8

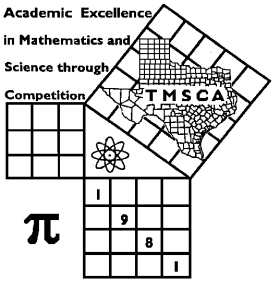
1st Score: _____	2nd Score: _____	3rd Score: _____	
S & G _____	S & G _____	S & G _____	_____. _____
Grader: _____	Grader: _____	Grader: _____	**Final Score**

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 # 7 ©

J A N U A R Y 1 4 , 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, $1.23(10)^{2}$, $1.23\cdot10^{2}$, $1.230x10^{2}$, $1.23*10^{2}$, 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 7

1. 179 – 882 ---------- 1=_____

2. 5 – 14 – 9 ---------- 2=_____

3. –2970 + 5990 + 3060 ---------- 3=_____

4. 19 – 22 – 13 – 20 ---------- 4=_____

5. 579 – 140 – 695 – 259 ---------- 5=_____

6. 273 + 189 – 180 – 308 + 350 ---------- 6=_____

7. 2.63 – 6.32 + 1.75 – 2.97 – 1.47 ---------- 7=_____

8. 1.13 + π – 1.68 + 4.17 + 5.26 ---------- 8=_____

9. 112 x 534 x 798 ---------- 9=_____

10. 555 x 187 x 684 x 147 ---------- 10=_____

11. The average of Destinys' first five math test scores is an 88. If she scores a 100 on her last test, calculate her new test average. --- 11=_____

12. In a 45-45-90 triangle, the hypotenuse measures 27.89 cm. Calculate a leg of the triangle. ---------- 12=_____cm

13. 66 ⅝% of what number is one billion? ---------- 13=_____

14. $(-17)[82 \times 112/74]$ ---------- 14=_____

15. $(130)[504 \times 160 \times 120]$ ---------- 15=_____

16. $\left[\frac{48}{338}\right][(389/287) + 0.843]$ ---------- 16=_____

17. $\{385/452\}\left[\frac{599}{630 + 153}\right]$ ---------- 17=_____

18. $\left[\frac{(2100/2680) - (2730/1890)}{0.00639/0.0109}\right]$ ---------- 18=_____

19. $\frac{[2.69/(0.746)]/0.00516}{(0.876 \times \pi)(46.9)}$ ---------- 19=_____

20. $\frac{46.9 + 81 + 41.8}{(6410)(2.58\times10^{-4})(0.0026)}$ ---------- 20=_____

21. $\frac{(7.18\times10^{-4})(0.0235)}{4.08\times10^{-4}}(4.58\times10^{-4} - 1.73\times10^{-4})$ ---------- 21=_____

22. $\frac{(720 \times 494)/927}{(239 \times 4.83) + 356}$ ---------- 22=_____

23. $\frac{[-(1020 + 753)(906 - 827)]}{(0.00818/(2.86))}$ ---------- 23=_____

24. Calculate the eighth root of five hundred seventy-two to the seventh power. ---------- 24=_____

25. Jennifer deposited $8000 in a bank simple interest 3-year CD. After those 3 years she withdrew $9348.32. Calculate the interest rate of the CD. ---------- 25=_____%

26. The melting point of a certain steel is 1370 °C. Calculate this in degrees Fahrenheit. ---------- 26=_____°F

27. $(7.25\text{x}10^{-4})[(0.0998/0.087)(0.00203 + 0.00632)]$ ------ 27=_____

28. $(0.997)[(0.0299/0.0156)(13.4/6.69)]$ ---------- 28=_____

29. $\dfrac{(0.00296 + 0.0193)(26.4 + 11.8)}{(1.82\text{x}10^{12})}$ ---------- 29=_____

30. $\dfrac{(0.0104 + 0.00234)}{(1.12\text{x}10^{12})}$ ---------- 30=_____

31. $\dfrac{1}{-11.3} + \dfrac{1}{(\pi - 7.99)}$ ---------- 31=_____

32. $\dfrac{1}{-0.312} + \dfrac{1}{(\pi)(0.0461 - 0.21)}$ ---------- 32=_____

33. $\left[\dfrac{1/107}{1/264}\right] + [0.168]$ ---------- 33=_____

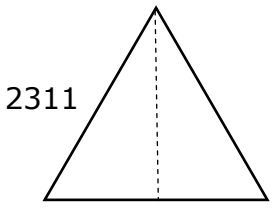
34. $\dfrac{1}{240} - \dfrac{1}{(44.8 + 135)}$ ---------- 34=_____

35. If m varies jointly as n and p, and m = 12 when n = 4 and p = 2.
Calculate the value of m when n = 5 and p = 7. ---------- 35=_____

36. A certain gas occupies 250 cm^3 under a pressure of 30 pounds.
Calculate the pressure needed to reduce the volume to 100 cm^3. 36=_____lbs.

37.

EQUILATERAL TRIANGLE

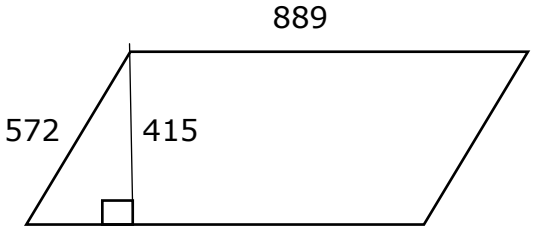


Height = ?

37= _____

38.

PARALLELOGRAM



Area = ?

38= _____

39. $\sqrt[3]{\frac{69.9 + 98.4}{0.0859 - 0.0261}}$ ---------- 39=_____

40. $(7.41 + 5.82)^2(0.29 + 0.151)^2$ ---------- 40=_____

41. $\left[\frac{1070}{76}\right](189 + 299)^3$ ---------- 41=_____

42. $\sqrt{(279/223) + 0.895 - 0.867}$ ---------- 42=_____

43. $(39200)\sqrt{263 + 118 + 736}$ ---------- 43=_____

44. $\sqrt{364 - 205 + 141} - \sqrt{284}$ ---------- 44=_____

45. $\left[\sqrt{(200/595)(2960)}\right]^4$ ---------- 45=_____

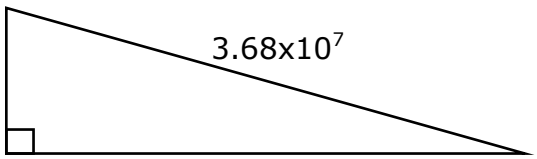
46. $\frac{1}{\sqrt{604 + 667 + 302}} + \left(\frac{1}{\sqrt{21.6}}\right)^2$ ---------- 46=_____

47. Calculate the sum of the exterior angles of an regular icosagon. - 47=_____°

48. A leap year is what percent larger than a regular year. ---------- 48=_____%

49.

RIGHT TRIANGLE

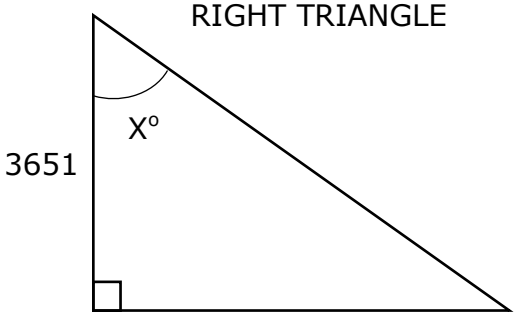


Area = ?

49= _____

50.

RIGHT TRIANGLE



X^o = ?

50= _____

51. $\dfrac{(63.6 + 369 - 39.7)^4}{\sqrt{17300 + 18000 + 8160}}$ ---------- 51=_____

52. $\left[\dfrac{\sqrt{\sqrt{0.0222 - 0.00553}}}{-(0.196 - 0.445)}\right]^3 [4170 + 7460]$ ---------- 52=_____

53. $\left[\dfrac{72600 + 50600 + \sqrt{1.49x10^{10} + 7.65x10^9}}{5120/4890}\right]^2$ ---------- 53=_____

54. $\sqrt{\dfrac{1/(72.5 - 64.9)}{(132)(467 + 428)^5}}$ ---------- 54=_____

55. $(14.9)^2 \sqrt{(6.21)/(9.53)} - (107 + 34.8)$ ---------- 55=_____

56. $0.444 + \sqrt{(3740)/(6960)} - (0.796 + 0.81)^2$ ---------- 56=_____

57. $\sqrt{\dfrac{(907)(243)}{(8.26) + (8.99)}} - 169$ ---------- 57=_____

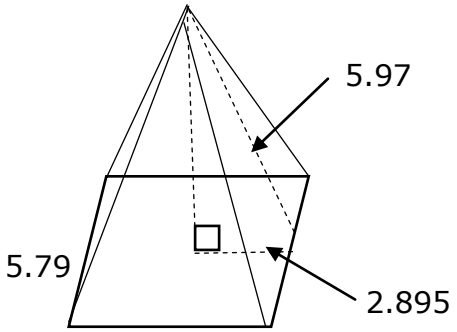
58. (rad) tan(134) + (143/62.2) ---------- 58=_____

59. Two motorcycles start from the same place, the second one an hour later than the first. The first one was traveling ae 57 mph, while the second at 68 mph. Calculate how long it will take the second to catch up to the first. ---------- 59=_____hrs.

60. Calculate the odds of drawing a red ace from a standard deck of cards. ---------- 60=_____

61.

SQUARE BASED PYRAMID

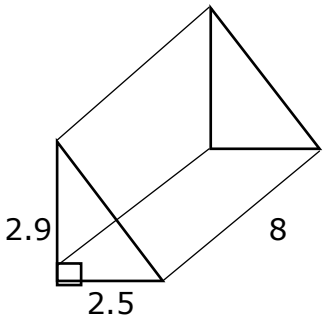


Volume = ?

61= _____

62.

RIGHT TRIANGULAR PRISM



Surface Area = ?

62= _____

63. $\frac{24! - 20!}{8!}$ ---------- 63=_____

64. $(24.7 - \pi)e^{0.864}$ ---------- 64=_____

65. (deg) (132 – 229)tan(188°) ---------- 65=_____

66. (deg) sin(121° – 144°) + 0.219 ---------- 66=_____

67. (deg) (287 – 203)tan(8.92°) + 4.5 ---------- 67=_____

68. (rad) (1070)tan(64.1) ---------- 68=_____

69. (deg) $\frac{\sin(1.13°) - \tan(1.13°)}{\sin(1.13°)}$ ---------- 69=_____

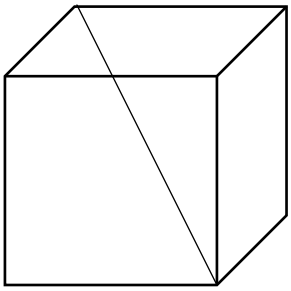
70. $\left[(816)\left(\frac{224}{(1460)(\pi)}\right)\right]^{7/2}$ ---------- 70=_____

71. A lab tech has a 70% solution of alcohol and an 80% solution of alcohol. He needs to make ten gallons of a 74% solution by mixing the two. Calculate the amount of the 70% solution that will be used. ---------- 71=_____gal.

72. Jim can row a boat downstream 40 km in 3 hours, but it takes him 5 hours to row the same distance upstream. Calculate his rate in still water. ---------- 72=_____kmph

73.

CUBE



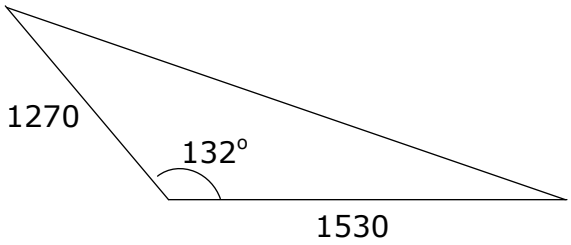
Inner Diagonal = 9.72

Side = ?

73= _____

74.

SCALENE TRIANGLE



Area = ?

74= _____

75. $\frac{\text{Log}(5.53\text{x}10^{9} + 6.66\text{x}10^{8})}{0.432}$ ---------- 75=_____

76. $\frac{\text{Log}(7.36 + 9.76)}{1120 - 954}$ ---------- 76=_____

77. $2\text{Log}\sqrt{\frac{(1.22)(3.56)}{15.9 + 5.82}}$ ---------- 77=_____

78. $(31.3)^{\pi}(18.3)^{4}(0.885 - 0.669)^{3}$ ---------- 78=_____

79. $2 + 4 + 6 + \ldots + 800$ ---------- 79=_____

80. $1 + \frac{(0.43)^{4}}{2} - \frac{(0.43)^{6}}{6} + \frac{(0.43)^{8}}{24} - \frac{(0.43)^{10}}{120}$ ---------- 80=_____

2022 – 2023 TMSCA Middle School Calculator Test 7 Answer Key

Page 1

1 = -703
= -7.03×10^{2}

2 = -18.0
= -1.80×10^{1}

3 = 6080
= 6.08×10^{3}

4 = -36.0
= -3.60×10^{1}

5 = -515
= -5.15×10^{2}

6 = 324
= 3.24×10^{2}

7 = -6.38
= -6.38×10^{0}

8 = 12.0
= 1.20×10^{1}

9 = 4.77×10^{7}

10 = 1.04×10^{10}

11 = 90.0
= 9.00×10^{1}

12 = 19.7
= 1.97×10^{1}

13 = 1.50×10^{9}

Page 2

14 = -2110
= -2.11×10^{3}

15 = 1.26×10^{9}

16 = 0.312
= 3.12×10^{-1}

17 = 0.652
= 6.52×10^{-1}

18 = -1.13
= -1.13×10^{0}

19 = 5.41
= 5.41×10^{0}

20 = 39500
= 3.95×10^{4}

21 = 1.18×10^{-5}

22 = 0.254
= 2.54×10^{-1}

23 = -4.90×10^{7}

24 = 259
= 2.59×10^{2}

25 = 5.62
= 5.62×10^{0}

26 = 2500
= 2.50×10^{3}

Page 3

27 = 6.94×10^{-6}

28 = 3.83
= 3.83×10^{0}

29 = 4.67×10^{-13}

30 = 1.14×10^{-14}

31 = -0.295
= -2.95×10^{-1}

32 = -5.15
= -5.15×10^{0}

33 = 2.64
= 2.64×10^{0}

34 = -0.00140
= -1.40×10^{-3}

35 = 52.5
= 5.25×10^{1}

36 = 75.0
= 7.50×10^{1}

37 = 2000
= 2.00×10^{3}

38 = 369000
= 3.69×10^{5}

Page 4

39 = 14.1
= 1.41×10^{1}

40 = 34.0
= 3.40×10^{1}

41 = 1.64×10^{9}

42 = 1.13
= 1.13×10^{0}

43 = 1.31×10^{6}

44 = 0.468
= 4.68×10^{-1}

45 = 990000
= 9.90×10^{5}

46 = 0.0715
= 7.15×10^{-2}

47 = 360
= 3.60×10^{2}

48 = 0.274
= 2.74×10^{-1}

49 = 2.66×10^{14}

50 = 55.3
= 5.53×10^{1}

2022 – 2023 TMSCA Middle School Calculator Test 7 Answer Key

Page 5

51 = 1.14×10^{8}

52 = 34900
= 3.49×10^{4}

53 = 6.82×10^{10}

54 = 1.32×10^{-9}

55 = 37.4
= 3.74×10^{1}

56 = -1.40
= -1.40×10^{0}

57 = -56.0
= -5.60×10^{1}

58 = 0.389
= 3.89×10^{-1}

59 = 5.18
= 5.18×10^{0}

60 = 0.0400
= 4.00×10^{-2}

Page 6

61 = 58.3
= 5.83×10^{1}

62 = 81.1
= 8.11×10^{1}

63 = 1.54×10^{19}

64 = 51.2
= 5.12×10^{1}

65 = -13.6
= -1.36×10^{1}

66 = -0.172
= -1.72×10^{-1}

67 = 17.7
= 1.77×10^{1}

68 = 3430
= 3.43×10^{3}

69 = -0.000195
= -1.95×10^{-4}

70 = 400000
= 4.00×10^{5}

71 = 6.00
= 6.00×10^{0}

72 = 10.7
= 1.07×10^{1}

Page 7

73 = 5.61
= 5.61×10^{0}

74 = 722000
= 7.22×10^{5}

75 = 22.7
= 2.27×10^{1}

76 = 0.00743
= 7.43×10^{-3}

77 = -0.699
= -6.99×10^{-1}

78 = 5.64×10^{7}

79 = 160000
= 1.60×10^{5}

80 = 1.02
= 1.02×10^{0}

TMSCA 2022-2023 MS CA Test 7 Solutions to Word and Geometry Problems

11. $\frac{5(88)+100}{6}$

12. $\frac{27.89}{\sqrt{2}}$

13. $\frac{6\frac{5}{8}}{100} = \frac{1{,}000{,}000{,}000}{x}$

$$x = \frac{1{,}000{,}000{,}000(100)}{66\frac{5}{8}}$$

24. $\sqrt[8]{572^7}$

25.

$$9348.32 - 8000 = 8000r(3)$$

$$r = \frac{9348.32 - 8000}{3(8000)}$$

Multiply by 100 to change to %

26. Many calculators have a conversion key. If not, use

$$F = \frac{9}{5}C + 32$$

$$F = \frac{9}{5}(1370) + 32$$

35. $m = knp; 12 = k(4)(2)$

$$k = \frac{12}{8}; m = \frac{12}{8}(5)(7)$$

36. $250(30) = 100x$

$$x = \frac{250(30)}{100}$$

37. $\frac{2311}{2}\sqrt{3}$

38. $889(415)$

47. The sum of the exterior angles of any regular polygon is always 360^o.

48. On HP, punch 365 enter, 366 %CHG

Otherwise: $\frac{366-365}{365} \cdot 100$

49. Short leg (base):

$$\sqrt{(3.68\,x10^7)^2 - (3.31\,x\,10^7)^2}$$

Area:

$$\frac{(base)(3.31x10^7)}{2}$$

50. $x = atan\left(\frac{5271}{3651}\right)$

59. Use rate(time) = distance

	Rate	Time	dist
1st	57	x+1	57(x+1)
2nd	68	x	68x

$$57x + 57 = 68x$$

$$57 = 11x; \frac{57}{11} = x$$

60. $\frac{\textbf{2 red aces}}{\textbf{50 not red aces}} = \frac{\mathbf{1}}{\mathbf{25}}$

61. $V = \frac{1}{3}Bh;\ B = 5.79^2$

$$h = \sqrt{5.97^2 - 2.895^2}$$

$$\frac{1}{3}\left(5.79^2\right)\left(\sqrt{5.97^2 - 2.895^2}\right)$$

62. 2 right triangles:

$$2\left(\frac{(2.9)(2.5)}{2}\right) = (2.9)(2.5)$$

Hypotenuse of right triangles is also a side of one rectangle

$$= \sqrt{2.9^2 + 2.5^2}$$

The 3 rectangle areas:

$$\left(\sqrt{2.9^2 + 2.5^2} + 2.9 + 2.5\right)8$$

71. Amount of solution times % alcohol = pure alcohol.

	Amt	%	Pure
1st	x	70	$.7x$
2nd	y	80	$.8y$
total	10	74	7.4

$$\begin{Bmatrix} x + y = 10 \\ .7x + .8y = 7.4 \end{Bmatrix}$$

Multiply first equation by $-.8$

$$\begin{Bmatrix} -.8x - .8y = -8 \\ .7x + .8y = 7.4 \end{Bmatrix}$$

Add these equations

$$-.1x = -.6$$

$$x = 6$$

72. rate(time) = distance

So $rate = \frac{distance}{time}$

b= rate of boat in still water

c= rate of current

	Rate	Time	Dist
Down	b+c	3	40
up	b-c	5	40

Add these: $\begin{Bmatrix} b + c = \frac{40}{3} \\ b - c = \frac{40}{5} \end{Bmatrix}$

$$2b = \frac{40}{3} + \frac{40}{5};$$

$$b = \left(\frac{40}{3} + \frac{40}{5}\right) \div 2$$

73. $\frac{9.72}{\sqrt{3}}$

74. $Area = \frac{1}{2}abSinC$

$$= \frac{1}{2}(1270)(1530)sin132$$
