8

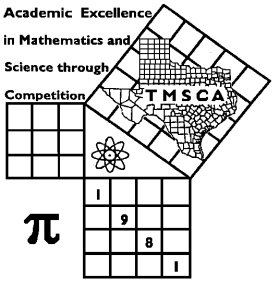
1st Score: _____	2nd Score: _____	3rd Score: _____	
S & G _____	S & G _____	S & G _____	_____. _____
Grader: _____	Grader: _____	Grader: _____	**Final Score**

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#6©

DECEMBER 5, 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 #6

1. 5720 – 4790 ---------- 1=_____

2. 0.699 + 2.79 + 1.5 ---------- 2=_____

3. 2890 – 4190 + 2190 ---------- 3=_____

4. 55 – 55 + 46 – 58 ---------- 4=_____

5. 310 + 151 + 150 + 61 ---------- 5=_____

6. 79.5 + 201 – 181 – 90.4 – 217 ---------- 6=_____

7. –1.45 + 4.46 – 1.87 + 1.99 + 3.28 ---------- 7=_____

8. 1.31 – 1.85 + π – 1.69 – 1.15 ---------- 8=_____

9. 151 x 97.2 x 28.6 ---------- 9=_____

10. 573 x 2070 x 1010 x 369 ---------- 10=_____

11. Mrs. Clancy sets up her class grading so that daily work counts 25%, quizzes count 25% and tests count 50% of a student's grade. Kim gets all 100s on her daily work, scores 95, 85, and 100 on her quizzes, and has test scores of 105, 98, 89, and 95 on her tests. Calculate her average for this class. ---------- 11=_____

12. Calculate the area of a rectangle with a length of 6.72 cm and a width of 5.92 cm in square inches. ---------- 12=_____$in.^2$

13. Randy purchased $856.72 worth of materials for his fence project in the back yard. He had to pay $910.98 after tax was added. Calculate the sales tax rate on this purchase. ---------- 13=_____%

14. $(134)[112 \times 47 \times 111]$ ---------- 14=_____

15. $277/[375 \times 617 \times 118]$ ---------- 15=_____

16. $\left[\frac{361}{799}\right][(725/388) + 1.66]$ ---------- 16=_____

17. $\{191/167\}\left[\frac{86}{131 + 64}\right]$ ---------- 17=_____

18. $\left[\frac{(1240/844) - (795/2010)}{0.181/(0.0903)}\right]$ ---------- 18=_____

19. $\frac{(189/79) + (84/139)}{(0.649 - 5.93)}$ ---------- 19=_____

20. $\frac{(2930)(47.9)}{9.56}(\pi - 2.62)$ ---------- 20=_____

21. $(19.5)[52/363 \times 274/53] - 11.4$ ---------- 21=_____

22. $\frac{(150 + 325 - 259)}{\{(6660 - 6860)/(3.87)\}}$ ---------- 22=_____

23. $\left[\frac{2690 + 1400}{1450 - 3190}\right]\left[\frac{1680}{478}\right]$ ---------- 23=_____

24. Mike's heart rate is 58 beats per minute. Calculate the number of times it beats in a 30 day month. ---------- 24=_____INT.

25. A store was having a sale on candles. 34 people bought lavender candles, 56 people bought magnolia candles and 15 people bought both. Calculate the number of people that bought at least one candle. ---------- 25=_____INT.

26. A sphere with a diameter of 6.2 cm is melted down and re-cast into three identical cubes. Calculate the length of an edge of those cubes. ---------- 26=_____cm

27. $\dfrac{(1.03\text{x}10^{12}) + (1.45\text{x}10^{12})}{(-0.338)(0.75) - 0.0737}$ ---------- 27=_____

28. $(0.00299)[[5.52/(3.6)][0.0598/(0.0473)]]$ ---------- 28=_____

29. $\dfrac{(1.83 - 2.32)(29.6 + 86.2)}{(2.36\text{x}10^{11})}$ ---------- 29=_____

30. $\dfrac{1}{1.31} + \dfrac{1}{(10.6 - 8.94)}$ ---------- 30=_____

31. $\dfrac{(526 + 332)}{(4.15\text{x}10^{11})}$ ---------- 31=_____

32. $\dfrac{1}{-39.7} + \dfrac{1}{(\pi)(29.6 - 60.9)}$ ---------- 32=_____

33. $\left[\dfrac{1/102}{1/109}\right][2.96\text{x}10^{6}]$ ---------- 33=_____

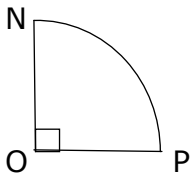
34. $\dfrac{1}{704} - \dfrac{1}{269} + \dfrac{1}{587}$ ---------- 34=_____

35. Jimmy's father is five times older than Jimmy and Jimmy is twice as old as his friend Marla. In two years, the sum of their ages will be fifty-eight. Calculate Jimmy's age now. ---------- 35=_____INT.

36. Calculate 638^{-937}. ---------- 36=_____

37.

QUARTER CIRCLE



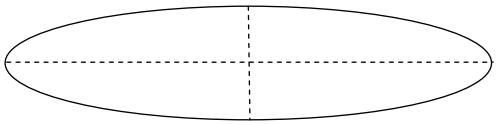
Arc NP = 36.7

Area = ?

37=_____

38.

ELLIPSE



Major Axis = 8900
Minor Axis = 1950
Area = ?

38=_____

39. $(1700 + 2400 + 2500)^2(996 + 274)^2$ ---------- 39=_____

40. $\left[\frac{26.5}{16.1}\right](33.2 + 15.1)^2$ ---------- 40=_____

41. $\left[\frac{12200 + (1/(1.84\text{x}10^{-4}))}{(24300/30700) - 0.232}\right]^2$ ---------- 41=_____

42. $(1/(0.00315))(17000 - 10900)^3$ ---------- 42=_____

43. $\sqrt{830 - 668 + 1120} - \sqrt{708}$ ---------- 43=_____

44. $(1/\pi)\sqrt[4]{\frac{0.432 + 0.196}{0.355 - 0.336}}$ ---------- 44=_____

45. $\left[\sqrt[3]{(106/81.7)(2.2)}\right]^4$ ---------- 45=_____

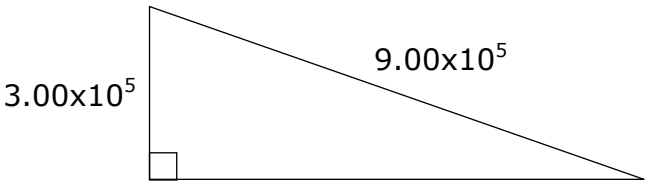
46. $\frac{(23900 + 34100)^{1/2}}{(1710 - 1160)^{1/4}}$ ---------- 46=_____

47. At first, the ratio of Morgan's savings to Brianna's savings was 6:5. After each of them donated \$50 to their favorite charity, the ratio of Morgan's savings to Brianna's savings became 11:9. Calculate the amount of Morgan's savings at first. ---------- 47=\$_____

48. Two shirts and one pant cost \$91. Two pants and one shirt cost \$98. Calculate the cost of one shirt. ---------- 48=\$_____

49.

RIGHT TRIANGLE

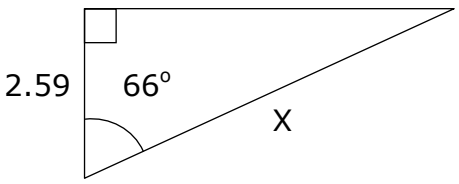


Area = ?

49=_____

50.

RIGHT TRIANGLE



X = ?

50=_____

51. $\sqrt{\frac{1.43\text{x}10^{17}}{(2870)(718)} + \frac{(1.93\text{x}10^{5} - 1.46\text{x}10^{5})}{(0.0368 + 0.0516)}}$ ---------- 51=_____

52. $\frac{\sqrt{10.6 + \pi + 5.35}}{(133 - 49.2 + 96.7)^{3}}$ ---------- 52=_____

53. $\frac{(1.36 + 1.47 - 1.95)^{2}}{\sqrt{416 + 1100 + 361}}$ ---------- 53=_____

54. $0.0501 + \sqrt{(129)/(3600)} - (0.265 + 0.106)^{2}$ ---------- 54=_____

55. $(1070)(3.49\text{x}10^{10})^{1/2} - [(2.56\text{x}10^{12})(1.15\text{x}10^{13})]^{1/3}$ -- 55=_____

56. $5160 + \sqrt{(7830)(8390)} - (7020 + 1190)$ ---------- 56=_____

57. $\sqrt{\frac{(49)(187)}{(4250) + (870)}} - 1.42$ ---------- 57=_____

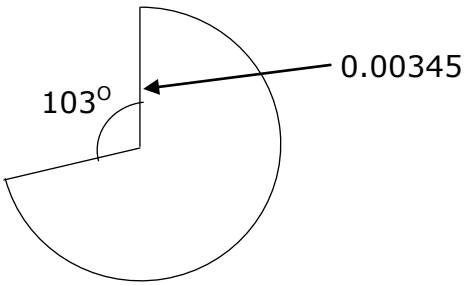
58. (deg) $\tan(2280^{\circ}) + (1.73/1.5)$ ---------- 58=_____

59. Sam is thinking of two integers. Their sum is 18 and their difference is 132. Calculate the value of the smaller integer. ---------- 59=_____INT.

60. The distance an object falls in a vacuum is directly proportional to the square of the time it falls. After 3 seconds, an object falls 236 feet. Calculate the time in seconds it will take to fall 1500 feet. 60=_____sec.

61.

SECTOR OF A CIRCLE

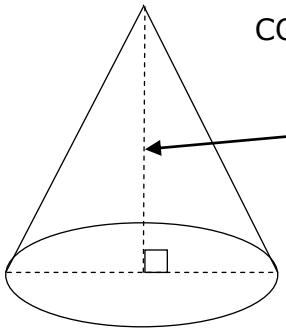


Area of Sector = ?

61=_____

62.

CONE



Diameter = 460

Volume = ?

62=_____

63. $\frac{19!}{18!}$ ---------- 63=_____

64. (deg) $\frac{\tan(401°)}{144}$ ---------- 64=_____

65. (deg) $(181 + 33.2)\cos(74.8°)$ ---------- 65=_____

66. (rad) $\sin\left[\frac{(225)(\pi)}{(7.99)(2.42)}\right]$ ---------- 66=_____

67. (rad) $\frac{\tan(38.8)}{57.8/3000}$ ---------- 67=_____

68. (rad) $(95.1)\tan(13.7)$ ---------- 68=_____

69. (deg) $\frac{\tan(16.1°)}{1320 + 975}$ ---------- 69=_____

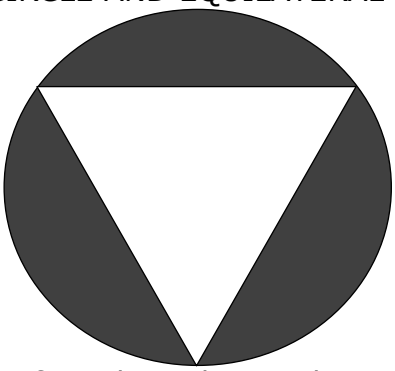
70. $(53.8 - 26.8 + 104)^{5/3}$ ---------- 70=_____

71. Calculate the probability of rolling a sum of 11 or 12 on a pair of six-sided standard dice. ---------- 71=_____

72. A 3-hour river cruise goes 15 mi. upstream and then back again. The river has a current of 2 miles an hour. Calculate the boat's speed in miles per hour. ---------- 72=_____mph

73.

CIRCLE AND EQUILATERAL TRIANGLE

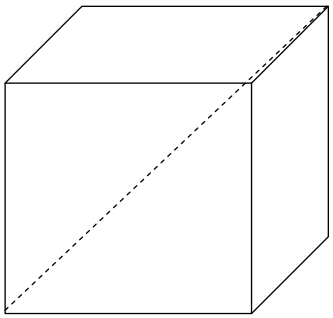


Side of Equilateral Triangle = 36.9
Shaded Area = ?

73=_____

74.

CUBE



Edge = 45.89

Inner Diagonal = ?

74=_____

75. $\dfrac{0.0701 + \sqrt{(0.0848)(0.0888)} + (0.0356)(0.451)}{\sqrt{\sqrt{0.206 + 0.211}}}$ ---------- 75=_____

76. $\dfrac{\text{Log}(1.49\text{x}10^{8} + 4.21\text{x}10^{7})}{7.68}$ ---------- 76=_____

77. $2\text{Log}\sqrt{\dfrac{(191)(11.6)}{1.87 + 2.42}}$ ---------- 77=_____

78. $\dfrac{\text{Log}[14300 + (71.7)(302)]}{1.42 + \text{Log}[72.8 + 149]}$ ---------- 78=_____

79. $1 + 2 + 3 + \ldots + 794$ ---------- 79=_____

80. $(0.92) - \dfrac{(0.92)^2}{2} + \dfrac{(0.92)^3}{3} - \dfrac{(0.92)^4}{4}$ ---------- 80=_____

2020 – 2021 TMSCA Middle School Calculator Test 6 Answer Key

Page 1

1 = 930
= 9.30×10^{2}

2 = 4.99
= 4.99×10^{0}

3 = 890
= 8.90×10^{2}

4 = -12.0
= -1.20×10^{1}

5 = 672
= 6.72×10^{2}

6 = -208
= -2.08×10^{2}

7 = 6.40
= 6.40×10^{0}

8 = -0.238
= -2.38×10^{-1}

9 = 420000
= 4.20×10^{5}

10 = 4.42×10^{11}

11 = 96.7
= 9.67×10^{1}

12 = 6.17
= 6.17×10^{0}

13 = 6.33
= 6.33×10^{0}

Page 2

14 = 7.83×10^{7}

15 = 1.01×10^{-5}

16 = 1.59
= 1.59×10^{0}

17 = 0.504
= 5.04×10^{-1}

18 = 0.536
= 5.36×10^{-1}

19 = -0.567
= -5.67×10^{-1}

20 = 7660
= 7.66×10^{3}

21 = 3.04
= 3.04×10^{0}

22 = -4.18
= -4.18×10^{0}

23 = -8.26
= -8.26×10^{0}

24 = 2505600 INT.

25 = 75 INT.

26 = 3.46
= 3.46×10^{0}

Page 3

27 = -7.58×10^{12}

28 = 0.00580
= 5.80×10^{-3}

29 = -2.40×10^{-10}

30 = 1.37
= 1.37×10^{0}

31 = 2.07×10^{-9}

32 = -0.0354
= -3.54×10^{-2}

33 = 3.16×10^{6}

34 = -0.000593
= -5.93×10^{-4}

35 = 8 INT.

36 = 7.64×10^{-2628}

37 = 429
= 4.29×10^{2}

38 = 1.36×10^{7}

Page 4

39 = 7.03×10^{13}

40 = 3840
= 3.84×10^{3}

41 = 9.93×10^{8}

42 = 7.21×10^{13}

43 = 9.20
= 9.20×10^{0}

44 = 0.763
= 7.63×10^{-1}

45 = 4.05
= 4.05×10^{0}

46 = 49.7
= 4.97×10^{1}

47 = $600.00

48 = $28.00

49 = 1.27×10^{11}

50 = 6.37
= 6.37×10^{0}

2020 – 2021 TMSCA Middle School Calculator Test 6 Answer Key

Page 5

51 = 795000
= 7.95×10^{5}

52 = 7.43×10^{-7}

53 = 0.0179
= 1.79×10^{-2}

54 = 0.102
= 1.02×10^{-1}

55 = -1.09×10^{8}

56 = 5060
= 5.06×10^{3}

57 = -0.0822
= -8.22×10^{-2}

58 = -0.579
= -5.79×10^{-1}

59 = -57 INT.

60 = 7.56
= 7.56×10^{0}

Page 6

61 = 2.67×10^{-5}

62 = 2.52×10^{7}

63 = 19.0
= 1.90×10^{1}

64 = 0.00604
= 6.04×10^{-3}

65 = 56.2
= 5.62×10^{1}

66 = -0.910
= -9.10×10^{-1}

67 = 102
= 1.02×10^{2}

68 = 203
= 2.03×10^{2}

69 = 0.000126
= 1.26×10^{-4}

70 = 3380
= 3.38×10^{3}

71 = 0.0833
= 8.33×10^{-2}

72 = 10.4
= 1.04×10^{1}

Page 7

73 = 836
= 8.36×10^{2}

74 = 79.5
= 7.95×10^{1}

75 = 0.215
= 2.15×10^{-1}

76 = 1.08
= 1.08×10^{0}

77 = 2.71
= 2.71×10^{0}

78 = 1.21
= 1.21×10^{0}

79 = 316000
= 3.16×10^{5}

80 = 0.577
= 5.77×10^{-1}

TMSCA 2020-2021 MS CA Test 6 Solutions to Word and Geometry Problems

11. Daily average = 100

Quiz average: $\frac{95+85+100}{3} = 93\frac{1}{3}$

Test average:

$$\frac{105+98+89+95}{4} = 96.75$$

$$100(.25) + 93\frac{1}{3}(.25) + 96.75(.5)$$

12. Some calculators have a key to change cm to inches. After converting, then multiply these. OR you can multiply (6.72)(5.92) and then use the conversion key twice.

Without a conversion key, change cm to inches by dividing by 2.54.

13.

$$856.72 + 856.72\left(\frac{x}{100}\right) = 910.98$$

$$x = \frac{(910.98 - 856.72)(100)}{856.72}$$

On the HP RPN calculator this can be done using the %chg key.

24. $58(60)(24)(30)$

25. Only lavender = 34-15=19

Only magnolia = 56-15

Both = 15

Total = 19+41+15

26. Volume of sphere = $\frac{4}{3}\pi r^3$ =

$$\frac{4}{3}\pi\left(\frac{6.2}{2}\right)^3$$

Volume of 3 cubes = $3e^3$

$\frac{4}{3}\pi\left(\frac{6.2}{2}\right)^3 = 3e^3$ Solve for e

$$e = \sqrt[3]{\frac{\frac{4}{3}\pi(3.1)^3}{3}}$$

35.

	now	In 2 yrs
Father	**10x**	**10x+2**
Jimmy	**2x**	**2x+2**
Marla	**x**	**X+2**

$$13x + 6 = 58$$

$x = 4$ This is Marla

Jimmy = 2x = 2(4) = 8

36.

-937 [ENTER] 638 [log]

[x] [SHOW] *(Look at the digits to the left of the decimal. This gives -2628 for the exponent. Write down 10^{-2628}.) Then punch*

-2628 [–] [10^x]

(This gives 7.64 E-1. Since it says E-1, add -1 to -2628. The answer is **7.64×10^{-2629}**. *This is done on the HP RPN calculator.*

37. $\frac{2\pi r}{4} = \frac{\pi r}{2} = 36.7$

$$r = \frac{36.7(2)}{\pi}$$

Area = $\frac{\pi r^2}{4} = \pi\left[\frac{36.7(2)}{\pi}\right]^2 \div 4$

38. A = $\left(\frac{8900}{2}\right)\left(\frac{1950}{2}\right)\pi$

47.

$\frac{M}{B} = \frac{6x}{5x}$; $\frac{6x-50}{5x-50} = \frac{11}{9}$

$$9(6x - 50) = 11(5x - 50)$$

Solve for x; x = 100

Morgan's savings = 6x

48. $\begin{Bmatrix} 2s + 1p = 91 \\ 1s + 2p = 98 \end{Bmatrix}$

$\begin{Bmatrix} -4s - 2p = -182 \\ 1s + 2p = 98 \end{Bmatrix}$

Add these $-3s = -84$

$$s = \frac{-84}{-3}$$

49. base =

$$\sqrt{(9\ x\ 10^5)^2 - (3x10^5)^2}$$

A = $\frac{(3x10^5)\left(\sqrt{(9\ x\ 10^5)^2 - (3x10^5)^2}\right)}{2}$

50.

$$\frac{\cos 66}{1} = \frac{2.59}{x}$$

$$x = \frac{2.59}{\cos 66}$$

59. $\begin{Bmatrix} x + y = 18 \\ x - y = 132 \end{Bmatrix}$

$\begin{Bmatrix} x + y = 18 \\ -x + y = -132 \end{Bmatrix}$

$2y = -114$

$y = -57$

60. Use $\frac{d}{t^2}$; $\frac{\mathbf{236}}{\mathbf{3^2}} = \frac{\mathbf{1500}}{\mathbf{x^2}}$

$$x = \sqrt{\frac{1500(9)}{236}}$$

61. Interior angle = 360 – 103 = 257 degrees

A = $\pi(.00345)^2\left(\frac{257}{360}\right)$

62. $V = \frac{1}{3}\pi r^2 h$

$$r = \frac{460}{2} = 230$$

$$V = \frac{1}{3}\pi(230)^2(455)$$

71. $\frac{2}{36}+\frac{1}{36}$

72. Use $rt = d$

	Rate	time	Dist
up	b - 2	$\frac{15}{b-2}$	15
down	b + 2	$\frac{15}{b+2}$	15

The sum of the times = 3

$$\frac{15}{b-2}+\frac{15}{b+2}=3$$

Multiply the whole equation by (b - 2)(b+2)

$$15(b+2)+15(b-2) = 3(b^2-4)$$

Simplifying we have

$$0 = 3(b^2-10b-4)$$

$$\frac{10+\sqrt{(-10)^2-4(1)(-4)}}{2}$$

73. side of equilateral triangle = 36.9

Ht. of triangle = $\frac{36.9}{2}\sqrt{3}$

Radius = $\frac{2}{3}h = \frac{2}{3}\left[\frac{36.9}{2}\sqrt{3}\right]$

Shaded area = $\pi r^2 - \frac{side^2\sqrt{3}}{4}$

$$\pi\left(\frac{2}{3}\left[\frac{36.9}{2}\sqrt{3}\right]\right)^2-\frac{(36.9)^2\sqrt{3}}{4}$$

74. Diagonal = $(45.89)\sqrt{3}$

79. $\frac{794(795)}{2}$