inches longer than the other. Calculate the length of the longer piece is feet. ---------- 25=_____ft.

26. In a 45-45-90 triangle, the hypotenuse measures 16.25 cm. Calculate the length of a leg of the triangle in centimeters. ------ 26=_____cm

27. $[654 - (586 + 833)] + [(16.3)(366 - 404)]$ ---------- 27=_____

28. $\dfrac{(0.00542 + 0.0127)(0.393 + 1.96)}{(1.87\text{x}10^{12})}$ ---------- 28=_____

29. $(7.57\text{x}10^{-4})\left[(0.00152/5.89\text{x}10^{-4})(0.0896/0.151)\right]$ ----- 29=_____

30. $[0.386]\left[\dfrac{1/2140}{1/520}\right]$ ---------- 30=_____

31. $(0.00224)\left[\dfrac{0.00188}{(5.21\text{x}10^{5})}\right]$ ---------- 31=_____

32. $\dfrac{1}{217} + \dfrac{1}{(\pi)(614 - 521)}$ ---------- 32=_____

33. $1/(0.0209 - 0.0433) - 1/(-0.0122)$ ---------- 33=_____

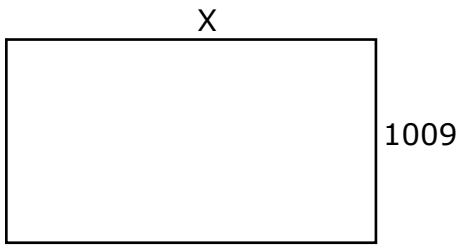
34. $\dfrac{1}{78.9} - \dfrac{1}{91.4} + \dfrac{1}{42.4}$ ---------- 34=_____

35. Calculate e^{1152} . ---------- 35=_____

36. Tina ran the 100 meter dash in 11.28 seconds. Calculate her speed in miles per hour. ---------- 36=_____mph

37.

RECTANGLE



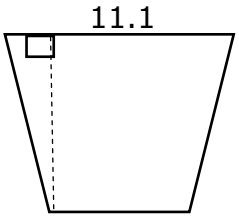
Area = $2.02\text{x}10^{6}$

X = ?

37= _____

38.

TRAPEZOID



Area = 50.2

Height = ?

38= _____

39. $\left[\frac{44100 + (1/(2.53\text{x}10^{-5}))}{(56200/77100) - 0.193}\right]^2$ ---------- 39=_____

40. $(0.646 + 0.238)^2(12.7 + 3.06)^2$ ---------- 40=_____

41. $\sqrt[4]{\frac{2.81 + 2.13}{13.4 - 9.98}}$ ---------- 41=_____

42. $(1/(3.90\text{x}10^{-4}))(2570 - 1330)^2$ ---------- 42=_____

43. $(1/\pi)\sqrt{\frac{0.0395 + 0.00559}{0.0179 - 0.00457}}$ ---------- 43=_____

44. $(99.7)\sqrt{400 + 339 + 491}$ ---------- 44=_____

45. $\frac{(5320 + 8890)^{1/2}}{(132 - 103)^{1/2}}$ ---------- 45=_____

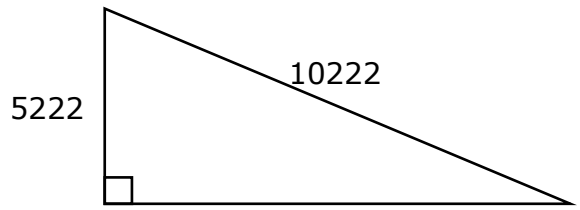
46. $\sqrt[3]{0.295 - 1020/5140} + 1/\sqrt{1070 + 499}$ ---------- 46=_____

47. Calculate the number of distinct diagonals in a polygon with one hundred eleven sides. ---------- 47=_____INT.

48. On a violin, the length of a string varies inversely as the frequency of its' vibrations. If a 12-inch string has a frequency of 320 Hertz, calculate the frequency of a 10-inch string. ---------- 48=_____Hz

49.

RIGHT TRIANGLE

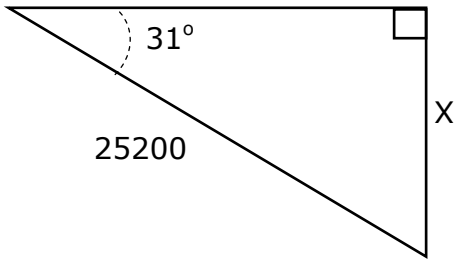


Area = ?

49= _____

50.

RIGHT TRIANGLE



X = ?

50= _____

51. $\left[\frac{20.3 + 11.6 + \sqrt{899 + 346}}{23300/67800}\right]^2$ ---------- 51=_____

52. $\frac{\sqrt{0.458 + \pi + 0.162}}{(0.314 - 0.623 + 0.644)^2}$ ---------- 52=_____

53. $\sqrt{\frac{1.05x10^8}{(1)(962)}} + \frac{(2210 - 4840)}{(2.27 + 4.11)}$ ---------- 53=_____

54. $(68.5)^2 \sqrt{(17.2)/(0.918)} - (14900 + 15800)$ ---------- 54=_____

55. $\sqrt{\frac{(1.50x10^5)(55300)}{(13000)(21300)}} - 1.83 + 4.37$ ---------- 55=_____

56. $(96.3)(9.49x10^8)^{1/2} - [(1.54x10^{12})(1.96x10^{13})]^{1/4}$ ---- 56=_____

57. (deg) $\tan(5840^\circ) + (13.6/13.6)$ ---------- 57=_____

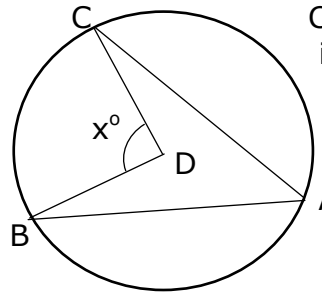
58. $\sqrt{\frac{(1760)(1660)}{(10.8) + (14.7)}} - 426$ ---------- 58=_____

59. A right circular storage tank can hold 55,000 gallons when 100% full. The area of the circular base is 52,000 in^2. Calculate the height of the tank in feet. ---------- 59=_____ft.

60. Calculate the odds of rolling a sum of 10 on a standard pair of dice. ---------- 60=_____

61.

CIRCLE AND INSCRIBED ANGLE



Center of circle is D.

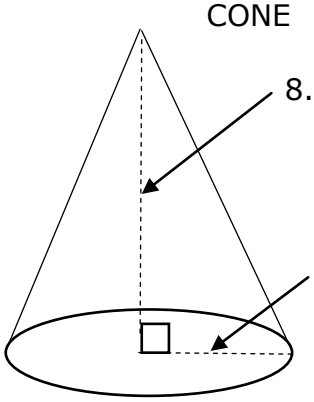
Angle A = 43.5°

Angle D = x°

61= _____

62.

CONE



Volume = ?

62= _____

63. $\frac{8!}{6!} + 4!$ ---------- 63=_____

64. $(25500 - 36200)^{-9}(1.74 \times 10^{6})$ ---------- 64=_____

65. (deg) $(6.13 + 4.6)\cos(20.2°)$ ---------- 65=_____

66. (deg) $(42500 - 40300)\sin(1.49°) + 45$ ---------- 66=_____

67. (deg) $\cos(129° - 185°) + 0.314$ ---------- 67=_____

68. (deg) $\frac{\sin(567°) - \tan(567°)}{\sin(567°)}$ ---------- 68=_____

69. (rad) $(10700)\tan(29.3)$ ---------- 69=_____

70. $(1820 - 1510)^{0.27 - 0.25}$ ---------- 70=_____

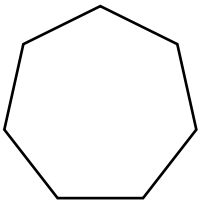
71. Calculate the 91st hexagonal number. ---------- 71=_____INT.

72. Three doughnuts and two coffees cost $8.50. Two doughnuts and three coffees cost $10.50. Calculate the cost of a single coffee. -- 72=$_____

73.

REGULAR HEPTAGON

Perimeter = 2115

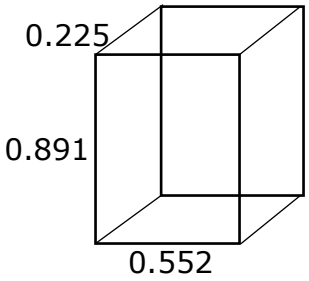


Area = ?

73= _____

74.

RECTANGULAR PRISM



Surface Area = ?

74= _____

75. $\dfrac{(1.82)^{0.6}(0.325)^{0.546}}{(0.848 - 0.426)^{-4}}$ ---------- 75=_____

76. $\text{Ln}\left[\dfrac{24.8 + 39.4 + 118}{327 + 485 - 120}\right]$ ---------- 76=_____

77. $2\text{Log}\sqrt{\dfrac{(8.93)(0.884)}{66.3 + 42.2}}$ ---------- 77=_____

78. $\dfrac{(e^{0.561})(e^{0.707})(e^{0.509})}{\text{Ln}(8.13 + 30.2)}$ ---------- 78=_____

79. $4 + 6 + 8 + \ldots + 258$ ---------- 79=_____

80. $1 + \dfrac{(0.87)^4}{2} - \dfrac{(0.87)^6}{6} + \dfrac{(0.87)^8}{24} - \dfrac{(0.87)^{10}}{120}$ ---------- 80=_____

2022 – 2023 TMSCA Middle School Calculator Test 8 Answer Key

Page 1

1 = -2240
= -2.24×10^{3}

2 = 26.0
= 2.60×10^{1}

3 = 325
= 3.25×10^{2}

4 = -38.1
= -3.81×10^{1}

5 = -2290
= -2.29×10^{3}

6 = -144
= -1.44×10^{2}

7 = -0.304
= -3.04×10^{-1}

8 = -1.29
= -1.29×10^{0}

9 = 387000
= 3.87×10^{5}

10 = 3.94×10^{12}

11 = 252 INT.

12 = $131.79

13 = 5650
= 5.65×10^{3}

Page 2

14 = 19200
= 1.92×10^{4}

15 = 1.70×10^{10}

16 = 1.95×10^{6}

17 = 3.29
= 3.29×10^{0}

18 = 7000
= 7.00×10^{3}

19 = -5.25
= -5.25×10^{0}

20 = 0.289
= 2.89×10^{-1}

21 = 0.261
= 2.61×10^{-1}

22 = 14.1
= 1.41×10^{1}

23 = 4.81
= 4.81×10^{0}

24 = 15800
= 1.58×10^{4}

25 = 6.58
= 6.58×10^{0}

26 = 11.5
= 1.15×10^{1}

Page 3

27 = -1380
= -1.38×10^{3}

28 = 2.28×10^{-14}

29 = 0.00116
= 1.16×10^{-3}

30 = 0.0938
= 9.38×10^{-2}

31 = 8.08×10^{-12}

32 = 0.00803
= 8.03×10^{-3}

33 = 37.3
= 3.73×10^{1}

34 = 0.0253
= 2.53×10^{-2}

35 = 2.03×10^{500}

36 = 19.8
= 1.98×10^{1}

37 = 2000
= 2.00×10^{3}

38 = 6.20
= 6.20×10^{0}

Page 4

39 = 2.43×10^{10}

40 = 194
= 1.94×10^{2}

41 = 1.10
= 1.10×10^{0}

42 = 3.94×10^{9}

43 = 0.585
= 5.85×10^{-1}

44 = 3500
= 3.50×10^{3}

45 = 22.1
= 2.21×10^{1}

46 = 0.484
= 4.84×10^{-1}

47 = 5994 INT.

48 = 384
= 3.84×10^{2}

49 = 2.29×10^{7}

50 = 13000
= 1.30×10^{4}

2022 – 2023 TMSCA Middle School Calculator Test 8 Answer Key

Page 5

51 = 38200
$= 3.82 \times 10^{4}$

52 = 17.3
$= 1.73 \times 10^{1}$

53 = -81.9
$= -8.19 \times 10^{1}$

54 = -10400
$= -1.04 \times 10^{4}$

55 = 8.01
$= 8.01 \times 10^{0}$

56 = 623000
$= 6.23 \times 10^{5}$

57 = 6.67
$= 6.67 \times 10^{0}$

58 = -87.5
$= -8.75 \times 10^{1}$

59 = 20.4
$= 2.04 \times 10^{1}$

60 = 0.0909
$= 9.09 \times 10^{-2}$

Page 6

61 = 87.0
$= 8.70 \times 10^{1}$

62 = 290
$= 2.90 \times 10^{2}$

63 = 80.0
$= 8.00 \times 10^{1}$

64 = -9.46×10^{-31}

65 = 10.1
$= 1.01 \times 10^{1}$

66 = 102
$= 1.02 \times 10^{2}$

67 = 0.873
$= 8.73 \times 10^{-1}$

68 = 2.12
$= 2.12 \times 10^{0}$

69 = 17600
$= 1.76 \times 10^{4}$

70 = 1.12
$= 1.12 \times 10^{0}$

71 = 16471 INT.

72 = $2.90

Page 7

73 = 332000
$= 3.32 \times 10^{5}$

74 = 1.63
$= 1.63 \times 10^{0}$

75 = 0.0246
$= 2.46 \times 10^{-2}$

76 = -1.33
$= -1.33 \times 10^{0}$

77 = -1.14
$= -1.14 \times 10^{0}$

78 = 1.62
$= 1.62 \times 10^{0}$

79 = 16800
$= 1.68 \times 10^{4}$

80 = 1.23
$= 1.23 \times 10^{0}$

TMSCA 2022-2023 MS CA Test 8 Solutions to Word and Geometry Problems

11.

$\frac{9}{10}(80) = 72$ attempts

Missed $\frac{1}{6}(72) = 12$

$72(5) - 12(9)$

12.

$12(8.99) + 3(3.99) + 6(1.99)$

13. Some calculators have a conversion key but it has to be used three times since the units are cubic. If you don't have a conversion key,

$345(2.54)^3$

24.

$$1x\ 10^9 \cdot \frac{1\ ft}{12\ in} \cdot \frac{1\ mi}{5280\ ft}$$

25. $x =$ longer piece

$x - 1\frac{1}{6} =$ shorter piece

$$x + x - 1\frac{1}{6} = 12$$

$$x = \frac{12 + 1\frac{1}{6}}{2}$$

26. $\frac{16.25}{\sqrt{2}}$

35. 1152 [ENTER] 1 *e* [log] [x] [SHOW] *(Look at the digits to the left of the decimal. This gives 500 for the exponent. Write down 10^{500}.) Then punch* 500 [−] [10^x] *(This gives 2.03 E0 which is the first part of your answer.*

35. contd.

The answer is **2.03 x10^{500}** *). This is done on the HP RPN calculator.*

36.

$$\frac{100\ m}{11.28\ s} \cdot \frac{1\ km}{1000m} \cdot \frac{.621\ mi}{1\ km} \cdot \frac{3600\ sec}{1\ hr}$$

37. $x = \frac{A}{w} = \frac{2.02\ x\ 10^6}{1009}$

38. $A = \frac{1}{2}(b_1 + b_2)h$

$$50.2 = \frac{1}{2}(11.1 + 5.1)h$$

$$\frac{2(50.2)}{11.1 + 5.1} = h$$

47. $\frac{n(n-3)}{2} = \frac{\mathbf{111(111-3)}}{\mathbf{2}}$

48. $12(320) = 10x$

$$x = \frac{12(320)}{10}$$

49. Long leg = $\sqrt{10222^2 - 5222^2}$

Area = $\frac{5222\left(\sqrt{10222^2 - 5222^2}\right)}{2}$

50. $\sin 31 = \frac{x}{25200}$

$$x = 25200(\sin 31)$$

59. There are 231 in^3 in 1 gal.

55000 gal = 55000(231) cu. In.

$$Bh = Volume$$

$$52000h = 55000(231)$$

$h = \frac{55000(231)}{52000}$ inches

Divide by 12 to change to feet.

60. 3 ways to get a 10.

(5,5), (6,4), (4,6)

There are 36 possible rolls so 33 ways to roll something other than 10. $\frac{3}{33}$

61. $43.5(2)$

62. $\frac{1}{3}\pi r^2 h =$

$$\frac{1}{3}\pi(5.81)^2(8.21)$$

71. Hexagonal number:

$$\frac{n(4n-2)}{2} = n(2n-1)$$

$$91[2(91) - 1]$$

72. $\left\{\begin{matrix} 3D + 2C = 8.50 \\ 2D + 3C = 10.50 \end{matrix}\right\}$

$\left\{\begin{matrix} -6D - 4C = -17 \\ 6D + 9C = 31.50 \end{matrix}\right\}$

Add these two equations

$$5C = 14.50$$

$$C = \frac{14.50}{5}$$

73. Area = $\frac{Perimeter^2}{\left(tan\frac{180}{n}\right)(4n)}$

$$\frac{2115^2}{\left(\tan\frac{180}{7}\right)(4 \cdot 7)}$$

74. $2(lw + wh + lh)$

$\mathbf{2}[(.\mathbf{552})(.\mathbf{225}) + (.\mathbf{225})(.\mathbf{891}) + (.\mathbf{552})(.\mathbf{891})]$