8

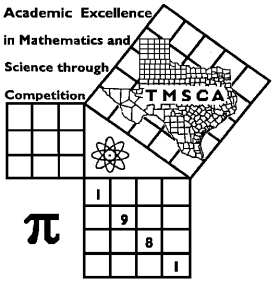
1st Score: _____	2nd Score: _____	3rd Score: _____	
S & G _____	S & G _____	S & G _____	_____. _____
Grader: _____	Grader: _____	Grader: _____	**Final Score**

PLACE LABEL BELOW

Name:_____ School:_____

SS/ID Number:_____ City:_____

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



T M S C A M I D D L E S C H O O L

C A L C U L A T O R

G E A R - U P T E S T ©

2 0 2 0 - 2 0 2 1

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 Gear-Up On-Line Meet

1. 708 – 2350 ---------- 1=_____

2. 22 + 34 + 32 ---------- 2=_____

3. 895 – 1340 – 266 ---------- 3=_____

4. 64 + 22 + 28 + 62 ---------- 4=_____

5. 1520 – 2580 + 372 – 376 ---------- 5=_____

6. 274 + 89 – 188 – 87.7 + 127 ---------- 6=_____

7. (1.46 – 0.429) + (π – 1.59 – 0.816) ---------- 7=_____

8. π + 1.01 + 7.04 + 4.68 + 0.897 ---------- 8=_____

9. 113 x 30.6 x 531 ---------- 9=_____

10. 408 x 354 x 88.5 x 192 ---------- 10=_____

11. Nicki drove a total of 623 miles in eight hours and forty-seven minutes. Calculate her average speed for the trip. ---------- 11=_____mph.

12. Using the Fibonacci sequence that begins with 1, 1, 2, 3, …, calculate the mean of the first 12 terms. ---------- 12=_____

13. 33 1/3% of what number is five thousand? ---------- 13=_____

14. $(71)[238 \times 250 \times 163]$ ---------- 14=_____

15. $817/[398 \times 114 \times 193]$ ---------- 15=_____

16. $\{(-490)(150 - 343)(227)\} - 1.72 \times 10^{7}$ ---------- 16=_____

17. $\left[\frac{-481}{467}\right][(306/274) + \pi]$ ---------- 17=_____

18. $\left[\frac{(677 + 220)}{231/225}\right]\left[\frac{14.3}{0.00185}\right]$ ---------- 18=_____

19. $\left[\frac{(421/870) - (831/358)}{0.0688/(0.125)}\right]$ ---------- 19=_____

20. $(370)[733/314 \times 206/531] - 297$ ---------- 20=_____

21. $\frac{(0.0109)(0.0114)}{4.01 \times 10^{-5}}(0.242 - 0.165)$ ---------- 21=_____

22. $\left[\frac{829 + 927}{690 - 497}\right]\left[\frac{1170}{537}\right]$ ---------- 22=_____

23. $\frac{[-(404 + 425)(311 - 1310)]}{(0.979/(1080))}$ ---------- 23=_____

24. A 30-60-90 triangle has a hypotenuse that measures 51.2 inches. Calculate the area of the triangle in square inches. ---------- 24=_____in^2.

25. A rectangle has a length of 12 cm and a width of 4 cm. Calculate the length of another rectangle of equal area that has a width of 1.87 cm. ---------- 25=_____cm

26. Five-eighths of a number increased by five and three-tenths is negative forty-seven and a third. Calculate the value of the number. ---------- 26=_____

27. $(619)\left[[0.00438/(9.00\text{x}10^{-4})][0.0173/(0.0355)]\right]$ ------- 27=_____

28. $\dfrac{(624 - 323)(71 + 30.1)}{(5.38\text{x}10^{12})}$ ---------- 28=_____

29. $\dfrac{(1.65\text{x}10^{9}) + (1.39\text{x}10^{9})}{(-8.61\text{x}10^{-4})(0.00439) - 2.11\text{x}10^{-6}}$ ---------- 29=_____

30. $(30)\left[(2.95\text{x}10^{12}) - (1.50\text{x}10^{12})\right]$ ---------- 30=_____

31. $\dfrac{1}{-109} + \dfrac{1}{(\pi)(132 - 191)}$ ---------- 31=_____

32. $\dfrac{(14.8 + 8.89)}{(1.46\text{x}10^{12})}$ ---------- 32=_____

33. $\left[\dfrac{1/389}{1/421}\right][1.50\text{x}10^{6}]$ ---------- 33=_____

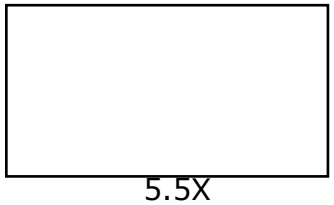
34. $1/(0.03 - 0.0333) - 1/(-0.00105)$ ---------- 34=_____

35. One of the fastest pitches thrown in baseball was thrown and recorded at 105.1 miles per hour. Calculate this speed in feet per second. ---------- 35=_____fps.

36. Calculate the number of degrees in five pi over eight radians. --- 36=_____°

37.

RECTANGLE



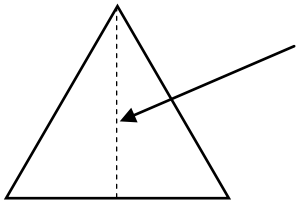
Perimeter = 152.9

Length = ?

37=_____

38.

EQUILATERAL TRIANGLE



Perimeter = ?

38=_____

39. $\left[\frac{27.1}{5630}\right](0.502 + 1.02)^2$ ---------- 39=_____

40. $(3.3 + 1.71)^2(467 + 198)^2$ ---------- 40=_____

41. $\left[\frac{10600 + (1/(4.20\text{x}10^{-4}))}{(3180/7750) - 0.232}\right]^2$ ---------- 41=_____

42. $\sqrt{12.8} + \sqrt{55.8 + 32.1} - (\pi)\sqrt{15.1}$ ---------- 42=_____

43. $(1/(0.0165))(2.67\text{x}10^5 - 1.66\text{x}10^5)^2$ ---------- 43=_____

44. $\sqrt{(722/951) + 0.598 - 0.359}$ ---------- 44=_____

45. $\left[\sqrt[4]{(49.9/55.9)(18.3)}\right]^2$ ---------- 45=_____

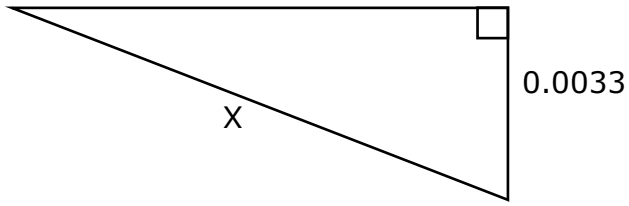
46. $(3720)\sqrt[3]{25400 + 72400 - 24200}$ ---------- 46=_____

47. Due to the pandemic, the university's enrollment decreased by 23% to 4,572 students. Calculate the enrollment before the pandemic. Round to the nearest person. ---------- 47=_____INT.

48. Calculate the value of 1324321 Base 5 in Base 10. ---------- 48=_____INT.

49.

RIGHT TRIANGLE



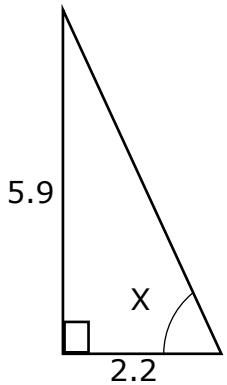
Area = 0.00001419

X = ?

49=_____

50.

RIGHT TRIANGLE



X(rad) = ?

50=_____(rad)

51. $\left[\frac{\sqrt{\sqrt{0.133 - 0.0642}}}{-(2370 - 2550)}\right]^3 [0.0471 + 0.00657]$ ---------- 51=_____

52. $\left[\frac{89.4 + 72.4 + \sqrt{11300 + 13600}}{16100/8600}\right]^3$ ---------- 52=_____

53. $\frac{(982 + 3130 - 3960)^4}{\sqrt{0.143 + 0.226 + 0.294}}$ ---------- 53=_____

54. $\sqrt{\frac{1/(16.1 - 7.24)}{(24)(2.37 + 18.2)^6}}$ ---------- 54=_____

55. $20200 + \sqrt{(40700)(46500)} - (38100 + 8440)$ ---------- 55=_____

56. $(168)(1.04\text{x}10^8)^{1/2} - [(1.13\text{x}10^6)(6.04\text{x}10^6)]^{1/2}$ ------- 56=_____

57. $\sqrt{\frac{1/(3540 - 1750)}{(1730)(553 + 211)^{-2}}}$ ---------- 57=_____

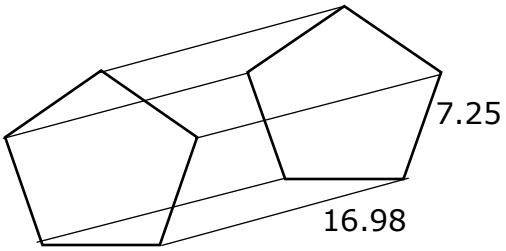
58. $\sqrt{\frac{(1970)(150)}{(4.09) + (6.06)}} - 317$ ---------- 58=_____

59. Adding 250ml of water to 450 ml of an acid solution, produces 700 ml of a 25% acid solution. Calculate the acid percentage of the original 450ml. ---------- 59=_____%

60. Phil ran to the store at 6 miles per hour and then had a slow stroll back home at 2.5 miles per hour. Calculate the distance to the store if the round trip took him 3.5 hours. ---------- 60=_____mi.

61.

REGULAR PENTAGONAL PRISM

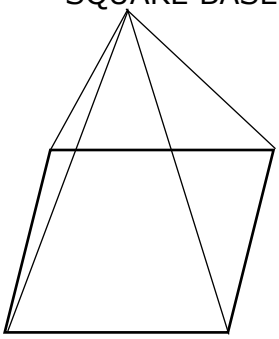


Volume = ?

61=_____

62.

SQUARE BASED PYRAMID



All Edges = 4.44

Surface Area = ?

62=_____

63. $\frac{16! + 15!}{22!}$ ---------- 63=_____

64. (deg) $(376 + 81.1)\sin(426°)$ ---------- 64=_____

65. (deg) $\frac{\sin(64.3°)}{114}$ ---------- 65=_____

66. (rad) $\cos\left[\frac{(1.07)(\pi)}{(0.186)(123)}\right]$ ---------- 66=_____

67. (deg) $[78.3]\sin(23.4° - 17°)$ ---------- 67=_____

68. (rad) $(0.255)\tan(763)$ ---------- 68=_____

69. (deg) $\frac{\sin(246°)}{\tan(246°)}[46.1]$ ---------- 69=_____

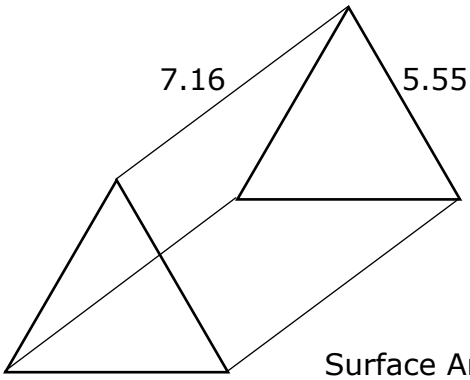
70. $(12.4 + 13.2 + 20.9)^{4/5}$ ---------- 70=_____

71. Calculate the slope of a line perpendicular to the line given by the equation 4x-7y=32. ---------- 71=_____

72. A tank in the shape of a rectangular prism holds waste oil. If the tank measures two and a half feet by thirty-two inches by four feet three inches, calculate the number of gallons it holds. ---------- 72=_____gal.

73.

EQUILATERAL TRIANGULAR PRISM

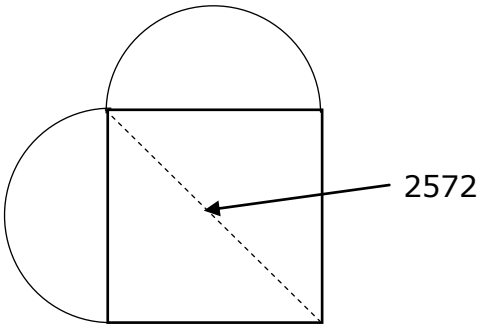


Surface Area = ?

73=_____

74.

SQUARE AND TWO SEMICIRCLES



Perimeter = ?

74=_____

75. $\text{Ln}\left[\frac{345 + 266 + 452}{218 + 50.1 - 33.1}\right]$ ---------- 75=_____

76. $\frac{(15.3)^{0.931}(1.73)^{0.874}}{(9.43 - 6.96)^{-5}}$ ---------- 76=_____

77. $\frac{2000 - 7250}{\text{Log}(4500 + 4380)}$ ---------- 77=_____

78. $\frac{\text{Log}[22.4 + (28.6)(1.29)]}{0.367 + \text{Log}[2.81 + 2.87]}$ ---------- 78=_____

79. $4 + 6 + 8 + \ldots + 124$ ---------- 79=_____

80. $\frac{1}{(0.259)} + \frac{1}{3(0.259)^3} + \frac{1}{5(0.259)^5} + \frac{1}{7(0.259)^7}$ ------ 80=_____

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

Page 1

1 = -1640
= -1.64×10^{3}

2 = 88.0
= 8.80×10^{1}

3 = -711
= -7.11×10^{2}

4 = 176
= 1.76×10^{2}

5 = -1060
= -1.06×10^{3}

6 = 214
= 2.14×10^{2}

7 = 1.77
= 1.77×10^{0}

8 = 16.8
= 1.68×10^{1}

9 = 1.84×10^{6}

10 = 2.45×10^{9}

11 = 70.9
= 7.09×10^{1}

12 = 31.3
= 3.13×10^{1}

13 = 15000
= 1.50×10^{4}

Page 2

14 = 6.89×10^{8}

15 = 9.33×10^{-5}

16 = 4.27×10^{6}

17 = -4.39
= -4.39×10^{0}

18 = 6.75×10^{6}

19 = -3.34
= -3.34×10^{0}

20 = 38.1
= 3.81×10^{1}

21 = 0.239
= 2.39×10^{-1}

22 = 19.8
= 1.98×10^{1}

23 = 9.14×10^{8}

24 = 568
= 5.68×10^{2}

25 = 25.7
= 2.57×10^{1}

26 = -84.2
= -8.42×10^{1}

Page 3

27 = 1470
= 1.47×10^{3}

28 = 5.66×10^{-9}

29 = -5.16×10^{14}

30 = 4.34×10^{13}

31 = -0.0146
= -1.46×10^{-2}

32 = 1.62×10^{-11}

33 = 1.62×10^{6}

34 = 649
= 6.49×10^{2}

35 = 154
= 1.54×10^{2}

36 = 113
= 1.13×10^{2}

37 = 49.5
= 4.95×10^{1}

38 = 64.4
= 6.44×10^{1}

Page 4

39 = 0.0112
= 1.12×10^{-2}

40 = 1.11×10^{7}

41 = 5.30×10^{9}

42 = 0.745
= 7.45×10^{-1}

43 = 6.18×10^{11}

44 = 0.999
= 9.99×10^{-1}

45 = 4.04
= 4.04×10^{0}

46 = 156000
= 1.56×10^{5}

47 = 5938 INT.

48 = 26,836 INT.

49 = 0.00921
= 9.21×10^{-3}

50 = 1.21
= 1.21×10^{0}

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Page 5

51 = 1.24×10^{-9}

52 = 4.98×10^{6}

53 = 6.56×10^{8}

54 = 7.88×10^{-6}

55 = 17200
= 1.72×10^{4}

56 = -899000
= -8.99×10^{5}

57 = 0.434
= 4.34×10^{-1}

58 = -146
= -1.46×10^{2}

59 = 38.9
= 3.89×10^{1}

60 = 6.18
= 6.18×10^{0}

Page 6

61 = 1540
= 1.54×10^{3}

62 = 53.9
= 5.39×10^{1}

63 = 1.98×10^{-8}

64 = 418
= 4.18×10^{2}

65 = 0.00790
= 7.90×10^{-3}

66 = 0.989
= 9.89×10^{-1}

67 = 8.73
= 8.73×10^{0}

68 = -0.110
= -1.10×10^{-1}

69 = -18.8
= -1.88×10^{1}

70 = 21.6
= 2.16×10^{1}

71 = -1.75
= -1.75×10^{0}

72 = 212
= 2.12×10^{2}

Page 7

73 = 146
= 1.46×10^{2}

74 = 9350
= 9.35×10^{3}

75 = 1.51
= 1.51×10^{0}

76 = 1880
= 1.88×10^{3}

77 = -1330
= -1.33×10^{3}

78 = 1.58
= 1.58×10^{0}

79 = 3900
= 3.90×10^{3}

80 = 2020
= 2.02×10^{3}

11. $\frac{623}{8\frac{47}{60}}$

12. 1 1 2 3 5 8 13 21 34 55 89 144. Find the sum and divide by 12.

13. $\frac{1}{3}N = 5000;\ N = 3(5000)$

24. Short leg = $\frac{51.2}{2}$

Long leg = $\frac{51.2}{2}\sqrt{3}$

Area = $\frac{1}{2}\left(\frac{51.2}{2}\right)\left(\frac{51.2}{2}\sqrt{3}\right)$

25. Areas = 12 x 4 =48;

48 = 1.87L; L = $\frac{48}{1.87}$

26. $\frac{5}{8}n + 5\frac{3}{10} = -47\frac{1}{3}$

$$n = \left(-47\frac{1}{3} - 5\frac{3}{10}\right) \div \frac{5}{8}$$

35. $\frac{15mph}{22\ ft/sec} = \frac{105.1}{x}$

$$x = \frac{105.1(22)}{15}$$

36. Some calculators have a key to convert radians to degrees. OR memorize that $\pi\ radians = 180\ degrees$.

$$\frac{5}{8}\pi\ radians = \frac{5}{8}(180)$$

37. $2(8.5x) = 152.9$

$$x = \frac{152.9}{2(8.5)}$$

Length = $5.5\left(\frac{152.9}{2(8.5)}\right)$

38. h = 18.6; ½ of side = $\frac{18.6}{\sqrt{3}}$

Perimeter = $6\left(\frac{18.6}{\sqrt{3}}\right)$

47. $.77x = 4572$

$$x = \frac{4572}{.77}$$

48.

$$5^6 + 3(5^5) + 2(5^4) + 4(5^3) + 3(5^2) + 2(5) + 1$$

49. A = ½ bh;

$$.00001419 = \frac{1}{2}(.0033)h$$

$$h = \frac{2(.00001419)}{.0033}$$

$$\sqrt{\left(\frac{2(.00001419)}{.0033}\right)^2 + (.0033)^2}$$

50. Be sure to change calculator to radians.

$$\frac{tan\ x}{1} = \frac{5.9}{2.2}$$

$$x = atan\left(\frac{5.9}{2.2}\right)$$

59. ml(% acid) = pure acid

	ml	% acid	Pure acid
Orig.	450	x	450x
Water	250	0	0
Mix	700	25x	175

450x = 17500

X = $\frac{17500}{450}$

60. Use rt=d

$$t = time\ to\ return$$

	rate	time	dist
to	6	$3.5 - t$	$21 - 6t$
from	2.5	t	2.5t

$$21 - 6t = 2.5t$$

$$t = \frac{21}{8.5}$$

Distance: $2.5t = 2.5\left(\frac{21}{8.5}\right)$

61. V = Bh;

B = area of pentagon

B = $\frac{Perimeter^2}{\left(tan\frac{180}{n}\right)(4n)} = \frac{(7.25\ x\ 5)^2}{\left(tan\frac{180}{5}\right)(20)}$

V = $\left(\frac{(7.25\ x\ 5)^2}{\left(tan\frac{180}{5}\right)(20)}\right)(16.98)$

62. Square plus 4 equilateral triangles

$$SA = 4.44^2 + 4\left(\frac{(4.44)^2\sqrt{3}}{4}\right)$$

71. Perpendicular slope to $ax + by = c$ is $\frac{b}{a} = \frac{-7}{4}$

72. 2.5 ft. = 30 inches

Use fact that $231in.^3 = 1\ gal.$

V = $30(51)(32)$

Gallons = $\frac{30(51)(32)}{231}$

73. SA = 2 triangles plus 3 rectangles

2 tri: = $2\left(\frac{(5.55)^2\sqrt{3}}{4}\right)$

3 rect: = $(3)(5.55)(7.16)$

Surface area:

$$2\left(\frac{(5.55)^2\sqrt{3}}{4}\right) + (3)(5.55)(7.16)$$

74. side of square = $\frac{2572}{\sqrt{2}}$

Diameter = $\frac{2572}{\sqrt{2}}$

Per = $2\left(\frac{2572}{\sqrt{2}}\right) + \pi\left(\frac{2572}{\sqrt{2}}\right)$