8

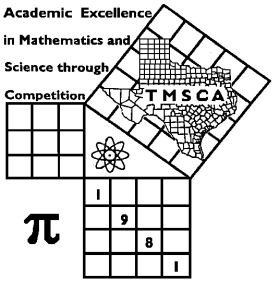
1st Score: _____	2nd Score: _____	3rd Score: _____	
S & G _____	S & G _____	S & G _____	_____. _____
Grader: _____	Grader: _____	Grader: _____	**Final Score**

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 TUNE-UP TEST © 2021

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 Tune-Up On-Line Meet

1. $-1360 - 4420$ ---------- 1=_____

2. $2.1 + 1.89 + 1.79$ ---------- 2=_____

3. $52 - 55 + 83$ ---------- 3=_____

4. $71 - 20 - 34 - 21$ ---------- 4=_____

5. $111 + 198 + 72 + 40$ ---------- 5=_____

6. $88 - 186 - 253 + 61.1 + 145$ ---------- 6=_____

7. $5.69 - 0.921 + 3.96 - 4.87 - 1.8$ ---------- 7=_____

8. $6.56 + 3.66 - 7.55 + 2.94 + 7.2$ ---------- 8=_____

9. $200 \times 277 \times 60.8$ ---------- 9=_____

10. $121 \times 165 \times 75.3 \times 1880$ ---------- 10=_____

11. Jimmy stockpiled all his change and then counted it one rainy Saturday. He had 50 quarters, 78 dimes, 85 nickels and 279 pennies. Calculate the value of his coins in cents. ---------- 11=_____INT.

12. The perimeter of a right isosceles triangle is 85.67 inches. Calculate the area of the triangle in square inches. ---------- 12=_____in^2.

13. The angles of a quadrilateral are in the ratio of 3:9:8:6. Calculate the degree measure of the largest angle. ---------- 13=_____^{o}

14. $(69)[223 \times 29 \times 185]$ ---------- 14=_____

15. $108/[79 \times 82 \times 92]$ ---------- 15=_____

16. $\left[\frac{-13}{85}\right][(95/26) + 1.52]$ ---------- 16=_____

17. $\{61/74\}\left[\frac{132}{48 + 26}\right]$ ---------- 17=_____

18. $\frac{[80.3/(170)]/0.00164}{(0.752 \times 1.78)(29.9)}$ ---------- 18=_____

19. $\left[\frac{(117 + 199)}{90/95}\right]\left[\frac{0.312}{0.694}\right]$ ---------- 19=_____

20. $(76)[432/144 \times 529/635] - 74.9$ ---------- 20=_____

21. $\frac{40}{(49 - 122)} - \frac{(68 - 19)}{177}$ ---------- 21=_____

22. $\frac{(810 \times 2030)/1000}{(1790 \times 0.0861) + 92.1}$ ---------- 22=_____

23. $\left[\frac{1300 + 206}{582 - 833}\right]\left[\frac{367}{1850}\right]$ ---------- 23=_____

24. Set A = {X, 24, 16, 22, 34} has the same mean, median and mode. Calculate the value of X. ---------- 24=_____INT.

25. A scalene triangle has side lengths of 6.8 m, 12.2 m, and 18.5 m. A similar triangle has a perimeter of 322.8 m. Calculate the length of the shortest side of the similar triangle in meters. ---------- 25=_____m

26. The perimeter of square and a circle are the same. If the radius of the circle is 382.7, calculate the length of a side of the square. - 26=_____

27. $(0.00289)\left[(12.3/14.9)(7.31\text{x}10^{-4} + 9.37\text{x}10^{-4})\right]$ ------- 27=_____

28. $\dfrac{(14.3 + 47.2)(0.0287 + 0.0206)}{(9.00\text{x}10^{10})}$ ---------- 28=_____

29. $[4840 - (4770 + 6400)] + \left[(\pi)(2660 - 4770)\right]$ --------- 29=_____

30. $\dfrac{1}{0.079} + \dfrac{1}{(0.206 - 0.154)}$ ---------- 30=_____

31. $(245)\left[\dfrac{5.57}{(3.21\text{x}10^{-8})}\right]$ ---------- 31=_____

32. $(9.6)\left[(1.05\text{x}10^{11}) - (4.42\text{x}10^{10})\right]$ ---------- 32=_____

33. $\dfrac{1}{75.4} - \dfrac{1}{211} + \dfrac{1}{148}$ ---------- 33=_____

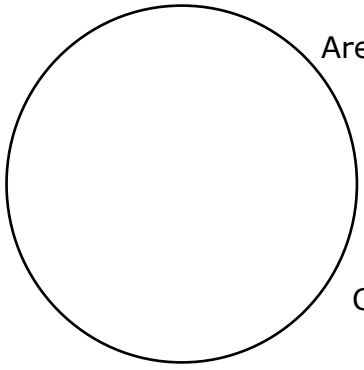
34. $\left[\dfrac{1/235}{1/303}\right] + [0.956]$ ---------- 34=_____

35. The Reese triplets completed Task A separately. It took Adam 1 hour 23 minutes, Austin 1 hour 57 minutes and Aaron 2 hours 13 minutes. Calculate the amount of time it would take to complete Task A if they worked together. ---------- 35=_____hrs.

36. A pile of quarters and dimes has a value of $31.20. There is a total of 159 coins. Calculate how many more quarters there are than dimes. ---------- 36=_____INT.

37.

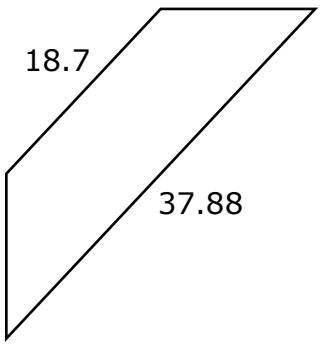
CIRCLE



37=_____

38.

TRAPEZOID



38=_____

39. $\sqrt[4]{\frac{228 + 198}{0.249 - 0.109}}$ ---------- 39=_____

40. $(30.2 + 6.14)^2(2.03 + 1.88)^2$ ---------- 40=_____

41. $\left[\frac{1840 + (1/(3.01\text{x}10^{-4}))}{(4260/5940) - 0.375}\right]^2$ ---------- 41=_____

42. $\sqrt{(19.2/78.6) + 0.237 - 0.185}$ ---------- 42=_____

43. $\sqrt{5150} + \sqrt{3750 + 2010} - (\pi)\sqrt{5850}$ ---------- 43=_____

44. $(1/(0.0751))(3790 - 1410)^3$ ---------- 44=_____

45. $\frac{1}{\sqrt{229 + 513 + 376}} + \left(\frac{1}{\sqrt{7.16}}\right)^2$ ---------- 45=_____

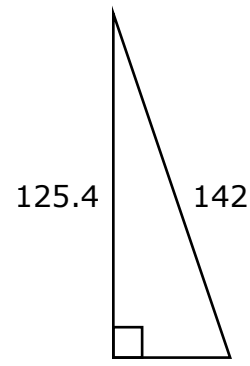
46. $(10600)\sqrt{98.3 + 127 - 60.6}$ ---------- 46=_____

47. Theresa fills a 10-gallon water cooler for her work crew. Calculate the number of 8-ounce cups that can be filled ½ full from the cooler. ---------- 47=_____INT.

48. Because of the pandemic the numbers in Math/Science competitors statewide went from 122,548 down to 24,567. Calculate the percent change in competitors. ---------- 48=_____%

49.

RIGHT TRIANGLE

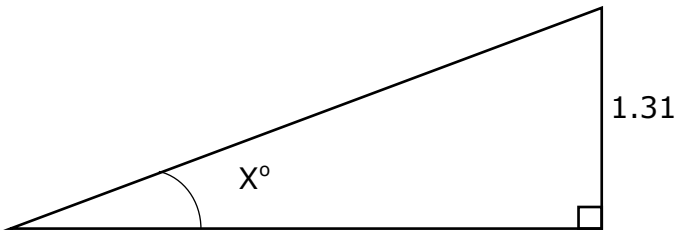


Perimeter = ?

49=_____

50.

RIGHT TRIANGLE



X° = ?

50=_____

51. $\dfrac{(18800 + 5010 - 2460)^3}{\sqrt{35.3 + 73.3 + 17.3}}$ ---------- 51=_____

52. $\left[\dfrac{275 - 272 + \sqrt{20100/2280}}{-85.3 + 103}\right]^2$ ---------- 52=_____

53. $\left[\dfrac{\sqrt{\sqrt{8060 - 7970}}}{-(0.709 - 3.8)}\right]^3 [88800 + 18900]$ ---------- 53=_____

54. $0.638 + \sqrt{(419)/(943)} - (0.705 + 0.759)^2$ ---------- 54=_____

55. $\sqrt{\dfrac{(1650)(2.98 \times 10^5)}{(3340)(1.49 \times 10^5)}} - 0.829 + 0.185$ ---------- 55=_____

56. $\sqrt{\dfrac{1/(9.65 - 7.87)}{(109)(306 + 390)^3}}$ ---------- 56=_____

57. $\sqrt{\dfrac{1/(61 - 39)}{(298)(1310 + 2360)^{-4}}}$ ---------- 57=_____

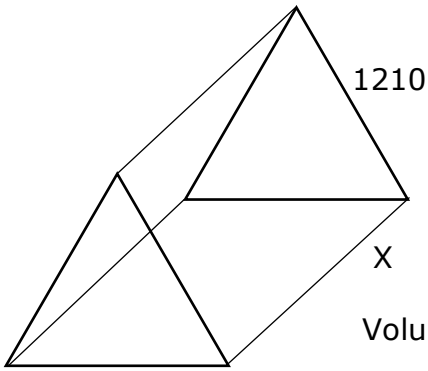
58. (rad) cos(28.3) + (22.1/11.6) ---------- 58=_____

59. The area of a regular tetradecagon is 2220 square inches. If the apothem measures 26.3581 inches, calculate the length of one side of the tetradecagon in inches. ---------- 59=_____in.

60. A bag contains 12 red, 18 blue, 8 white and 21 green marbles. If a marble is drawn and then replaced, calculate the probability of drawing a red, a white and then a blue. ---------- 60=_____

61.

EQUILATERAL TRIANGULAR PRISM



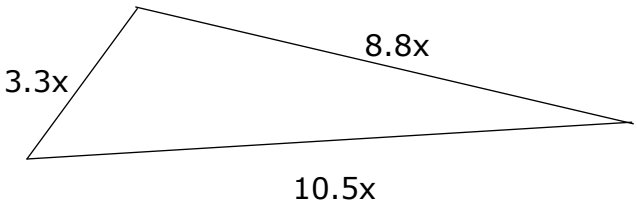
Volume = 8.47×10^{11}

X = ?

61=_____

62.

SCALENE TRIANGLE



Area = 8227

Longest Side = ?

62=_____

63. $\frac{12!}{24!}$ ---------- 63=_____

64. (deg) (142 + 391)tan(180°) ---------- 64=_____

65. (deg) (237 – 248)sin(73.8°) ---------- 65=_____

66. (rad) $\cos\left[\frac{(48.1)(\pi)}{(59.1)(739)}\right]$ ---------- 66=_____

67. (deg) sin(65.6° – 78.1°) + 0.187 ---------- 67=_____

68. (deg) $\frac{\tan(144°)}{2.88 + 7.72}$ ---------- 68=_____

69. (rad) (14300)tan(395) ---------- 69=_____

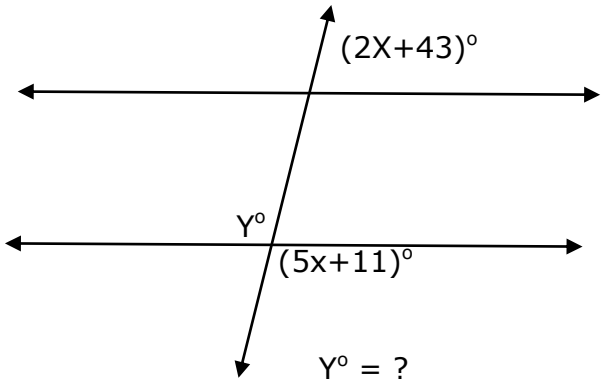
70. $(16.6 - 13.7 + 7.1)^{5/3}$ ---------- 70=_____

71. Calculate the product of the 50th Triangular, Pentagonal, and Hexagonal numbers. ---------- 71=_____

72. Kendal and Liz sit balanced on a 15-foot-long seesaw. Kendal weighs 106 pounds and sits 7 feet from the fulcrum. Liz sits 6 feet 4 inches from the fulcrum. Calculate how much Liz weighs in pounds. ---------- 72=_____lbs.

73.

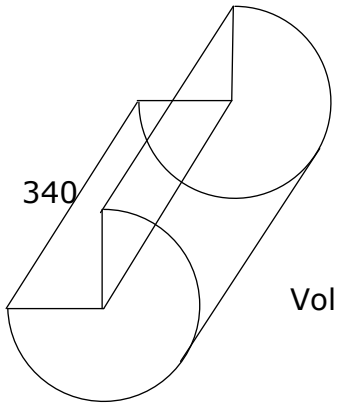
PARALLEL LINES CUT BY A TRANSVERSAL



73=_____

74.

THREE QUARTER RIGHT CIRCULAR CYLINDER



74=_____

75. $\dfrac{0.103 + \sqrt{(0.095)(0.135)} + (0.263)(0.347)}{\sqrt{\sqrt{0.013 + 0.0294}}}$ ---------- 75=_____

76. $\text{Ln}\left[\dfrac{426 + 504 + 527}{395 + 266 - 254}\right]$ ---------- 76=_____

77. $\text{Log}(3920 + 2780 + 4430)$ ---------- 77=_____

78. $\dfrac{(e^{0.459})(e^{0.863})(e^{0.729})}{\text{Ln}(83.2 + 82.7)}$ ---------- 78=_____

79. $1 + 2 + 3 + \ldots + 489$ ---------- 79=_____

80. $1 + 0.3 + (0.3)^2 + \dfrac{(0.3)^4}{8} - \dfrac{(0.3)^5}{15}$ ---------- 80=_____

2020–2021 TMSCA Middle School Calculator Tune-Up On-Line Meet Answer Key

Page 1

1 = -5780
= -5.78×10^{3}

2 = 5.78
= 5.78×10^{0}

3 = 80.0
= 8.00×10^{1}

4 = -4.00
= -4.00×10^{0}

5 = 421
= 4.21×10^{2}

6 = -145
= -1.45×10^{2}

7 = 2.06
= 2.06×10^{0}

8 = 12.8
= 1.28×10^{1}

9 = 3.37×10^{6}

10 = 2.83×10^{9}

11 = 2734 INT.

12 = 315
= 3.15×10^{2}

13 = 125
= 1.25×10^{2}

Page 2

14 = 8.26×10^{7}

15 = 0.000181
= 1.81×10^{-4}

16 = -0.791
= -7.91×10^{-1}

17 = 1.47
= 1.47×10^{0}

18 = 7.20
= 7.20×10^{0}

19 = 150
= 1.50×10^{2}

20 = 115
= 1.15×10^{2}

21 = -0.825
= -8.25×10^{-1}

22 = 6.68
= 6.68×10^{0}

23 = -1.19
= -1.19×10^{0}

24 = 24 INT.

25 = 35.6
= 3.56×10^{1}

26 = 601
= 6.01×10^{2}

Page 3

27 = 3.98×10^{-6}

28 = 3.37×10^{-11}

29 = -13000
= -1.30×10^{4}

30 = 31.9
= 3.19×10^{1}

31 = 4.25×10^{10}

32 = 5.84×10^{11}

33 = 0.0153
= 1.53×10^{-2}

34 = 2.25
= 2.25×10^{0}

35 = 0.593
= 5.93×10^{-1}

36 = 45 INT.

37 = 0.000472
= 4.72×10^{-4}

38 = 9.35
= 9.35×10^{0}

Page 4

39 = 7.43
= 7.43×10^{0}

40 = 20200
= 2.02×10^{4}

41 = 2.28×10^{8}

42 = 0.544
= 5.44×10^{-1}

43 = -92.6
= -9.26×10^{1}

44 = 1.80×10^{11}

45 = 0.170
= 1.70×10^{-1}

46 = 136000
= 1.36×10^{5}

47 = 320 INT.

48 = -80.0
= -8.00×10^{1}

49 = 335
= 3.35×10^{2}

50 = 20.2
= 2.02×10^{1}

2020–2021 TMSCA Middle School Calculator Tune-Up On-Line Meet Answer Key

Page 5

51 = 8.67×10^{11}

52 = 0.114
= 1.14×10^{-1}

53 = 107000
= 1.07×10^{5}

54 = -0.839
= -8.39×10^{-1}

55 = 0.350
= 3.50×10^{-1}

56 = 3.91×10^{-6}

57 = 166000
= 1.66×10^{5}

58 = 0.906
= 9.06×10^{-1}

59 = 12.0
= 1.20×10^{1}

60 = 0.00841
= 8.41×10^{-3}

Page 6

61 = 13400
= 1.34×10^{4}

62 = 260
= 2.60×10^{2}

63 = 7.72×10^{-16}

64 = 0.00
= 0.00×10^{0}

65 = -10.6
= -1.06×10^{1}

66 = 1.00
= 1.00×10^{0}

67 = -0.0294
= -2.94×10^{-2}

68 = -0.0685
= -6.85×10^{-2}

69 = -16000
= -1.60×10^{4}

70 = 46.4
= 4.64×10^{1}

71 = 2.35×10^{10}

72 = 117
= 1.17×10^{2}

Page 7

73 = 101
= 1.01×10^{2}

74 = 1.31×10^{7}

75 = 0.678
= 6.78×10^{-1}

76 = 1.28
= 1.28×10^{0}

77 = 4.05
= 4.05×10^{0}

78 = 1.52
= 1.52×10^{0}

79 = 120000
= 1.20×10^{5}

80 = 1.39
= 1.39×10^{0}

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

11.
$50(25) + 78(10) + 85(5) + 279$

12. Let legs each be x. The hypotenuse will then be $x\sqrt{2}$

$$x + x + x\sqrt{2} = 85.67$$
$$x(2 + \sqrt{2}) = 85.67$$
$$x = \frac{85.67}{2 + \sqrt{2}}$$
$$A = \frac{x^2}{2} = \frac{\left(\frac{85.67}{2 + \sqrt{2}}\right)^2}{2}$$

13. $(3 + 9 + 8 + 2)x$ = 360
$x = \frac{360}{26}$. The largest will be
$$9\left(\frac{360}{26}\right)$$

24. The mean of the 4 numbers given is 24. Therefore the 5th number is also 24. That is the mean, median and mode.

25.
$$(6.8 + 12.2 + 18.5)x = 322.8$$
$$x = \frac{322.8}{6.8 + 12.2 + 18.5}$$
Smallest side = $6.8x$ =
$$6.8\left(\frac{322.8}{6.8 + 12.2 + 18.5}\right)$$

26. x = side of square
$C = 2\pi r = 2\pi(382.7) = 4x$
$$x = \frac{2\pi(382.7)}{4}$$

35. $$\frac{1}{\frac{1}{1\frac{23}{60}} + \frac{1}{1\frac{57}{60}} + \frac{1}{2\frac{13}{60}}}$$

36. $$\begin{Bmatrix} Q + D = 159 \\ 25Q + 10D = 3120 \end{Bmatrix}$$

36. contd.
$$\begin{Bmatrix} -10Q - 10D = -1590 \\ 25Q + 10D = 3120 \end{Bmatrix}$$
$$15Q = 1530$$
$$Q = 102$$
$$D = 159 - 102 = 57$$
$$Q - D = 102 - 57$$

37. $\pi r^2 = 1.772\ x\ 10^{-8}$
$$r = \sqrt{\frac{1.772\ x\ 10^{-8}}{\pi}}$$
$$C = 2\pi r = 2\pi\left(\sqrt{\frac{1.772\ x\ 10^{-8}}{\pi}}\right)$$

38. $264.51 = \frac{1}{2}(37.88 + 18.7)h$
$$h = \frac{264.51(2)}{37.88 + 18.7}$$

47. 1 gal. = 128 oz
10 gal. = 1280 oz.
8 oz. cups are half full so 4 oz. in each. $\frac{1280}{4}$

48. $\frac{24567 - 122548}{122548} \cdot 100$
Or some calculators have a % change key.

49. Short leg =
$$\sqrt{142.26^2 - 125.4^2}$$
$P = 125.4 + 142.26$ + short leg

50. $x = atan\left(\frac{1.31}{3.56}\right)$

59. Tetradecagon is a 14-sided plane figure. $A = \frac{1}{2}aP$
$$2220 = \frac{1}{2}(26.3581)(14x)$$
$$x = \frac{2220(2)}{(26.3581)14}$$

60. $\frac{12}{59} \cdot \frac{8}{59} \cdot \frac{18}{59}$

61.
$$\left(\frac{12100^2\sqrt{3}}{4}\right)x = 8.47\ x10^{11}$$
$$x = \frac{(8.47\ x10^{11})(4)}{12100^2\sqrt{3}}$$

62. Semi-perimeter = 11.3x
Use A = $\sqrt{s(s-a)(s-b)(s-c)}$
$$s - a = 11.3x - 3.3x$$
$$s - b = 11.3x - 8.8x$$
$$s - c = 11.3x - 10.5x$$
$$8227 = \sqrt{11.3x(8x)(2.5x)(.8x)}$$
$$8227 = \sqrt{180.8x^4}$$
Square both sides
$$8227^2 = 180.4x^4$$
$$x = \sqrt[4]{\frac{8227^2}{180.8}}$$
Longest side = 10.5 times x

71. 50th
triangular # = $\frac{(50)(51)}{2}$
pentagonal # = $\frac{50(150-1)}{2}$
hexagonal # = $50(100 - 1)$
Multiply all three of these.

72. Wt.(dist) = Wt.(dist)
$$106(7) = 6\frac{1}{3}(L)$$
$$L = \frac{106(7)}{6\frac{1}{3}}$$

73. $2x + 43 + 5x + 11 = 180$
$$x = \frac{180 - 54}{7} = 18$$
Angle = $5(18) + 11$

74. $V = \frac{3}{4}\pi r^2 h$
$$V = \frac{3}{4}\pi(128)^2(340)$$