

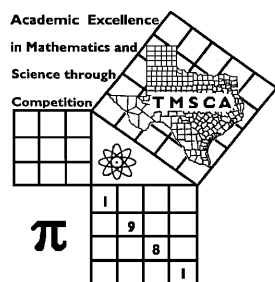
8 1st Score: _____	2nd Score: _____	3rd Score: _____	_____. ____ Final Score
S & G _____	S & G _____	S & G _____	
Grader: _____	Grader: _____	Grader: _____	

PLACE LABEL BELOW

Name: _____ School: _____

SS/ID Number: _____ City: _____

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



TMSCA MIDDLE SCHOOL CALCULATOR

TEST # 13 ©

FEBRUARY 25, 2023

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. Calculators are no longer required to be cleared.**

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*}, 1.23x10¹, 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.

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 13

1. $5580 - 4080$ ----- 1= _____

2. $29 - 14 + 9$ ----- 2= _____

3. $27.3 + 23.5 + 24.2$ ----- 3= _____

4. $14 + 10 + 11 + \pi$ ----- 4= _____

5. $410 - 503 - 2250 + 1130$ ----- 5= _____

6. $368 + 412 - 234 - 293 + 374$ ----- 6= _____

7. $5.28 + 4.12 - 4.2 + 4.76 + 2.84$ ----- 7= _____

8. $(-1.23 + 0.324 - 1.26) - (0.307 + 0.577)$ ----- 8= _____

9. $261 \times 81.7 \times 445$ ----- 9= _____

10. $90.7 \times 530 \times 1110 \times 2080$ ----- 10= _____

11. Calculate the mean of the first 10 terms of the Fibonacci sequence that starts with 0,1,1,2,... ----- 11= _____

12. The volume of a cube is 328 cubic inches. Convert this volume to cubic centimeters. ----- 12= _____ cm^3

13. The mean of 7 numbers is 522.8. The first six numbers are 719.5, 347.8, 901.6, 222.1, 489.7, and 289.7. Calculate the value of the 7th number. ----- 13= _____

14. $(328)[240 \times 129/102]$ ----- 14= _____

15. $(113)[452 \times 303 \times 185]$ ----- 15= _____

16. $(358 + 109)[120 - 130 - 355]$ ----- 16= _____

17. $\{102/48\} \left[\frac{174}{26 + 32} \right]$ ----- 17= _____

18. $\left[\frac{338/303}{367/411} \right] \{1.93 + 2.41 - \pi\}$ ----- 18= _____

19. $\left[\frac{(942/962) - (1090/650)}{555/210} \right]$ ----- 19= _____

20. $(2.86)[235/146 \times 109/107] - 2.46$ ----- 20= _____

21. $\frac{(\pi)(111)}{9.79} (2300 - 1640)$ ----- 21= _____

22. $\frac{(0.0601 + 0.0178 - 0.0445)}{\{(1150 - 510)/(0.00728)\}}$ ----- 22= _____

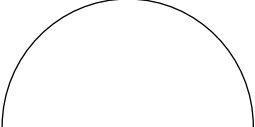
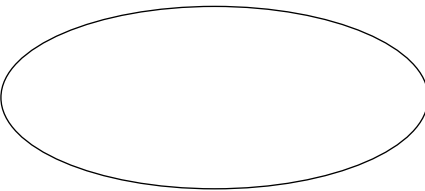
23. $\frac{(1010 \times 1710)/3810}{(3450 \times 0.00128) + 4.3}$ ----- 23= _____

24. The distance when the moon is closest to the earth is called the perigee. This distance is 225,309 miles. Convert this distance to kilometers. ----- 24= _____ km

25. Silvia received a 3% raise at the beginning of the year. She now makes \$62,700 per year. Calculate her salary last year. ----- 25=\$ _____

26. When twelve times a number is added to seven the sum is equal to three hundred fifty-six. Calculate the value of the number. ----- 26= _____

27. $(30.4)[(0.0518/0.224)(2.63 + 8.61)]$ ----- 27= _____
28. $(12.7)[(0.129/0.0669)(678/182)]$ ----- 28= _____
29. $[2820 - (5400 + 4830)] + [(-2.39)(5670 - 2790)]$ ----- 29= _____
30. $\frac{1}{-1350} + \frac{1}{(\pi)(3000 - 4190)}$ ----- 30= _____
31. $\frac{(2.68 + 4.58)}{(2.42 \times 10^{12})}$ ----- 31= _____
32. $(0.00996) \left[\frac{0.818}{(2.12 \times 10^{-12})} \right]$ ----- 32= _____
33. $\left[\frac{1/259}{1/204} \right] + [0.835]$ ----- 33= _____
34. $\frac{1}{118} - \frac{1}{26.8} + \frac{1}{125}$ ----- 34= _____
35. Calculate the value of 5252 Base 8 in Base 10. ----- 35= _____ INT.
36. A regular heptagon has a side length of 32.87 cm. Calculate the length of the longest diagonal in this polygon. ----- 36= _____ cm

<p>37. SEMICIRCLE</p> <div style="text-align: center;">  <p>Perimeter = 71.88</p> <p>Area = ?</p> </div> <p>37= _____</p>	<p>38. ELLIPSE</p> <div style="text-align: center;">  <p>Minor axis = 72.8 Major axis = 231.5</p> <p>Area = ?</p> </div> <p>38= _____</p>
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39. $\sqrt[3]{\frac{1160 + 304}{596 - 176}}$ ----- 39= _____

40. $\left[\frac{256}{24.1}\right](2.4 + 0.78)^4$ ----- 40= _____

41. $\left[\frac{43200 + (1/(1.02 \times 10^{-5}))}{(52000/59000) - 0.649}\right]^2$ ----- 41= _____

42. $\sqrt{1130 - 612 + 1470} - \sqrt{1710}$ ----- 42= _____

43. $\sqrt{(6.13/4.08) + 1.49 - 0.674}$ ----- 43= _____

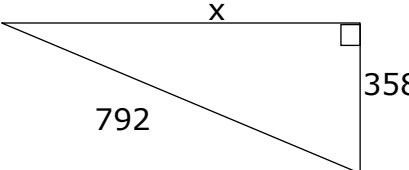
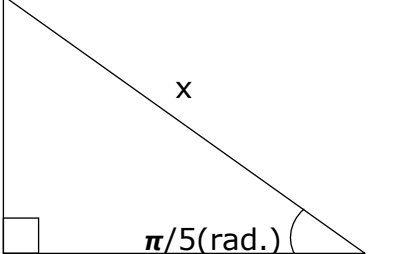
44. $\sqrt{13.8} + \sqrt{17.4 + 13.7} - (\pi)\sqrt{19.8}$ ----- 44= _____

45. $\sqrt[4]{3.95 - 85.1/35.6} + 1/\sqrt{0.0931 + 0.139}$ ----- 45= _____

46. $(652)\sqrt[3]{125 + 143 - 94}$ ----- 46= _____

47. A furniture store is having a sale. Buy one item, no discount, buy 2 items, 5% discount, buy 3 items, a 15% discount, and buy 4 items, a 25% discount. Bri bought 4 items for a total of \$2,628 before her discount. Calculate her cost after the discount, not including tax. 47=\$ _____

48. Calculate the distance between the points (5,2) and (7,-8) on a coordinate plane. ----- 48= _____

<p>49. RIGHT TRIANGLE</p>  <p style="text-align: center;">Area = ?</p> <p>49= _____</p>	<p>50. RIGHT TRIANGLE</p>  <p style="text-align: right;">x = ?</p> <p>50= _____</p>
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51. $\sqrt{\frac{1.22 \times 10^5}{(331)(0.858)} + \frac{(5680 - 7170)}{(25.4 + 18.7)}}$ ----- 51= _____

52. $\left[\frac{12.9 + 79.6 + \sqrt{1170 + 7660}}{768/758} \right]^2$ ----- 52= _____

53. $\left[\frac{\sqrt{\sqrt{0.00901 - 0.00649}}}{-(3160 - 2360)} \right]^2 [44700 + 1.01 \times 10^5]$ ----- 53= _____

54. $\sqrt{\frac{1/(21.5 - 13.2)}{(3.89)(22.9 + 78.5)^5}}$ ----- 54= _____

55. $(0.341)(1.04 \times 10^7)^{1/2} - [(34900)(42600)]^{1/3}$ ----- 55= _____

56. $0.133 + \sqrt{(1650)/(1120)} - (1.06 + 0.261)^2$ ----- 56= _____

57. $\sqrt{\frac{1/(20 - 11.2)}{(863)(32.2 + 28.1)^4}}$ ----- 57= _____

58. $(\text{deg}) \sin(38.8^\circ) + (629/550)$ ----- 58= _____

59. Calculate the number of ways that the letters in the word ADDITION can be arranged. ----- 59= _____ INT.

60. All of the prime numbers less than 100 are put in a bag. Calculate the probability of drawing a single digit prime number. ----- 60= _____

61. RECTANGULAR BASED PYRAMID

Surface Area = ?

61= _____

62. SCALENE TRIANGLE

x = ?

62= _____

63. $\frac{6!/27!}{13! + 25!}$ ----- 63= _____

64. (deg) $(30.1 - 62.5)\cos(70.5^\circ)$ ----- 64= _____

65. (deg) $(52 + 55.6)\tan(201^\circ)$ ----- 65= _____

66. (rad) $\sin\left[\frac{(21.8)(\pi)}{(1.82)(4.75)}\right]$ ----- 66= _____

67. (deg) $\tan(2.58^\circ - 0.925^\circ) + 0.0217$ ----- 67= _____

68. (deg) $\frac{\sin(25.1^\circ)}{\tan(25.1^\circ)}[188]$ ----- 68= _____

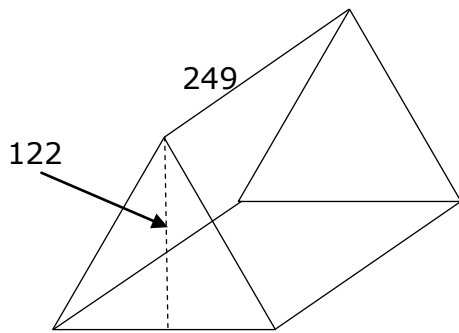
69. (rad) $\cos[(0.88 - 1.73)(37.7)]$ ----- 69= _____

70. $\left[(6.2)\left(\frac{324}{(3410)(\pi)}\right)\right]^{1/2}$ ----- 70= _____

71. Suppose Y varies directly as the cube root of X. If Y = 42 when x = 3, calculate the value of Y when x = 23. ----- 71= _____

72. The apothem of a regular decagon is 2112 m. Calculate the length of a side in meters. ----- 72= _____ m

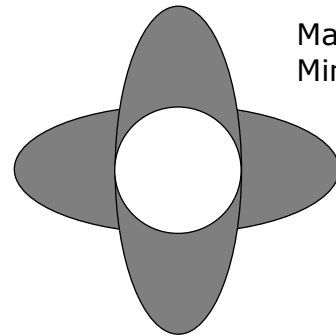
73. EQUILATERAL TRIANGULAR PRISM



Volume = ?

73= _____

74. CIRCLE AND TWO CONGRUENT ELLIPSES



Major Axis = 27.2
Minor Axis = 11.5

Shaded Area = ?

74= _____

75. $\frac{\text{Log}(826 + 1920)}{612 - 1260}$ ----- 75= _____

76. $\frac{1.32 + \sqrt{(3.24)(\pi) + (1.05)(1.28)}}{\sqrt{\sqrt{2.77 + 3.15}}}$ ----- 76= _____

77. $\text{Log}(10.9 + 81.9 + 21.4)$ ----- 77= _____

78. $(167)^\pi (5.84)^4 (61.9 - 10.3)^2$ ----- 78= _____

79. $2 + 4 + 6 + \dots + 366$ ----- 79= _____

80. $1 + \frac{(0.55)^4}{2} - \frac{(0.55)^6}{6} + \frac{(0.55)^8}{24} - \frac{(0.55)^{10}}{120}$ ----- 80= _____

2022 – 2023 TMSCA Middle School Calculator Test 13 Answer Key

Page 1	Page 2	Page 3	Page 4
1 = 1500 = 1.50×10^3	14 = 99600 = 9.96×10^4	27 = 79.0 = 7.90×10^1	39 = 1.52 = 1.52×10^0
2 = 24.0 = 2.40×10^1	15 = 2.86×10^9	28 = 91.2 = 9.12×10^1	40 = 1090 = 1.09×10^3
3 = 75.0 = 7.50×10^1	16 = -170000 = -1.70×10^5	29 = -14300 = -1.43×10^4	41 = 3.69×10^{11}
4 = 38.1 = 3.81×10^1	17 = 6.38 = 6.38×10^0	30 = -0.00101 = -1.01×10^{-3}	42 = 3.23 = 3.23×10^0
5 = -1210 = -1.21×10^3	18 = 1.50 = 1.50×10^0	31 = 3.00×10^{-12}	43 = 1.52 = 1.52×10^0
6 = 627 = 6.27×10^2	19 = -0.264 = -2.64×10^{-1}	32 = 3.84×10^9	44 = -4.69 = -4.69×10^0
7 = 12.8 = 1.28×10^1	20 = 2.23 = 2.23×10^0	33 = 1.62 = 1.62×10^0	45 = 3.19 = 3.19×10^0
8 = -3.05 = -3.05×10^0	21 = 23500 = 2.35×10^4	34 = -0.0208 = -2.08×10^{-2}	46 = 3640 = 3.64×10^3
9 = 9.49×10^6	22 = 3.80×10^{-7}		
10 = 1.11×10^{11}	23 = 52.0 = 5.20×10^1	35 = 2730 INT.	47 = \$1,971.00
11 = 8.80 = 8.80×10^0	24 = 363000 = 3.63×10^5	36 = 73.9 = 7.39×10^1	48 = 10.2 = 1.02×10^1
12 = 5370 = 5.37×10^3	25 = \$60,873.79	37 = 307 = 3.07×10^2	49 = 126000 = 1.26×10^5
13 = 689 = 6.89×10^2	26 = 29.1 = 2.91×10^1	38 = 13200 = 1.32×10^4	50 = 9610 = 9.61×10^3

2022 – 2023 TMSCA Middle School Calculator Test 13 Answer Key

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$$\begin{aligned} 51 &= -13.1 \\ &= -1.31 \times 10^1 \\ 52 &= 33900 \\ &= 3.39 \times 10^4 \\ 53 &= 0.0114 \\ &= 1.14 \times 10^{-2} \\ 54 &= 1.70 \times 10^{-6} \\ 55 &= -41.6 \\ &= -4.16 \times 10^1 \\ 56 &= -0.398 \\ &= -3.98 \times 10^{-1} \\ 57 &= 3.16 \times 10^{-6} \\ 58 &= 1.77 \\ &= 1.77 \times 10^0 \\ 59 &= 10080 \text{ INT.} \\ 60 &= 0.160 \\ &= 1.60 \times 10^{-1} \end{aligned}$$

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$$\begin{aligned} 61 &= 6640 \\ &= 6.64 \times 10^3 \\ 62 &= 791 \\ &= 7.91 \times 10^2 \\ 63 &= 4.26 \times 10^{-51} \\ 64 &= -10.8 \\ &= -1.08 \times 10^1 \\ 65 &= 41.3 \\ &= 4.13 \times 10^1 \\ 66 &= 0.998 \\ &= 9.98 \times 10^{-1} \\ 67 &= 0.0506 \\ &= 5.06 \times 10^{-2} \\ 68 &= 170 \\ &= 1.70 \times 10^2 \\ 69 &= 0.809 \\ &= 8.09 \times 10^{-1} \\ 70 &= 0.433 \\ &= 4.33 \times 10^{-1} \\ 71 &= 82.8 \\ &= 8.28 \times 10^1 \\ 72 &= 1370 \\ &= 1.37 \times 10^3 \end{aligned}$$

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$$\begin{aligned} 73 &= 2.14 \times 10^6 \\ 74 &= 255 \\ &= 2.55 \times 10^2 \\ 75 &= -0.00531 \\ &= -5.31 \times 10^{-3} \\ 76 &= 3.75 \\ &= 3.75 \times 10^0 \\ 77 &= 2.06 \\ &= 2.06 \times 10^0 \\ 78 &= 2.98 \times 10^{13} \\ 79 &= 33700 \\ &= 3.37 \times 10^4 \\ 80 &= 1.04 \\ &= 1.04 \times 10^0 \end{aligned}$$

TMSCA 2022-2023 MS CA Test 13 Solutions to Word and Geometry Problems

11. 0,1,1,2,3,5,8,13,21,34

Add these. Then divide by 10.

12. If you have a conversion key, use it three times since the units are cubic. Otherwise,
 $(328)(2.54)(2.54)(2.54)$

13. $522.8(7)$ = total of all 7 numbers. Find the sum of the first six numbers. Then subtract from the total. Sum should be 2970.4
 $522.8(7) - 2970.4$

24. If you have a conversion key, use it. Otherwise,
 $225309 \text{ mi.} \left(\frac{1.61 \text{ km}}{1 \text{ mi}} \right)$

25. $1.03x = 62700$
 $x = \frac{62700}{1.03}$

26. $12x + 7 = 356$
 $x = \frac{356 - 7}{12}$

35.
 $5(8^3) + 2(8^2) + 5(8) + 2$

36. Longest diagonal with odd number of sides:
 $\frac{\text{side}}{2 \left(\sin \frac{90}{n} \right)} = \frac{32.87}{2 \left(\sin \frac{90}{7} \right)}$

37.
 $2r + \pi r = r(2 + \pi) = 71.88$
 $r = \frac{71.88}{2 + \pi}$
 $\text{Area} = \frac{\pi r^2}{2} = \pi \left(\frac{71.88}{2 + \pi} \right)^2 \div 2$

38. $\pi \left(\frac{72.8}{2} \right) \left(\frac{231.5}{2} \right)$

47. $2628(.75)$

48.
 $\frac{\sqrt{(2 - -8)^2 + (5 - 7)^2}}{\sqrt{10^2 + (-2)^2}}$

49. Long leg = $\sqrt{792^2 - 358^2}$
 $\text{Area} = \frac{358(\sqrt{792^2 - 358^2})}{2}$

50. $\cos \left(\frac{\pi}{5} \right) = \frac{7777}{x}$
 $x = \frac{7777}{\cos \frac{\pi}{5}}$

59. $\frac{8!}{2!2!}$

60. There are 25 primes less than 100; 4 are single digits.
 $\frac{4}{25}$

61. Base: 105(23)
 2 of the triangular faces combined:
 $\left(\sqrt{\left(\frac{23}{2} \right)^2 + 25^2} \right) \left(\frac{105}{2} \right) (2)$

The other two triangular faces combined are:

$$\left(\sqrt{\left(\frac{105}{2} \right)^2 + 25^2} \right) \left(\frac{23}{2} \right) (2)$$

Total surface area: Add the base and the 4 triangular faces.

62. Law of Sines
 $\frac{\sin 33}{571} = \frac{\sin 131}{x}$
 $x = \frac{(\sin 131)(571)}{\sin 33}$

$$71. \frac{42}{\sqrt[3]{3}} = \frac{y}{\sqrt[3]{23}}$$

$$y = \frac{42(\sqrt[3]{23})}{\sqrt[3]{3}}$$

72. The central angle of a decagon is $360/10$ or 36^0 . The right triangle formed with the apothem and a side has an angle of half of 36 or 18^0 . x = half of the side.

$$\tan 18 = \frac{x}{2112}$$

$$x = 2112(\tan 18)$$

The side of the decagon is $2[2112(\tan 18)]$

$$73. \left(\frac{122^2 \sqrt{3}}{3} \right) (249)$$

$$74. 2 \left\{ \pi \left(\frac{27.2}{2} \right) \left(\frac{11.5}{2} \right) \right\} - (11.5)^2 - \pi \left(\frac{11.5}{2} \right)^2$$

This is the area of the two ellipses minus a square on the partially hidden ellipse minus the circle on the top ellipse. The square on the underside includes the circle and some surrounding area that would duplicate the shaded area that is visible.

