

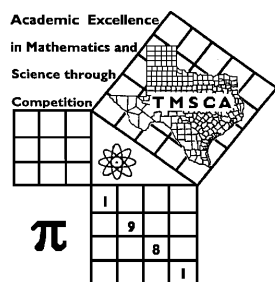
8 1st Score: _____	2nd Score: _____	3rd Score: _____	_____. ____ Final Score
S & G _____	S & G _____	S & G _____	
Grader: _____	Grader: _____	Grader: _____	

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 # 4 ©

NOVEMBER 12, 2022

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. **ALL calculators must be cleared. Calculators limited to the types specified by UIL.**

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 4

1. $4990 - 4250$ ----- 1= _____

2. $13 - 24 + 8$ ----- 2= _____

3. $-14.1 + 2.2 + 6.3$ ----- 3= _____

4. $11 - \pi - 2 + 4$ ----- 4= _____

5. $1820 - 3250 - 4750 + 2100$ ----- 5= _____

6. $338 + 51 - 146 - 317 + 89.5$ ----- 6= _____

7. $(0.884 - \pi) + (2.04 - 1.78 - 4.36)$ ----- 7= _____

8. $(2.28 + 2.31 - \pi) - (5.4 + 1.26)$ ----- 8= _____

9. $379 \times 44.4 \times 546$ ----- 9= _____

10. $608 \times 138 \times 59.3 \times 950$ ----- 10= _____

11. Calculate the mode of the number of letters used to spell each of the first ten integers beginning with one. ----- 11= _____ INT.

12. Mary is using a 2-liter bottle of soda to fill cups for her daughters' birthday party. Calculate the number of 10 oz. cups she can completely fill with one bottle. ----- 12= _____ INT.

13. An isosceles right triangle and a circle have the same area. The radius of the circle is 9.71 in. Calculate the length of a leg of the triangle in inches. ----- 13= _____ in.

14. $(136)[116 \times 121/73]$ ----- 14= _____

15. $(166/26)[32 - 212]$ ----- 15= _____

16. $\{(-567)(113 - 601)(633)\} - 7.48 \times 10^7$ ----- 16= _____

17. $\left[\frac{28}{179}\right] [(55/98) + 0.409]$ ----- 17= _____

18. $\left[\frac{(5130/7040) - (1060/3040)}{0.00141/4.00 \times 10^{-4}}\right]$ ----- 18= _____

19. $\frac{[2.42/(2.13)]/1.58}{(8.07 \times 10^{-4} \times 9.40 \times 10^{-4})(61.4)}$ ----- 19= _____

20. $\frac{(235)(0.0442)}{574} (0.0252 - 0.019)$ ----- 20= _____

21. $\frac{280}{(127 - 279)} - \frac{(80 - 84)}{320}$ ----- 21= _____

22. $\frac{(6870 \times 2260)/7300}{(1300 \times 47.8) + 40700}$ ----- 22= _____

23. $\left[\frac{159 + 344}{814 - 764}\right] \left[\frac{358}{776}\right]$ ----- 23= _____

24. The Rugrat baseball team only won 2 of the 12 games they played. Calculate the percentage of the games they lost. ----- 24= _____ %

25. Janet is going to paint a rectangular wall that is 15 feet long and 8 feet tall. There is a door in the wall the is 6.5 feet tall and 2.5 feet wide, that will not be painted. Calculate the area of the wall to be painted. ----- 25= _____ ft.²

26. Two angles are supplementary. One angle is 8° more than twice the other angle. Calculate the larger of the two angles in degrees. 26= _____ °

27. $\frac{(0.55 - 2.45)(0.108 + 0.178)}{(2.45 \times 10^{12})}$ ----- 27= _____

28. $\frac{(2.36 + 0.708)(0.581 + 0.233)}{(3.04 \times 10^{12})}$ ----- 28= _____

29. $\frac{(1.16 \times 10^{13}) + (9.13 \times 10^{12})}{(-0.0148)(0.00588) - 3.13 \times 10^{-5}}$ ----- 29= _____

30. $(6.35) [(2.07 \times 10^{-13}) - (3.27 \times 10^{-14})]$ ----- 30= _____

31. $\frac{1}{7.34} + \frac{1}{(12.8 - \pi)}$ ----- 31= _____

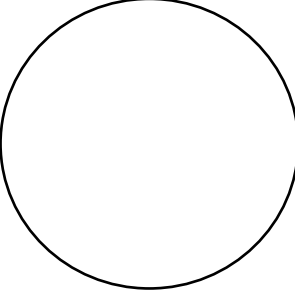
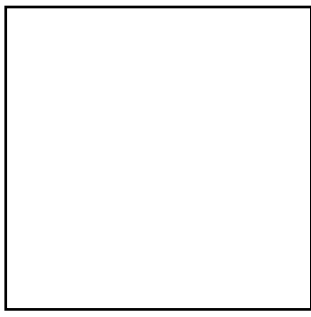
32. $\frac{(0.0214 + 0.0225)}{(1.92 \times 10^{12})}$ ----- 32= _____

33. $1/(0.664 - 0.426) - 1/(0.101)$ ----- 33= _____

34. $\left[\frac{1/121}{1/73.1} \right] + [0.187]$ ----- 34= _____

35. If the sum of two consecutive integers is 93, calculate the larger of the two integers. ----- 35= _____ INT.

36. Two triangles are similar. The first triangle has sides that measure 8 in., 11 in., and 15 in. The second triangle has a perimeter of 172 in. Calculate the length of the longest side of the second triangle. -- 36= _____ in.

<p>37. CIRCLE</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: center;"> <p>Area = 182.74</p> <p>Diameter = ?</p> </div> </div> <p>37= _____</p>	<p>38. SQUARE</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: center;"> <p>Area = 572.9</p> <p>Diagonal = ?</p> </div> </div> <p>38= _____</p>
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39. $(0.0508 + 0.226)^2(3.43 + 5.66)^2$ ----- 39= _____

40. $(0.456 + 0.53 + 0.431)^2(2.94 + 8.06)^2$ ----- 40= _____

41. $\left[\frac{250}{2.79}\right](2520 + 3150)^2$ ----- 41= _____

42. $\sqrt{(5.54/2.63) + 1.9 - 1.47}$ ----- 42= _____

43. $(1/(9.27 \times 10^{-4}))(4.01 \times 10^5 - 3.64 \times 10^5)^3$ ----- 43= _____

44. $(152)\sqrt{445 + 527 + 161}$ ----- 44= _____

45. $\frac{1}{\sqrt{5670 + 2090 + 7540}} + \left(\frac{1}{\sqrt{6.93}}\right)^4$ ----- 45= _____

46. $\sqrt[3]{14.3 - 3940/1340} + 1/\sqrt{5.96 \times 10^{-4} + 1.10 \times 10^{-4}}$ ----- 46= _____

47. Sandy cuts a 16 inch diameter pizza into equal size slices by cutting every 30° around the center of the pizza. Calculate the area of each slice. ----- 47= _____ in.²

48. In a 30-60-90 triangle, the hypotenuse measures 128 cm. Calculate the length of the side opposite the 60° angle. ----- 48= _____ cm

49. RIGHT TRIANGLE

Hypotenuse of large triangle = 14.114

H = ?

49= _____

50. RIGHT TRIANGLE

X = ?

50= _____

51. $\frac{\sqrt{7.42 + \pi + 9.06}}{(110 - 172 + 100)^2}$ ----- 51= _____

52. $\left[\frac{7.41 - 3.14 + \sqrt{14900/2470}}{-17.5 + 24.1} \right]^5$ ----- 52= _____

53. $\frac{(0.649 + 0.602 - 1.44)^2}{\sqrt{4.51 + 4.66 + 4.49}}$ ----- 53= _____

54. $(2.24)(8.39 \times 10^6)^{1/3} - [(1.66 \times 10^5)(3.39 \times 10^5)]^{1/4}$ ----- 54= _____

55. $(2.6)^2 \sqrt{(21.9)/(0.221)} - (50.8 + 32.1)$ ----- 55= _____

56. $\sqrt{\frac{1/(49.5 - 24.4)}{(813)(174 + 153)^3}}$ ----- 56= _____

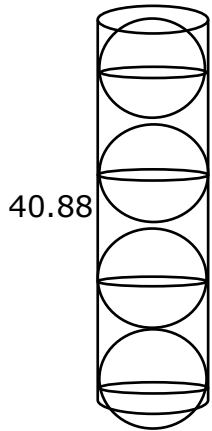
57. $\sqrt{\frac{(79.4)(724)}{(272) + (498)}} - 10.4$ ----- 57= _____

58. $(\text{rad}) \tan(402) + (116/518)$ ----- 58= _____

59. Randy needs a loan for home improvements. He took out a loan for \$40,000. If he paid back \$48,000 in five years simple interest, calculate the interest rate on the loan. ----- 59= _____ %

60. If a die is rolled twice, calculate the probability it land on the same number both times. ----- 60= _____

61. CYLINDER FILLED WITH EQUAL SPHERES

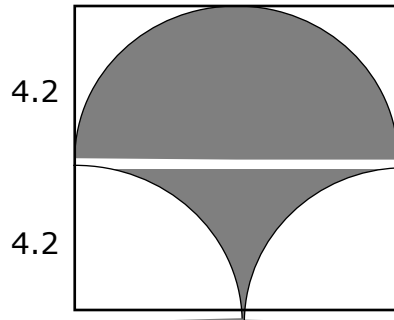


Radius of Cylinder = 5.11

Empty space in cylinder = ?

61= _____

62. SQUARE AND CIRCLE PARTS



Shaded Area = ?

62= _____

63. $\frac{12! + 16!}{20!}$ ----- 63= _____

64. (deg) $(9890 + 7000)\tan(62.6^\circ)$ ----- 64= _____

65. $(12.5 - \pi)e^{0.492}$ ----- 65= _____

66. (rad) $\tan\left[\frac{(18.4)(\pi)}{(17.7)(51.7)}\right]$ ----- 66= _____

67. (deg) $(1190 - 491)\tan(4.06^\circ) + 17.1$ ----- 67= _____

68. (deg) $\frac{\cos(12.9^\circ)}{406 + 529}$ ----- 68= _____

69. (deg) $\frac{\sin(91.7^\circ) - \tan(91.7^\circ)}{\sin(91.7^\circ)}$ ----- 69= _____

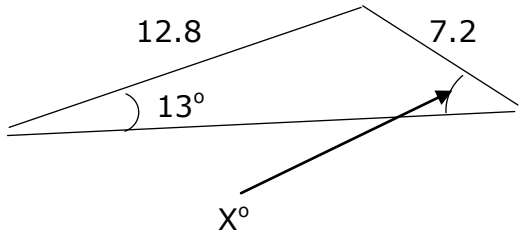
70. $(282 - 244)^{0.505 - 0.367}$ ----- 70= _____

71. The student council at my school has 6 girls and 4 boys on it. A subcommittee was formed of 2 girls and 2 boys. Calculate how many different subcommittees could be formed. ----- 71= _____ INT.

72. Calculate the number of distinct diagonals there are in a polygon with thirty-four sides. ----- 72= _____ INT.

73.

SCALENE TRIANGLE

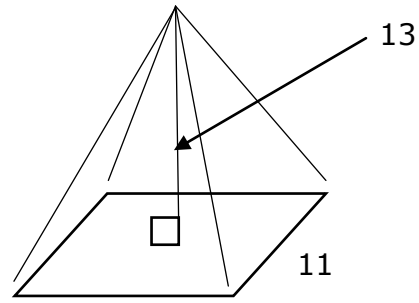


$X^\circ = ?$

73= _____

74.

SQUARE BASED PYRAMID



Surface Area = ?

74= _____

75.

$\ln\left[\frac{182 + 366 + 321}{126 + 316 - 142}\right]$ ----- 75= _____

76.

$\frac{(2.85)^{0.694}(21.5)^{0.364}}{(2.46 - 2)^{-5}}$ ----- 76= _____

77.

$(7370)_{10}^{(0.404)}(2.9)$ ----- 77= _____

78.

$\frac{\text{Log}[523 + (978)(2.24)]}{0.203 + \text{Log}[0.993 + 2.56]}$ ----- 78= _____

79.

$4 + 6 + 8 + \dots + 722$ ----- 79= _____

80.

$-\frac{1}{(9.69)} + \frac{1}{3(9.69)^3} - \frac{1}{5(9.69)^5} + \frac{1}{7(9.69)^7}$ ----- 80= _____

2022 – 2023 TMSCA Middle School Calculator Test 4 Answer Key

Page 1	Page 2	Page 3	Page 4
1 = 740 = 7.40×10^2	14 = 26100 = 2.61×10^4	27 = -2.22×10^{-13}	39 = 6.33 = 6.33×10^0
2 = -3.00 = -3.00×10^0	15 = -1150 = -1.15×10^3	28 = 8.21×10^{-13}	40 = 243 = 2.43×10^2
3 = -5.60 = -5.60×10^0	16 = 1.00×10^8	30 = 1.11×10^{-12}	41 = 2.88×10^9
4 = 9.86 = 9.86×10^0	17 = 0.152 = 1.52×10^{-1}	31 = 0.240 = 2.40×10^{-1}	42 = 1.59 = 1.59×10^0
5 = -4080 = -4.08×10^3	18 = 0.108 = 1.08×10^{-1}	32 = 2.29×10^{-14}	43 = 5.46×10^{16}
6 = 15.5 = 1.55×10^1	19 = 15400 = 1.54×10^4	33 = -5.70 = -5.70×10^0	44 = 5120 = 5.12×10^3
7 = -6.36 = -6.36×10^0	20 = 0.000112 = 1.12×10^{-4}	34 = 0.791 = 7.91×10^{-1}	45 = 0.0289 = 2.89×10^{-2}
8 = -5.21 = -5.21×10^0	21 = -1.83 = -1.83×10^0		46 = 39.9 = 3.99×10^1
9 = 9.19×10^6	22 = 0.0207 = 2.07×10^{-2}		
10 = 4.73×10^9	23 = 4.64 = 4.64×10^0	35 = 47 INT.	47 = 16.8 = 1.68×10^1
11 = 3 INT.	24 = 83.3 = 8.33×10^1	36 = 75.9 = 7.59×10^1	48 = 111 = 1.11×10^2
12 = 6 INT.	25 = 104 = 1.04×10^2	37 = 15.3 = 1.53×10^1	49 = 5.42 = 542×10^0
13 = 24.3 = 2.43×10^1	26 = 123 = 1.23×10^2	38 = 33.8 = 3.38×10^1	50 = 3.56 = 3.56×10^0

2022 – 2023 TMSCA Middle School Calculator Test 4 Answer Key

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$$51 = 0.00307 \\ = 3.07 \times 10^{-3}$$

$$52 = 1.10 \\ = 1.10 \times 10^0$$

$$53 = 0.00966 \\ = 9.66 \times 10^{-3}$$

$$54 = -31.9 \\ = -3.19 \times 10^1$$

$$55 = -15.6 \\ = -1.56 \times 10^1$$

$$56 = 1.18 \times 10^{-6}$$

$$57 = -1.76 \\ = -1.76 \times 10^0$$

$$58 = 0.0994 \\ = 9.94 \times 10^{-2}$$

$$59 = 4.00 \\ = 4.00 \times 10^0$$

$$60 = 0.0278 \\ = 2.78 \times 10^{-2}$$

Page 6

$$61 = 1120 \\ = 1.12 \times 10^3$$

$$62 = 35.3 \\ = 3.53 \times 10^1$$

$$63 = 8.60 \times 10^{-6}$$

$$64 = 32600 \\ = 3.26 \times 10^4$$

$$65 = 15.3 \\ = 1.53 \times 10^1$$

$$66 = 0.0633 \\ = 6.33 \times 10^{-2}$$

$$67 = 66.7 \\ = 6.67 \times 10^1$$

$$68 = 0.00104 \\ = 1.04 \times 10^{-3}$$

$$69 = 34.7 \\ = 3.47 \times 10^1$$

$$70 = 1.65 \\ = 1.65 \times 10^0$$

$$71 = 90 \text{ INT.}$$

$$72 = 527 \text{ INT.}$$

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$$73 = 23.6 \\ = 2.36 \times 10^1$$

$$74 = 432 \\ = 4.32 \times 10^2$$

$$75 = 1.06 \\ = 1.06 \times 10^0$$

$$76 = 0.130 \\ = 1.30 \times 10^{-1}$$

$$77 = 109000 \\ = 1.09 \times 10^5$$

$$78 = 4.56 \\ = 4.56 \times 10^0$$

$$79 = 131000 \\ = 1.31 \times 10^5$$

$$80 = -0.103 \\ = -1.03 \times 10^{-1}$$

TMSCA 2022-2023 MS CA Test 4 Solutions to Word and Geometry Problems

11. Three letters: 1,2,6,10

Four letters:4,5,9

Five letters: 3,7,8

3 is the mode.

12. Many calculators will convert L to gal. Then multiply by 128 to convert to oz. Divide by 10. Answer is 6.76 so 6 cups can be completely filled.

13. Area of circle: $\pi(9.71)^2$

$$\pi(9.71)^2 = \frac{x^2}{2}$$

$$x = \sqrt{2\pi(9.71)^2}$$

24. Team lost 10 of 12

$$\frac{10}{12} = \frac{x}{100}; x = \frac{10(100)}{12}$$

25. $15(8) - 6.5(2.5)$

26. $x = \text{smaller}$

$$8 + 2x = \text{larger}$$

$$x + 8 + 2x = 180$$

$$3x = 172; x = \frac{172}{3}$$

$$8 + 2\left(\frac{172}{3}\right) = \text{larger}$$

35. $x + x + 1 = 93$

$$2x = 92$$

$$x = 46$$

$$x + 1 = 47$$

36. Sides and perimeters are proportional.

$$\frac{15}{34} = \frac{x}{172}; x = \frac{15(172)}{34}$$

37. $A = 182.74 = \pi r^2$

$$\sqrt{\frac{182.74}{\pi}} = r$$

$$d = 2\left(\sqrt{\frac{182.74}{\pi}}\right)$$

38. $\frac{d^2}{2} = A = 572.9$

$$d = \sqrt{572.9(2)}$$

47. $30^\circ = \frac{30}{360} = \frac{1}{12}$ of circle

Area of piece: $\frac{\pi(8)^2}{12}$

48. On a 30-60-90 triangle, the short leg is half the hypotenuse. The long leg is the short leg times $\sqrt{3}$

$$\frac{128}{2}\sqrt{3}$$

49. On a right triangle, the height on the hypotenuse =

$$\frac{\text{leg} \times \text{leg}}{\text{hypotenuse}} = \frac{5.99(12.78)}{\sqrt{5.99^2 + 12.78^2}}$$

50. $\frac{\sin 29}{1} = \frac{1.725}{x}$

$$x = \frac{1.725}{\sin 29}$$

59. $I = Prt$

$$8 = \frac{40000(r)5}{8000}$$

$$r = \frac{40000(5)}{40000(5)} = .0400 = 4.00\%$$

60. $\frac{6}{36} \cdot \frac{6}{36}$

61. Cylinder V – 4 spheres V

$$\pi(5.11)^2(40.88) - 4\left[\frac{4}{3}\pi(5.11)^3\right]$$

62. The shaded area is half the square: $\frac{8.4^2}{2}$

71. This is a combination problem since order doesn't matter.

$$\frac{6!}{2!4!} \cdot \frac{4!}{2!2!}$$

72. $\frac{n(n-3)}{2} = \frac{34(31)}{2}$

73. Law of Sines

$$\frac{\sin 13}{7.2} = \frac{\sin x}{12.8}$$

$$x = \text{asin}\left[\frac{12.8(\sin 13)}{7.2}\right]$$

74. Heights of triangular

faces: $\sqrt{5.5^2 + 13^2}$

SA =

$$11^2 + 2(11)\left(\sqrt{5.5^2 + 13^2}\right)$$

79. $\left(\frac{722}{2}\right)\left(\frac{722}{2} + 1\right)$