8

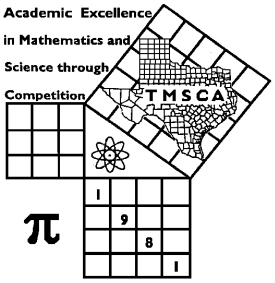
1st Score: _____	2nd Score: _____	3rd Score: _____	
S & G _____	S & G _____	S & G _____	_____. _____
Grader: _____	Grader: _____	Grader: _____	**Final Score**

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

T E S T # 1 2 ©

M A R C H 6, 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 Test #12

1. 1760 – 1060 ---------- 1=_____

2. 9 – 38 – 37 ---------- 2=_____

3. 1290 + 5270 + 3140 ---------- 3=_____

4. π – 9 – 26 + 27 ---------- 4=_____

5. –92 – 100 – 96 – 18 ---------- 5=_____

6. 56.4 – 249 – 231 – 70.4 + 139 ---------- 6=_____

7. 0.518 + 1.51 + 1.75 + 0.388 + 1.24 ---------- 7=_____

8. (3.11 + 0.64 – 3.32) – (3.41 + 3.89) ---------- 8=_____

9. 293 x 182 x 264 ---------- 9=_____

10. 146 x 2740 x 1830 x 58.1 ---------- 10=_____

11. The population of a certain state doubles every 25 years. If the population in 2020 is 22,500,000, calculate the projected population in 2120. ---------- 11=_____

12. A train is traveling at an average speed of 57.9 miles per hour. Calculate how far the train will travel in 5 hours and 22 minutes. 12=_____mi.

13. A store advertises a spring sale of 25% off. If you open a line of credit with the store, they will take an additional 10% off of the sale price. Calculate the percent saved on a sale item using the new line of credit. ---------- 13=_____%

14. $(112)[67 \times 120 \times 124]$ ---------- 14=_____

15. $771/[319 \times 372 \times 309]$ ---------- 15=_____

16. $\left[\frac{-420}{321}\right][(445/482) - 0.227]$ ---------- 16=_____

17. $\left[\frac{12}{74}\right][(92/97) + 0.846]$ ---------- 17=_____

18. $\frac{[0.136/(0.871)]/0.0323}{(0.00992 \times 0.00919)(6.75)}$ ---------- 18=_____

19. $\left[\frac{(211/674) - (1030/205)}{1.49/(1.78)}\right]$ ---------- 19=_____

20. $\frac{(0.726)(5.61)}{1.63}(227 - 198)$ ---------- 20=_____

21. $\frac{(\pi)(98/36)(63/58)}{221}$ ---------- 21=_____

22. $\left[\frac{469 + 1190}{2050 - 1050}\right]\left[\frac{940}{1510}\right]$ ---------- 22=_____

23. $\frac{(\pi)(51/81)(84/25)}{(19/94)}$ ---------- 23=_____

24. In 1965, McDonalds went public and a block of 100 shares could be bought for $2250. After 12 stock splits, those 100 shares turned into 74,360 shares worth $1.8 million in 2003. Calculate the increase in price of one share of stock. ---------- 24=$_____

25. Calculate the percentage of integers from 1 to 100 inclusive that have at least one digit that is a 5. ---------- 25=_____%

26. If the sum of -3 and the opposite of a number is multiplied by 2, the result is 5 less than the product of the number and 3. Calculate the value of the number. ---------- 26=_____

27. $(5.64)[[0.00169/(0.00407)][21.1/(48.9)]]$ ---------- 27=_____

28. $\dfrac{(0.514 - 0.649)(27.4 + 68.4)}{(1.95\text{x}10^{12})}$ ---------- 28=_____

29. $(235)\left[(7.10\text{x}10^{-4}/0.00172)(0.0606 + 0.05)\right]$ ---------- 29=_____

30. $(19.2)\left[(6.38\text{x}10^{11}) - (1.36\text{x}10^{12})\right]$ ---------- 30=_____

31. $\dfrac{1}{11.7} + \dfrac{1}{(6.54 - 0.848)}$ ---------- 31=_____

32. $(0.0857)\left[\dfrac{\pi}{(8.95\text{x}10^{8})}\right]$ ---------- 32=_____

33. $\dfrac{1}{623} - \dfrac{1}{(526 + 135)}$ ---------- 33=_____

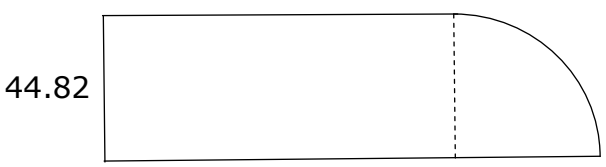
34. $\dfrac{1}{102} - \dfrac{1}{39.9} + \dfrac{1}{104}$ ---------- 34=_____

35. The perimeter of a square is three hundred fifty-two thousandths. Calculate the length of the diagonal of the square. ---------- 35=_____

36. A furniture store going out of business was selling a bedroom suite, that normally listed for $7267.89, for 58% off. Calculate the sale price of this bedroom suite. ---------- 36=$_____

37.

RECTANGLE AND QUARTER CIRCLE

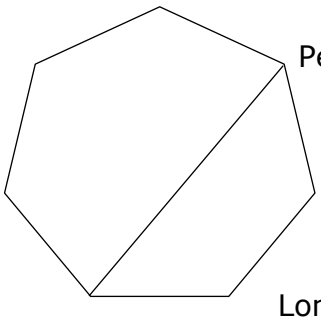


Perimeter = ?

37=_____

38.

REGULAR SEPTAGON



Perimeter = 593.96

Longest Diagonal = ?

38=_____

39. $\left[\frac{59.2}{105}\right](1.79 + 1.9)^4$ ---------- 39=_____

40. $(363 + 458)^2(0.919 + 2.29)^2$ ---------- 40=_____

41. $\left[\frac{50300 + (1/(3.47\text{x}10^{-5}))}{(39300/14200) - 1.79}\right]^2$ ---------- 41=_____

42. $\sqrt{704 - 661 + 124} - \sqrt{306}$ ---------- 42=_____

43. $\sqrt{2630} + \sqrt{5800 + 7020} - (\pi)\sqrt{8310}$ ---------- 43=_____

44. $(64)\sqrt{81.2 + 192 + 326}$ ---------- 44=_____

45. $(97.6)\sqrt[4]{1420 + 1180 - 795}$ ---------- 45=_____

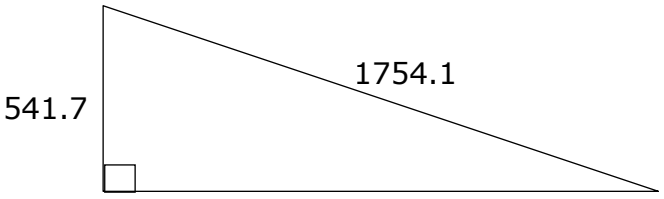
46. $\sqrt[4]{5.43 - 853/335} + 1/\sqrt{0.0108 + 0.0135}$ ---------- 46=_____

47. Old McDonald wants to expand his farm by buying a parcel of land that is ¼ mile by ¼ mile, from his neighbor. They agree on a price of $725.00 per acre. Calculate the cost of the plot of land. ------ 47=$_____

48. Two angles of a triangle measure 23.8° and 51.9°. Calculate the measure of the supplement of the remaining angle of the triangle in degrees. ---------- 48=_____°

49.

RIGHT TRIANGLE

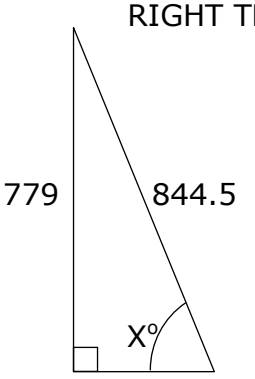


Area = ?

49=_____

50.

RIGHT TRIANGLE



X° = ?

50=_____

51. $\dfrac{(0.447 + 0.712 - 0.612)^4}{\sqrt{0.318 + 0.211 + 0.693}}$ ---------- 51=_____

52. $\left[\dfrac{7.25 - 3.5 + \sqrt{1170/125}}{-8.05 + 41.5}\right]^{-3}$ ---------- 52=_____

53. $\sqrt{\dfrac{1.46\text{x}10^{-4}}{(5370)(0.0325)}} + \dfrac{(1310 - 1120)}{(68700 + 59600)}$ ---------- 53=_____

54. $\sqrt{\dfrac{1/(209 - 109)}{(409)(7.41 + 22)^5}}$ ---------- 54=_____

55. $(9.73)(1.09\text{x}10^9)^{1/2} - [(3.53\text{x}10^7)(3.35\text{x}10^8)]^{1/3}$ ------ 55=_____

56. $\sqrt{\dfrac{(5.45\text{x}10^5)(93100)}{(26600)(3.51\text{x}10^5)}} - 0.933 + 1.81$ ---------- 56=_____

57. (deg) $\sin(3050^\circ) + (27.5/14.4)$ ---------- 57=_____

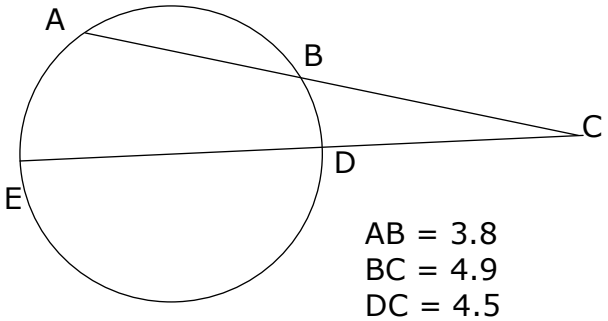
58. (rad) $\cos(210) + (210/75.6)$ ---------- 58=_____

59. Elanor can complete the task in one hour and twenty-eight minutes. Kaelynn can complete the same task in fifty-eight minutes. Calculate the time it would take them to complete the task together in minutes. ---------- 59=_____min.

60. A circular pond is surrounded by a circular walkway that is 6 feet wide. The area of the entire region, pond and walkway, is 2,463 square feet. Calculate the diameter of the pond in feet. ---------- 60=_____ft.

61.

CIRCLE AND SECANT SEGMENTS

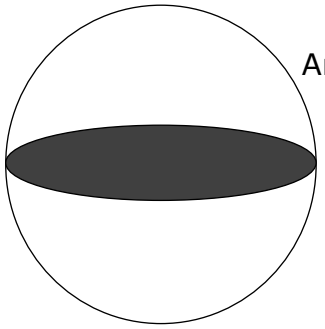


AB = 3.8
BC = 4.9
DC = 4.5
ED = ?

61=_____

62.

SPHERE



Area of Great Circle = 3524.8

Volume = ?

62=_____

63. $\frac{22! + 21!}{27!}$ ---------- 63=_____

64. (deg) $(39.3 - 52.5)\sin(46.1°)$ ---------- 64=_____

65. $(2.58 \times 10^5 - 2.47 \times 10^5)^8 (6.51 \times 10^7)$ ---------- 65=_____

66. (rad) $\tan\left[\frac{(25.2)(\pi)}{(58.3)(4.18)}\right]$ ---------- 66=_____

67. (rad) $\frac{\cos(69.6)}{60.8/241}$ ---------- 67=_____

68. (rad) $\sin[(0.361 - 0.999)(0.421)]$ ---------- 68=_____

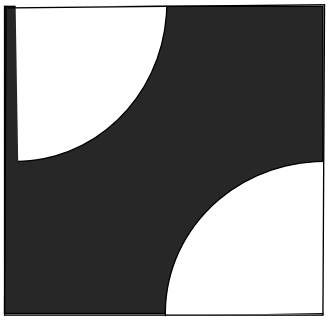
69. (deg) $\frac{\sin(547°)}{\tan(547°)}[219]$ ---------- 69=_____

70. $(39.5 - 10.1)e^{\pi - 0.527}$ ---------- 70=_____

71. Calculate the odds of drawing a red ace from a standard deck of cards. ---------- 71=_____

72. Calculate the number of degrees in the measure of one interior angle of a regular 22-sided polygon. ---------- 72=_____°

73.
SQUARE AND EQUAL QUARTER CIRCLES

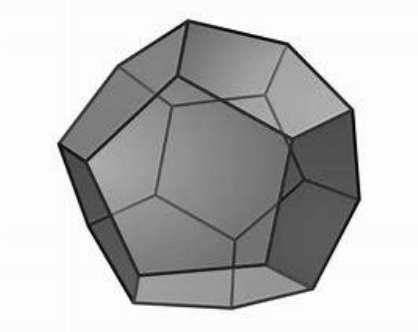


Perimeter of Square = 4729

Shaded Area = ?

73=_____

74.
REGULAR DODECAHEDRON



Each edge = 830.1 Total Surface Area = ?

74=_____

75. $\text{Ln}\left[\frac{527 + 482 + 631}{741 + 700 - 349}\right]$ ---------- 75=_____

76. $\frac{\text{Log}(6.00\text{x}10^{5} + 4.76\text{x}10^{5})}{2.16}$ ---------- 76=_____

77. $2\text{Log}\sqrt{\frac{(20.9)(715)}{24.3 + 25.2}}$ ---------- 77=_____

78. $\frac{(e^{0.438})(e^{0.78})(e^{0.82})}{\text{Ln}(8.59 + 54.4)}$ ---------- 78=_____

79. $2 + 4 + 6 + \ldots + 228$ ---------- 79=_____

80. $\frac{1}{(0.349)} + \frac{1}{3(0.349)^{3}} + \frac{1}{5(0.349)^{5}} + \frac{1}{7(0.349)^{7}}$ ------ 80=_____

2020 – 2021 TMSCA Middle School Calculator Test #12 Answer Key

Page 1

1 = 700
= 7.00×10^{2}

2 = -66.0
= -6.60×10^{1}

3 = 9700
= 9.70×10^{3}

4 = -4.86
= -4.86×10^{0}

5 = -306
= -3.06×10^{2}

6 = -355
= -3.55×10^{2}

7 = 5.41
= 5.41×10^{0}

8 = -6.87
= -6.87×10^{0}

9 = 1.41×10^{7}

10 = 4.25×10^{10}

11 = 3.60×10^{8}

12 = 311
= 3.11×10^{2}

13 = 32.5
= 3.25×10^{1}

Page 2

14 = 1.12×10^{8}

15 = 2.10×10^{-5}

16 = -0.911
= -9.11×10^{-1}

17 = 0.291
= 2.91×10^{-1}

18 = 7860
= 7.86×10^{3}

19 = -5.63
= -5.63×10^{0}

20 = 72.5
= 7.25×10^{1}

21 = 0.0420
= 4.20×10^{-2}

22 = 1.03
= 1.03×10^{0}

23 = 32.9
= 3.29×10^{1}

24 = $1.71

25 = 19.0
= 1.90×10^{1}

26 = -0.200
= -2.00×10^{-1}

Page 3

27 = 1.01
= 1.01×10^{0}

28 = -6.63×10^{-12}

29 = 10.7
= 1.07×10^{1}

30 = -1.39×10^{13}

31 = 0.261
= 2.61×10^{-1}

32 = 3.01×10^{-10}

33 = 9.23×10^{-5}

34 = -0.00564
= -5.64×10^{-3}

35 = 0.124
= 1.24×10^{-1}

36 = $3052.51

37 = 377
= 3.77×10^{2}

38 = 191
= 1.91×10^{2}

Page 4

39 = 105
= 1.05×10^{2}

40 = 6.94×10^{6}

41 = 6.55×10^{9}

42 = -4.57
= -4.57×10^{0}

43 = -122
= -1.22×10^{2}

44 = 1570
= 1.57×10^{3}

45 = 636
= 6.36×10^{2}

46 = 7.72
= 7.72×10^{0}

47 = $29000.00

48 = 75.7
= 7.57×10^{1}

49 = 452000
= 4.52×10^{5}

50 = 67.3
= 6.73×10^{1}

2020 – 2021 TMSCA Middle School Calculator Test #12 Answer Key

Page 5

51 = 0.0810
= 8.10×10^{-2}

52 = 119
= 1.19×10^{2}

53 = 0.00240
= 2.40×10^{-3}

54 = 1.05×10^{-6}

55 = 93400
= 9.34×10^{4}

56 = 3.21
= 3.21×10^{0}

57 = 2.08
= 2.08×10^{0}

58 = 1.89
= 1.89×10^{0}

59 = 35.0
= 3.50×10^{1}

60 = 44.0
= 4.40×10^{1}

Page 6

61 = 4.97
= 4.97×10^{0}

62 = 157000
= 1.57×10^{5}

63 = 1.08×10^{-7}

64 = -9.51
= -9.51×10^{0}

65 = 1.40×10^{40}

66 = 0.337
= 3.37×10^{-1}

67 = 3.51
= 3.51×10^{0}

68 = -0.265
= -2.65×10^{-1}

69 = -217
= -2.17×10^{2}

70 = 402
= 4.02×10^{2}

71 = 0.040
= 4.00×10^{-2}

72 = 164
= 1.64×10^{2}

Page 7

73 = 849000
= 8.49×10^{5}

74 = 1.42×10^{7}

75 = 0.407
= 4.07×10^{-1}

76 = 2.79
= 2.79×10^{0}

77 = 2.48
= 2.48×10^{0}

78 = 1.85
= 1.85×10^{0}

79 = 13100
= 1.31×10^{4}

80 = 276
= 2.76×10^{2}

TMSCA 2020-2021 MS CA Test 12 Solutions to Word and Geometry Problems

11. $22500000(2)^{\frac{100}{25}}$

12. $57.9\left(5\frac{22}{60}\right)$

13. 25% off, pay 75%
10% off reduced price is 7.5% less. Pay 67.5%. Saved 32.5%.

24.
$\frac{2250}{100}$ = price per share in 1965
$\frac{1{,}800{,}000}{74360}$ = price per share in 2003

$$\frac{1{,}800{,}000}{74360} - \frac{2250}{100}$$

25. $\frac{19}{100} = \frac{x}{100} \quad x = 19$

26. $2(-3 + \{-n\}) = 3n - 5$

$$-6 - 2n = 3n - 5$$
$$-1 = 5n$$
$$n = \frac{-1}{5}$$

35. $\left(\frac{.352}{4}\right)(\sqrt{2})$

36. $(7267.89)(.42)$
Note: 58% off means 42% is paid.

37. radius is 44.82
The curved part is ¼ of Circumference =
$\frac{2\pi(44.82)}{4} = \frac{\pi(44.82)}{2}$
Perimeter =
$\frac{\pi(44.82)}{2} + 108.46(2) + 44.82(2)$

38. Longest diagonal of a polygon with an odd number of sides is $\frac{side}{2sin\left(\frac{90}{n}\right)} = \frac{(593.96 \div 7)}{2sin\left(\frac{90}{7}\right)}$

47. 640 acres = 1 square mile
A plot of land that is ¼ mile by ¼ mile is 1/16 square mile.

$$\frac{1}{16}(640) = 40\ acres.$$

\$750 per acre: $750(40)$

48. The exterior angle of a triangle = the sum of the 2 remote interior angles.
23.8 + 51.9

49. Long leg
$= \sqrt{1754.1^2 - 541.7^2}$
A = $\frac{Long\ leg(541.7)}{2}$

50. $asin\left(\frac{779}{844.5}\right)$

59. $\frac{(88)(58)}{88+58}$

60. Radius of entire region = r+6. Radius of pond = r.

$$A = \pi(r+6)^2 = 2463$$

So $(r+6)^2 = \frac{2463}{\pi}$

$$r = \sqrt{\frac{2463}{\pi}} - 6$$

Diameter = 2r
$= 2\left(\sqrt{\frac{2463}{\pi}} - 6\right)$

61.

$$(3.8 + 4.9)(4.9) = 4.5(\overline{EC})$$
$$\overline{EC} = \frac{(3.8 + 4.9)(4.9)}{4.5}$$
$$\overline{ED} = \overline{EC} - \overline{DC} = \overline{EC} - 4.5$$
$$\overline{ED} = \frac{(3.8 + 4.9)(4.9)}{4.5} - 4.5$$

62. $\pi r^2 = 3524.8$

$$r = \sqrt{\frac{3524.8}{\pi}}$$

$$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi\left(\sqrt{\frac{3524.8}{\pi}}\right)^3 =$$

71. 2 red aces, 50 are not red.

$$\frac{2}{50}$$

72. An exterior angle is $\frac{360}{22}$. An interior angle is the supplement. $180 - \frac{360}{22}$.

73. Side of square = $\frac{4729}{4}$
Radius of circle = $\frac{4729}{8}$
Area = Square – ½ circle.

$$\left(\frac{4729}{4}\right)^2 - \frac{\pi\left(\frac{4729}{8}\right)^2}{2}$$

74. There are 12 faces that are pentagons. One pentagon area is

$$\frac{perimeter^2}{\left(\tan\frac{180}{n}\right)(4n)}$$

$$\frac{\{(830.1)(5)\}^2}{\left(\tan\frac{180}{5}\right)(20)}$$

For total surface area, multiply this result by 12.