8

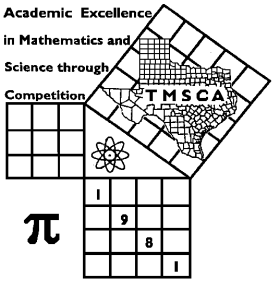
1st Score: _____	2nd Score: _____	3rd Score: _____	
S & G _____	S & G _____	S & G _____	_____. _____
Grader: _____	Grader: _____	Grader: _____	**Final Score**

PLACE LABEL BELOW

Name:_____ School:_____

SS/ID Number:_____ City:_____

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



TMSCA MIDDLE SCHOOL CALCULATOR TEST#4©

NOVEMBER 7, 2020

GENERAL DIRECTIONS

I. About this test:
- A. You will be given 30 minutes to take this test. There are 80 problems on this test.
- **B. ALL calculators must be cleared. HP Prime and Casio Prizm calculators are NOT permitted.**

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*, $1.23x10^{0}$*, $1.23x10^{1}$, $1.23x10^{01}$, .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.

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.

2020 – 2021 TMSCA Middle School Calculator Test #4

1. 1160 – 412 ---------- 1=_____

2. 11 – 17 + 14 ---------- 2=_____

3. 28 + 36.2 + 62.5 ---------- 3=_____

4. π – 11 + 23 – 12 ---------- 4=_____

5. 1210 – 1310 – 946 + 167 ---------- 5=_____

6. 240 + 149 – 168 – 95.6 – 122 ---------- 6=_____

7. π + 5.16 + 4.75 + 1.42 + 4.67 ---------- 7=_____

8. 0.361 – 0.592 + 0.867 – 0.55 – 1.46 ---------- 8=_____

9. 166 x 329 x 26.5 ---------- 9=_____

10. 564 x 2110 x 3240 x 263 ---------- 10=_____

11. Calculate the mode of the following list of numbers. 15, 25, $\sqrt[4]{625}$, 5, 10, and $\ln(e^5)$. ---------- 11=_____

12. Sarah is making face masks for her school. She buys the heavy fabric in bolts that measure 40 yards X 60 inches. If each mask is made from an 8-inch by 12-inch rectangle, calculate the number of masks she can make from one bolt of fabric. ---------- 12=_____INT.

13. The radius of a circle is 376.8 in. Calculate the side of a square with the same area as the circle in square inches. ---------- 13=_____$in.^2$

14. $(-148)[52 \times 110 \times 124]$ ---------- 14=_____

15. $214 - [34/239 + 0.158]$ ---------- 15=_____

16. $\left[\frac{382}{466}\right][(140/236) - 0.379]$ ---------- 16=_____

17. $\{128/138\}\left[\frac{100}{17 + 85}\right]$ ---------- 17=_____

18. $\left[\frac{335/377}{215/273}\right]\{13.7 + 16 - 17.6\}$ ---------- 18=_____

19. $\frac{(382/185) + (124/404)}{(0.0113 - 0.00809)}$ ---------- 19=_____

20. $\frac{(3.74 \times 10^{-5})(0.00174)}{15.1}(0.0124 - 0.0271)$ ---------- 20=_____

21. $\frac{(\pi)(5/6)(7/7)}{96}$ ---------- 21=_____

22. $\frac{(1680 \times 1060)/979}{(865 \times 2.30 \times 10^{-4}) + 0.178}$ ---------- 22=_____

23. $\left[\frac{840 + 848}{343 - 616}\right]\left[\frac{499}{1180}\right]$ ---------- 23=_____

24. Twelve of the thirty-seven runners are below the age of twenty. Calculate the percentage of the runners that are twenty or over. 24=_____%

25. Angle A and Angle B are vertical angles. The measure of Angle A is 38.9^{o}. Calculate the measure of Angle B in degrees. ---------- 25=_____^{o}

26. Some communications satellites orbit the earth at a height of 22,300 miles above the earth in what is called the Clarke Belt. Convert this distance to inches. ---------- 26=_____in.

27. $(1.51)\left[[0.681/(\pi)][4.90\text{x}10^{-4}/(1.68\text{x}10^{-4})]\right]$ ---------- 27=_____

28. $\dfrac{(1.40\text{x}10^{10}) + (4.06\text{x}10^{10})}{(-0.00712)(0.00666) - 3.58\text{x}10^{-5}}$ ---------- 28=_____

29. $(0.0216)[(20.1/17.3)(0.00209 + 0.00165)]$ ---------- 29=_____

30. $[36]\left[\dfrac{1/2390}{1/(1920)}\right]$ ---------- 30=_____

31. $(7.19\text{x}10^{-4})\left[\dfrac{0.0167}{(2.00\text{x}10^{-13})}\right]$ ---------- 31=_____

32. $(6.66)\left[(1.29\text{x}10^{-12}) - (3.27\text{x}10^{-12})\right]$ ---------- 32=_____

33. $\left[\dfrac{1/321}{1/238}\right] + [0.748]$ ---------- 33=_____

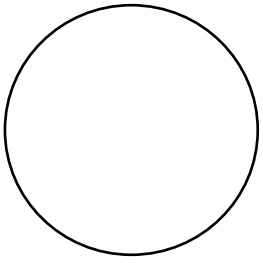
34. $\left[\dfrac{1/231}{1/422}\right][1.15\text{x}10^{6}]$ ---------- 34=_____

35. The edge of a cube is 47. Calculate the ratio of the volume of the cube to the surface area of the cube. ---------- 35=_____

36. Two triangles are similar. The first triangle has sides that measure 8cm, 12 cm, and 17 cm. The second triangle has a long side that has a length of 44 cm. Calculate the perimeter of the second triangle. ---------- 36=_____cm

37.

CIRCLE



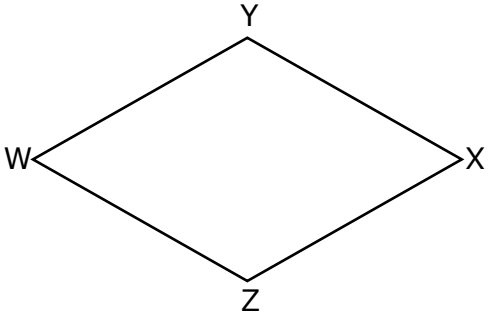
Area = 782.19

Diameter = ?

37=_____

38.

RHOMBUS



YZ = .0042
WX = .0074

Area = ?

38=_____

39. $\left[\frac{4.25}{39.9}\right](130 + 74)^2$ ---------- 39=_____

40. $(0.0503 + 0.145 + 0.0889)^2(37.9 + 56.4)^2$ ---------- 40=_____

41. $\sqrt[4]{\frac{39.5 + 20.8}{0.714 - 0.583}}$ ---------- 41=_____

42. $(1/(0.00262))(4.33\text{x}10^5 - 3.40\text{x}10^5)^3$ ---------- 42=_____

43. $(5070)\sqrt{1430 + 462 + 3100}$ ---------- 43=_____

44. $\sqrt{11700 - 8850 + 9510} - \sqrt{35700}$ ---------- 44=_____

45. $\left[\sqrt{(1.07/0.59)(21)}\right]^3$ ---------- 45=_____

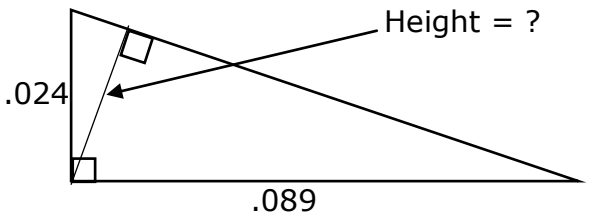
46. $\sqrt[4]{1.33 - 12.1/29.5} + 1/\sqrt{0.929 + 0.908}$ ---------- 46=_____

47. Calculate $(107^{211})(107^{391})$. ---------- 47=_____

48. On a 30-60-90 triangle, the side opposite the 30° angle measures 23π. Calculate the length of the hypotenuse. ---------- 48=_____

49.

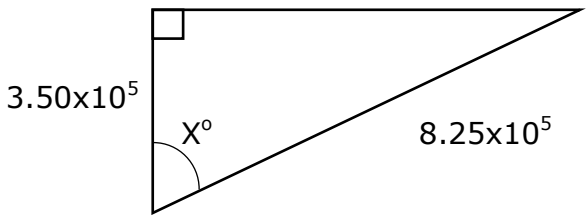
RIGHT TRIANGLE



49=_____

50.

RIGHT TRIANGLE



X° = ?

50=_____°

51. $\left[\frac{\sqrt{\sqrt{1800 - 1470}}}{-(51.9 - 22.5)}\right]^3 [515 + 965]$ ---------- 51=_____

52. $\sqrt{\frac{27700}{(1620)(0.103)}} + \frac{(3.63 - 1.98)}{(0.0966 + 0.0219)}$ ---------- 52=_____

53. $\frac{\sqrt{15.1 + \pi + 3.54}}{(190 - 324 + 150)^2}$ ---------- 53=_____

54. $1210 + \sqrt{(809)(1650)} - (1120 + 716)$ ---------- 54=_____

55. $0.947 + \sqrt{(32.9)/(25.3)} - (0.714 + 0.703)^2$ ---------- 55=_____

56. $(22.7)(1.66 \times 10^8)^{1/2} - [(1.12 \times 10^5)(6.89 \times 10^5)]^{1/2}$ ------ 56=_____

57. $\sqrt{\frac{(8200)(13.3)}{(240) + (268)}} - 43.6$ ---------- 57=_____

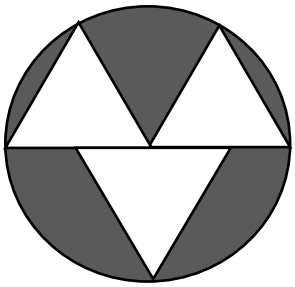
58. $\sqrt{\frac{(41.6)(3910)}{(142) + (138)}} + 1/(0.588)^6$ ---------- 58=_____

59. Pam borrowed money from the bank for five years at 5.25% simple interest. If she had to pay $5289 in simple interest, calculate the amount that she borrowed. ---------- 59=$_____

60. Calculate the length of the longest diagonal in a regular dodecagon with a side length of 28.7 m. ---------- 60=_____m

61.

CIRCLE AND EQUIVALENT EQUILATERAL TRIANGLES



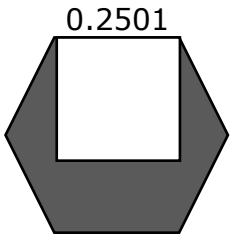
Side of Triangle = 23400

Shaded Area = ?

61=_____

62.

REGULAR HEXAGON AND SQUARE



Shaded Area = ?

62=_____

63. $\frac{26! + 25!}{26!}$ ---------- 63=_____

64. (deg) $(48.7 - 111)\cos(72.2°)$ ---------- 64=_____

65. (deg) $\frac{\tan(716°)}{1910}$ ---------- 65=_____

66. (deg) $(5.8 - 8.78)\cos(0.7°) + 0.387$ ---------- 66=_____

67. (rad) $\frac{\sin(120)}{488/342}$ ---------- 67=_____

68. (deg) $\frac{\sin(369°)}{4.86 + 11.6}$ ---------- 68=_____

69. (deg) $\frac{\sin(15.9°)}{\tan(15.9°)}[284]$ ---------- 69=_____

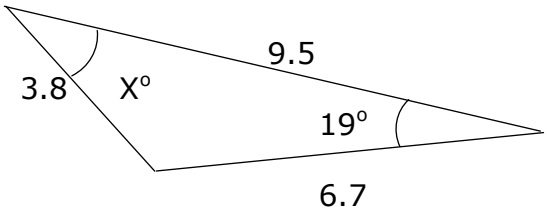
70. $(132 - 121 + 264)^{1/3}$ ---------- 70=_____

71. Mr. Quinn gave a test to his class. The test had 25 True/False questions and 25 multiple choice questions with 4 answer choices each. Calculate the number of possible outcomes for this test. 71=_____

72. Calculate the odds of drawing a red ace from a standard deck of playing cards. ---------- 72=_____

73.

SCALENE TRIANGLE

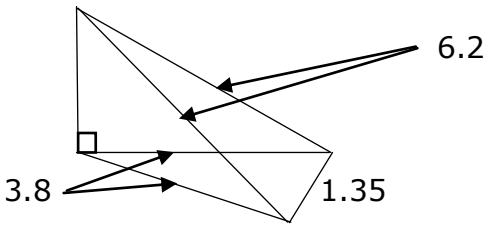


X^o = ?

73=_____°

74.

OBLIQUE PYRAMID



Volume = ?

74=_____

75. $\text{Ln}\left[\frac{161 + 132 + 42}{118 + 114 - 85.2}\right]$ ---------- 75=_____

76. $\frac{\text{Log}(47700 + 55000)}{2440 - 2970}$ ---------- 76=_____

77. $\text{Log}(1.39 + 5.8 + 8.78)$ ---------- 77=_____

78. $\text{Ln}\left[\frac{23.5 + 17.7 + 12}{488 - 149 - 103}\right]$ ---------- 78=_____

79. $1 + 3 + 5 + \ldots + 411$ ---------- 79=_____

80. $1 + 0.67 + (0.67)^2 + \frac{(0.67)^4}{8} - \frac{(0.67)^5}{15}$ ---------- 80=_____

2020 – 2021 TMSCA Middle School Calculator Test 4 Answer Key

Page 1

1 = 748
= 7.48×10^{2}

2 = 8.00
= 8.00×10^{0}

3 = 127
= 1.27×10^{2}

4 = 3.14
= 3.14×10^{0}

5 = -879
= -8.79×10^{2}

6 = 3.40
= 3.40×10^{0}

7 = 19.1
= 1.91×10^{1}

8 = -1.37
= -1.37×10^{0}

9 = 1.45×10^{6}

10 = 1.01×10^{12}

11 = 5.00
= 5.00×10^{0}

12 = 900 INT.

13 = 668
= 6.68×10^{2}

Page 2

14 = -1.05×10^{8}

15 = 214
= 2.14×10^{2}

16 = 0.176
= 1.76×10^{-1}

17 = 0.909
= 9.09×10^{-1}

18 = 13.7
= 1.37×10^{1}

19 = 739
= 7.39×10^{2}

20 = -6.34×10^{-11}

21 = 0.0273
= 2.73×10^{-2}

22 = 4830
= 4.83×10^{3}

23 = -2.61
= -2.61×10^{0}

24 = 67.6
= 6.76×10^{1}

25 = 38.9
= 3.89×10^{1}

26 = 1.41×10^{9}

Page 3

27 = 0.955
= 9.55×10^{-1}

28 = -6.56×10^{14}

29 = 9.39×10^{-5}

30 = 28.9
= 2.89×10^{1}

31 = 6.00×10^{7}

32 = -1.32×10^{-11}

33 = 1.49
= 1.49×10^{0}

34 = 2.10×10^{6}

35 = 7.83
= 7.83×10^{0}

36 = 95.8
= 9.58×10^{1}

37 = 31.6
= 3.16×10^{1}

38 = 0.0000155
= 1.55×10^{-5}

Page 4

39 = 4430
= 4.43×10^{3}

40 = 718
= 7.18×10^{2}

41 = 4.63
= 4.63×10^{0}

42 = 3.07×10^{17}

43 = 358000
= 3.58×10^{5}

44 = -77.8
= -7.78×10^{1}

45 = 235
= 2.35×10^{2}

46 = 1.72
= 1.72×10^{0}

47 = 4.89×10^{1221}

48 = 145
= 1.45×10^{2}

49 = 0.0232
= 2.32×10^{-2}

50 = 64.9
= 6.49×10^{1}

2020 – 2021 TMSCA Middle School Calculator Test 4 Answer Key

Page 5

51 = -4.51
$= -4.51 \times 10^{0}$

52 = 26.8
$= 2.68 \times 10^{1}$

53 = 0.0182
$= 1.82 \times 10^{-2}$

54 = 529
$= 5.29 \times 10^{2}$

55 = 0.0795
$= 7.95 \times 10^{-2}$

56 = 14700
$= 1.47 \times 10^{4}$

57 = -28.9
$= -2.89 \times 10^{1}$

58 = 48.3
$= 4.83 \times 10^{1}$

59 = $20,148.57

60 = 111
$= 1.11 \times 10^{2}$

Page 6

61 = 1.01×10^{9}

62 = 0.100
$= 1.00 \times 10^{-1}$

63 = 1.04
$= 1.04 \times 10^{0}$

64 = -19.0
$= -1.90 \times 10^{1}$

65 = -3.66×10^{-5}

66 = -2.59
$= -2.59 \times 10^{0}$

67 = 0.407
$= 4.07 \times 10^{-1}$

68 = 0.00950
$= 9.50 \times 10^{-3}$

69 = 273
$= 2.73 \times 10^{2}$

70 = 6.50
$= 6.50 \times 10^{0}$

71 = 3.78×10^{22}

72 = 0.0400
$= 4.00 \times 10^{-2}$

Page 7

73 = 35.0
$= 3.50 \times 10^{1}$

74 = 4.12
$= 4.12 \times 10^{0}$

75 = 0.825
$= 8.25 \times 10^{-1}$

76 = -0.00946
$= -9.46 \times 10^{-3}$

77 = 1.20
$= 1.20 \times 10^{0}$

78 = -1.49
$= -1.49 \times 10^{0}$

79 = 42400
$= 4.24 \times 10^{4}$

80 = 2.14
$= 2.14 \times 10^{0}$

TMSCA 2020-2021 MS CA Test 4 Solutions to Word and Geometry Problems

11. The mode is 5 because it appears most often in

$$\sqrt[4]{625}, 5, and\ ln(e^5)$$

12. $\frac{40\ x\ 36\ x\ 60}{8\ x\ 12}$

13. Area of circle = $\pi r^2 = \pi(376.8)^2 =$ Area of square. Side of square =

$$\sqrt{\pi(376.8)^2}$$

24. 37 – 12 = 25 who are twenty or over. $\frac{25}{37} = \frac{x}{100}$

$$x = \frac{2500}{37}$$

25. Vertical angles are congruent.

26. 22300(5280)(12)

35. $\frac{e^3}{6e^2} = \frac{e}{6} = \frac{47}{6}$

36. $\frac{\mathbf{17}}{\mathbf{44}} = \frac{\mathbf{8+12+17}}{\boldsymbol{x}}$

$$x = \frac{44(37)}{17}$$

37. $A = \pi r^2$

$$782.19 = \pi r^2$$

$$r = \sqrt{\frac{782.19}{\pi}}$$

$$d = 2\left(\sqrt{\frac{782.19}{\pi}}\right)$$

38. $A = \frac{.0042(.0074)}{2}$

47. $107^{(211+391)} = 107^{602}$

602 [ENTER] 107 [log] [x] [SHOW] *(Look at the digits to the left of the decimal. This gives 1221 for the exponent. Write down 10^{1221}.) Then punch*

1221 [–] [10^x]

(This gives 4.89E0 which is the first part of your answer.

The answer is **4.89 x10^{1221}**. *This is done on the HP RPN calculator.*

48. On a 30-60-90 triangle the hypotenuse is twice the length of the short leg.

$2(23\pi)$

49. Hypotenuse of largest triangle = $\sqrt{(.089)^2 + (.024)^2}$

Make a proportion using short legs/hypotenuse

$$\frac{.024}{\sqrt{(.089)^2 + (.024)^2}} = \frac{x}{.089}$$

$$x = \frac{(.089)(.024)}{\sqrt{(.089)^2 + (.024)^2}}$$

50. $\cos x = \frac{3.5\ x\ 10^5}{8.25\ x\ 10^5}$

$$x = acos\left(\frac{3.5\ x\ 10^5}{8.25\ x\ 10^5}\right)$$

59. $I = Prt$

$$5289 = P(.0525)(5)$$

$$P = \frac{5289}{(.0525)(5)}$$

60. For an even number of sides longest diagonal is

$$\frac{side}{sin\left(\frac{180}{n}\right)} = \frac{28.7}{sin\left(\frac{180}{12}\right)}$$

61. radius = 23400 = side of triangle A = $\pi r^2 - 3\left(\frac{side^2\sqrt{3}}{4}\right)$

$$\pi(23400)^2 - 3\left(\frac{(23400)^2\sqrt{3}}{4}\right)$$

62. Hexagon = 6 equilateral triangles

A = Hexagon – Square

$$6\left(\frac{(.2501)^2\sqrt{3}}{4}\right) - .2501^2$$

71. $(2^{25})(4^{25})$

72. $\frac{2\ red\ aces}{50\ not\ red\ aces}$

73. $\frac{sin\ 19}{3.8} = \frac{sin\ x}{6.7}$

$$x = \text{asin}\left(\frac{6.7[\sin 19]}{3.8}\right)$$

74. ht. of pyramid

$$h_1 = \sqrt{6.2^2 - 3.8^2}$$

Ht. of base = $\sqrt{3.8^2 - \left(\frac{1.35}{2}\right)^2}$

B = $\frac{1}{2}(1.35)\sqrt{3.8^2 - \left(\frac{1.35}{2}\right)^2}$

V = $\frac{1}{3}Bh_1$ Substitute values of B and h_1 to find volume.

79. For odds beginning with 1:

$$\left(\frac{n+1}{2}\right)^2 = \left(\frac{412}{2}\right)^2$$