8

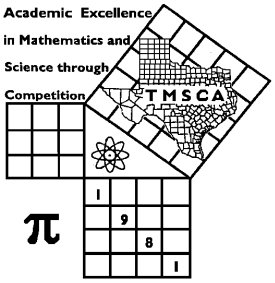
1st Score: _____	2nd Score: _____	3rd Score: _____	
S & G _____	S & G _____	S & G _____	_____. _____
Grader: _____	Grader: _____	Grader: _____	**Final Score**

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#2©

OCTOBER 24, 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.

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1. 2150 – 2420 ---------- 1=_____

2. 48 + 24 + 45 ---------- 2=_____

3. 2290 – 2150 – 4490 ---------- 3=_____

4. π – 13 – 11 – 14 ---------- 4=_____

5. 661 – 2600 + 515 – 447 ---------- 5=_____

6. 130 + 99.5 – 155 – 101 – 29.7 ---------- 6=_____

7. 5.26 – 5.86 + 2.14 – 0.859 – π ---------- 7=_____

8. (–1.64 + 0.869 – 1.44) – (5.24 + 6.28) ---------- 8=_____

9. 90.3 x 65.4 x 71.9 ---------- 9=_____

10. 541 x 845 x 223 x 56.4 ---------- 10=_____

11. Trina purchased items online for $235.67, including tax. If the tax rate is 6.25%, calculate the cost of just the items that she purchased. ---------- 11=$_____

12. Calculate the Least Common Multiple of 22, 30, and 45. --------- 12=_____INT.

13. Convert 225.5^{o}F to degrees Celsius. ---------- 13=_____^{o}C

14. $(148)[166 \times 215 \times 130]$ ---------- 14=_____

15. $(63/47)[108 - 138]$ ---------- 15=_____

16. $\left[\frac{192}{46}\right][(410/290) - 0.509]$ ---------- 16=_____

17. $\{-480/221\}\left[\frac{326}{85 + 336}\right]$ ---------- 17=_____

18. $\frac{[0.549/(0.161)]/0.00343}{(41 \times 64)(190)}$ ---------- 18=_____

19. $\frac{(675/432) + (313/548)}{(0.0126 - 0.00344)}$ ---------- 19=_____

20. $\frac{(0.169)(0.0298)}{0.0254}(8.5 - 26.9)$ ---------- 20=_____

21. $\frac{442}{(336 - 288)} - \frac{(327 - 150)}{103}$ ---------- 21=_____

22. $\frac{(\pi)(250/258)(171/591)}{(555/485)}$ ---------- 22=_____

23. $\frac{[-(1060 + 1030)(1020 - 777)]}{(718/(2.71 \times 10^5))}$ ---------- 23=_____

24. Calculate the geometric mean of e^5, Log 10, and pi. ---------- 24=_____

25. Under certain conditions, supersonic speed is approximately 343.2 m/s. Calculate the number of meters traveled in one hour at this supersonic speed. ---------- 25=_____m

26. Mr. Finely has seven more students than Mrs. Abbot. Together they have fifty-three students. Calculate the number of students in Mr. Finley's' class. ---------- 26=_____INT.

27. $\dfrac{(0.338 - 0.512)(6.21 + 7.27)}{(5.12\text{x}10^{12})}$ ---------- 27=_____

28. $\dfrac{(0.0182 + 0.00544)(45.3 + 54.9)}{(2.01\text{x}10^{11})}$ ---------- 28=_____

29. $[2160 - (8900 + 5340)] + [(13.2)(2610 - 2790)]$ ------- 29=_____

30. $\dfrac{(0.237 + 0.18)}{(2.70\text{x}10^{12})}$ ---------- 30=_____

31. $\dfrac{1}{-3.19} + \dfrac{1}{(\pi)(5.98 - \pi)}$ ---------- 31=_____

32. $\dfrac{1}{-38.7} + \dfrac{1}{(49.2 - 73.7)}$ ---------- 32=_____

33. $\left[\dfrac{1/772}{1/539}\right][2.98\text{x}10^{6}]$ ---------- 33=_____

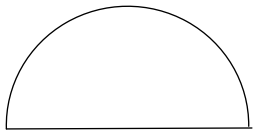
34. $\dfrac{1}{76.4} - \dfrac{1}{(44.8 + 67.3)}$ ---------- 34=_____

35. Phillip drives 947 miles at an average speed of 57 mph. Calculate the number of minutes it will take him to drive that distance. --- 35=_____min.

36. A rock is dropped from a bridge that spans a canyon. The distance it falls is proportional to the square of the time it falls. If the rock falls 22.4 feet in two seconds, calculate how far it will fall in nine seconds. ---------- 36=_____ft.

37.

SEMICIRCLE



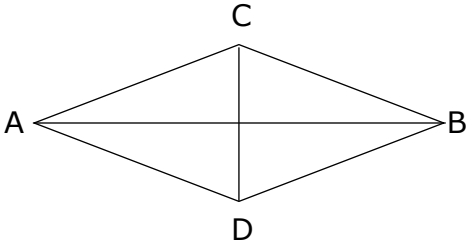
Perimeter = 35.47

Radius = ?

37=_____

38.

RHOMBUS



AB = 561
CD = 216

Area = ?

38=_____

39. $(7.31 + 11.1)^2(1.78 + 2.08)^2$ ---------- 39=_____

40. $\left[\frac{6320}{10.4}\right](442 + 132)^2$ ---------- 40=_____

41. $\left[\frac{689 + (1/(7.11\text{x}10^{-4}))}{(426/1760) - 0.136}\right]^2$ ---------- 41=_____

42. $\sqrt{8.86} + \sqrt{30.8 + 24} - (\pi)\sqrt{28.2}$ ---------- 42=_____

43. $(1/(0.0049))(7130 - 7080)^2$ ---------- 43=_____

44. $\sqrt{5000 - 4460 + 4950} - \sqrt{7420}$ ---------- 44=_____

45. $\left[\sqrt[4]{(1460/1020)(38.1)}\right]^3$ ---------- 45=_____

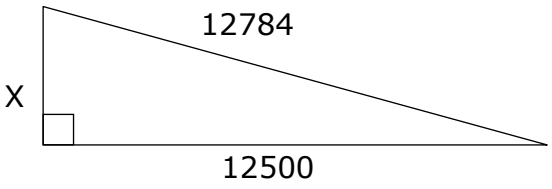
46. $\frac{(477 + 822)^{1/3}}{(49200 - 29200)^{1/2}}$ ---------- 46=_____

47. Mindy drove 257 miles at an average speed of 52 mph and then drove 158 miles at an average speed of 71 mph. Calculate her average speed for the entire trip. ---------- 47=_____mph

48. Calculate 677^{556}. ---------- 48=_____

49.

RIGHT TRIANGLE

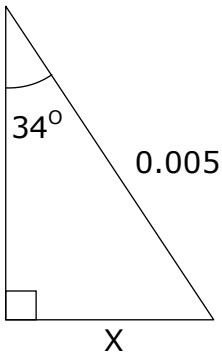


X = ?

49=_____

50.

RIGHT TRIANGLE



X = ?

50=_____

51. $\left[\dfrac{713 - 489 + \sqrt{3.45\text{x}10^{6}/79}}{-33.6 + 86}\right]^{3}$ ---------- 51=_____

52. $\dfrac{\sqrt{1.17 + \pi + 1.02}}{(90300 - 50100 + 63700)^{3}}$ ---------- 52=_____

53. $\left[\dfrac{\sqrt{\sqrt{1.33\text{x}10^{5} - 55600}}}{-(1.26 - 4.67)}\right]^{3}[13300 + 23800]$ ---------- 53=_____

54. $(183)^{2}\sqrt{(10.3)/(16.1)} - (19200 + 26500)$ ---------- 54=_____

55. $0.172 + \sqrt{(71.9)/(447)} - (0.121 + 0.181)^{2}$ ---------- 55=_____

56. $(153)(2.36\text{x}10^{10})^{1/4} - [(2.86\text{x}10^{9})(4.38\text{x}10^{9})]^{1/4}$ ------ 56=_____

57. $\sqrt{\dfrac{(1370)(864)}{(63) + (45.5)}} - 166$ ---------- 57=_____

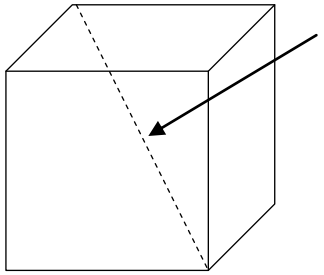
58. $\sqrt{\dfrac{1/(189 - 173)}{(489)(1290 + 641)^{-3}}}$ ---------- 58=_____

59. The volume of a pyramid with a square base is 987.54 cm^3. Calculate the length of an edge of the base of the pyramid in cm if the height is 47.2 cm. ---------- 59=_____cm

60. A circular spinner is divided into equal sections with the numbers 1 to 10 inclusive. Calculate the odds of landing on a space with a prime number. ---------- 60=_____

61.

CUBE



Inner Diagonal = 0.006

Volume = ?

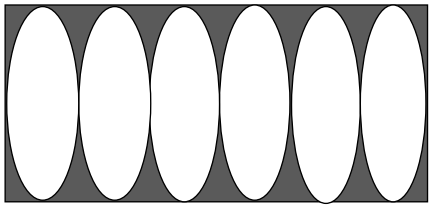
61=_____

62.

RECTANGLE AND EQUIVALENT ELLIPSES

578

271



Shaded Area = ?

62=_____

63. $\frac{16! - 14!}{15!}$ ---------- 63=_____

64. (deg) (25.3 – 29.2)sin(23.5°) ---------- 64=_____

65. (deg) (15.2 + 63.6)sin(22.8°) ---------- 65=_____

66. (rad) $\tan\left[\frac{(193)(\pi)}{(4.83)(129)}\right]$ ---------- 66=_____

67. (deg) (193 – 70.9)cos(89.9°) + 0.0337 ---------- 67=_____

68. (deg) $\frac{\sin(254°)}{36.2 + 55.7}$ ---------- 68=_____

69. (rad) cos[(0.494 – 0.546)(5.13)] ---------- 69=_____

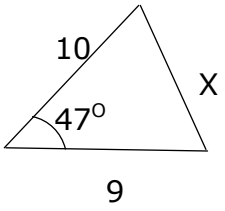
70. $(19.8 + 12.5 + 7.82)^{2/5}$ ---------- 70=_____

71. A 1:350 ship model measures 30 inches. Calculate the actual length of the ship in feet. ---------- 71=_____ft.

72. Calculate the number of gallons of water that must be added to 40 gallons of a 70% acid solution in order to produce a 25% acid solution. ---------- 72=_____gal.

73.

SCALENE TRIANGLE

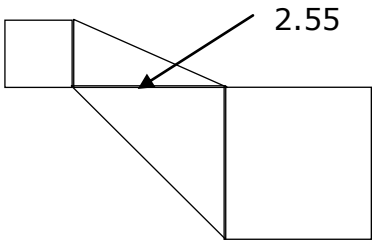


X = ?

73=_____

74.

SQUARES AND RIGHT TRIANGLES



Perimeter of small square = 4.6
Perimeter of large square = 10.4

Perimeter = ?

74=_____

75. $\frac{\text{Log}(8.50\text{x}10^5 + 2.11\text{x}10^6)}{0.6}$ ---------- 75=_____

76. $\frac{0.313 + \sqrt{(0.258)(0.763)} + (0.1)(0.744)}{\sqrt{\sqrt{1.91 + 0.946}}}$ ---------- 76=_____

77. $(5400)10^{(0.986)(5.97)}$ ---------- 77=_____

78. $\frac{\text{Log}[14100 + (1400)(15.3)]}{3.49 + \text{Log}[2910 + 1210]}$ ---------- 78=_____

79. $2 + 4 + 6 + \ldots + 862$ ---------- 79=_____

80. $1 + \frac{(0.409)^4}{2} - \frac{(0.409)^6}{6} + \frac{(0.409)^8}{24} - \frac{(0.409)^{10}}{120}$ --------- 80=_____

2020 – 2021 TMSCA Middle School Calculator Test #2 Answer Key

Page 1

1 = -270
= -2.70×10^{2}

2 = 117
= 1.17×10^{2}

3 = -4350
= -4.35×10^{3}

4 = -34.9
= -3.49×10^{1}

5 = -1870
= -1.87×10^{3}

6 = -56.3
= -5.63×10^{1}

7 = -2.46
= -2.46×10^{0}

8 = -13.7
= -1.37×10^{1}

9 = 425000
= 4.25×10^{5}

10 = 5.75×10^{9}

11 = $221.81

12 = 990 INT.

13 = 108
= 1.08×10^{2}

Page 2

14 = 6.87×10^{8}

15 = -40.2
= -4.02×10^{1}

16 = 3.78
= 3.78×10^{0}

17 = -1.68
= -1.68×10^{0}

18 = 0.00199
= 1.99×10^{-3}

19 = 233
= 2.33×10^{2}

20 = -3.65
= -3.65×10^{0}

21 = 7.49
= 7.49×10^{0}

22 = 0.770
= 7.70×10^{-1}

23 = -1.92×10^{8}

24 = 7.75
= 7.75×10^{0}

25 = 1.24×10^{6}

26 = 30 INT.

Page 3

27 = -4.58×10^{-13}

28 = 1.18×10^{-11}

29 = -14500
= -1.45×10^{4}

30 = 1.54×10^{-13}

31 = -0.201
= -2.01×10^{-1}

32 = -0.0667
= -6.67×10^{-2}

33 = 2.08×10^{6}

34 = 0.00417
= 4.17×10^{-3}

35 = 997
= 9.97×10^{2}

36 = 454
= 4.54×10^{2}

37 = 6.90
= 6.90×10^{0}

38 = 60600
= 6.06×10^{4}

Page 4

39 = 5050
= 5.05×10^{3}

40 = 2.00×10^{8}

41 = 3.90×10^{8}

42 = -6.30
= -6.30×10^{0}

43 = 510000
= 5.10×10^{5}

44 = -12.0
= -1.20×10^{1}

45 = 20.1
= 2.01×10^{1}

46 = 0.0772
= 7.72×10^{-2}

47 = 57.9
= 5.79×10^{1}

48 = 6.42×10^{1573}

49 = 2680
= 2.68×10^{3}

50 = 0.00289
= 2.89×10^{-3}

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Page 5

51 = 564
$= 5.64 \times 10^{2}$

52 = 2.06×10^{-15}

53 = 4.34×10^{6}

54 = -18900
$= -1.89 \times 10^{4}$

55 = 0.482
$= 4.82 \times 10^{-1}$

56 = 476
$= 4.76 \times 10^{2}$

57 = -61.6
$= -6.16 \times 10^{1}$

58 = 959
$= 9.59 \times 10^{2}$

59 = 7.92
$= 7.92 \times 10^{0}$

60 = 0.667
$= 6.67 \times 10^{-1}$

Page 6

61 = 4.16×10^{-8}

62 = 33600
$= 3.36 \times 10^{4}$

63 = 15.9
$= 1.59 \times 10^{1}$

64 = -1.56
$= -1.56 \times 10^{0}$

65 = 30.5
$= 3.05 \times 10^{1}$

66 = 1.47
$= 1.47 \times 10^{0}$

67 = 0.247
$= 2.47 \times 10^{-1}$

68 = -0.0105
$= -1.05 \times 10^{-2}$

69 = 0.965
$= 9.65 \times 10^{-1}$

70 = 4.38
$= 4.38 \times 10^{0}$

71 = 875
$= 8.75 \times 10^{2}$

72 = 72.0
$= 7.20 \times 10^{1}$

Page 7

73 = 7.63
$= 7.63 \times 10^{0}$

74 = 17.7
$= 1.77 \times 10^{1}$

75 = 10.8
$= 1.08 \times 10^{1}$

76 = 0.639
$= 6.39 \times 10^{-1}$

77 = 4.16×10^{9}

78 = 0.640
$= 6.40 \times 10^{-1}$

79 = 186000
$= 1.86 \times 10^{5}$

80 = 1.01
$= 1.01 \times 10^{0}$

TMSCA 2020-2021 MS CA Test 2 Solutions to Word and Geometry Problems

11. $1.0625x = 235.67$

$$x = \frac{235.67}{1.0625}$$

12. 22 = 11(2)
30 = 2(3)(5)
45 = (3)(3)(5)
LCM = 2 x 11 x 3 x 3 x 5

13. On RPN HP there is a key to change F to C. Without the RPN, C = $\frac{5}{9}(225.5 - 32)$

24. $\sqrt[3]{e^5(Log\ 10)\pi}$

25. $\frac{343.2\ m}{sec} \cdot \frac{3600\ sec}{1\ hr}$

26. F = A + 7
A + 7 + A = 53; Solve for A
A = 23 F = 23 + 7

35. $t = \frac{d}{r} = \frac{947}{57}$ = hrs.
Multiply by 60 to change to min.

36. $\frac{d}{t^2}$; $\frac{22.4}{2^2} = \frac{x}{9^2}$; $x = \frac{9^2(22.4)}{2^2}$

37. $P = \pi r + 2r = 35.47$

$$r(\pi + 2) = 35.47$$

$$r = \frac{35.47}{\pi + 2}$$

38. $\frac{561(216)}{2}$

47. $\frac{total\ distance}{total\ time}$ =

$$\frac{257 + 158}{\left(\frac{257}{52} + \frac{158}{71}\right)}$$

48. 556 [ENTER] 677 [log] [x] [SHOW] *(Look at the digits to the left of the decimal. This gives 1573 for the exponent. Write down 10^{1573}.) Then punch*
1573 [–] [10^x]
(This gives 6.42 E0 which is the first part of your answer.
The answer is **6.42 x10^{1573}**). *This is done on the HP RPN calculator.*

49. $\sqrt{12784^2 - 12500^2}$

50. $\frac{sin\ 34}{1} = \frac{x}{.00516}$

$$x = .00516(\sin 34)$$

59. V = $\frac{1}{3}Bh = 987.54$

$$\frac{1}{3}B(47.2) = 987.54$$

$$B = \frac{987.54(3)}{47.2}$$

Edge = $\sqrt{\frac{987.54(3)}{47.2}}$

60. Primes are 2,3,5,7
6 #'s are not prime. Odds: $\frac{4}{6}$

61. edge of the cube = $\frac{.006}{\sqrt{3}}$

V = $e^3 = \left(\frac{.006}{\sqrt{3}}\right)^3$

62. Area of rectangle minus areas of 6 ellipse
Area of each ellipse = $\left(\frac{578}{12}\right)\left(\frac{271}{2}\right)\pi$
Shaded area =
$578(271) - 6\left(\frac{578}{12}\right)\left(\frac{271}{2}\right)\pi$

71. $\frac{1}{350} = \frac{30}{x}$; $x = 30(350)$
To express in feet, divide by 12.

72.

	Gal times	% acid As dec =	Pure acid
Sol 1	40	.70	28
added	x	0	0
final	40+x	.25	10+ .25x

Equation:
$28 = 10 + .25x$
Solve for *x*.

73.
x
$= \sqrt{10^2 + 9^2 - 2(10)(9)(\cos 47)}$

74. side of small square = $\frac{4.6}{4}$
Side of large square = $\frac{10.4}{4}$
Hypotenuse of upper triangle
$= \sqrt{\left(\frac{4.6}{4}\right)^2 + (2.55)^2}$
Hypotenuse of lower triangle
$= \sqrt{\left(\frac{10.4}{4}\right)^2 + (2.55)^2}$

		74 contd. For the perimeter you use three sides of each square and the hypotenuse of each triangle. **79.** For sum of evens beginning with 2, divide the last integer by 2. Then multiply by the next consecutive integer. $\left(\frac{862}{2}\right)\left(\frac{862}{2}+1\right)$ $= (431)(432)$