

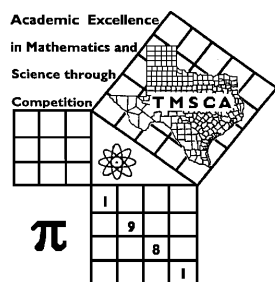
8 1st Score: _____	2nd Score: _____	3rd Score: _____	_____. ____ Final Score
S & G _____	S & G _____	S & G _____	
Grader: _____	Grader: _____	Grader: _____	

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 26, 2019

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*}, 1.23x10¹, 1.23x10⁰¹, .0190, 1.90x10⁻²
 Incorrect: 12.30, 123.0, 1.23(10)², 1.23·10², 1.230x10², 1.23*10², 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.

2019-2020 TMSCA Middle School Calculator Test #2

1. $965 - 2630$ ----- 1=_____

2. $50 + 8 + 30$ ----- 2=_____

3. $858 + 1760 + 1450$ ----- 3=_____

4. $\pi - 12 - 3 + 2$ ----- 4=_____

5. $86 - 75 + 192 - 175$ ----- 5=_____

6. $-108 - 132 - 44.9 - 143 + 163$ ----- 6=_____

7. $(2.35 - 1.93) + (3.47 - 0.7 - 3.48)$ ----- 7=_____

8. $2.22 - 0.476 + 1.82 - 1.9 - 0.852$ ----- 8=_____

9. $191 \times 186 \times 139$ ----- 9=_____

10. $1290 \times 7060 \times 62.2 \times 6960$ ----- 10=_____

11. Calculate the mean of the first ten prime numbers. ----- 11=_____

12. Calculate the radius of a circle with area 31.8 inches squares. --- 12=_____in.

13. Eight hundred fifty-two is what percent less than five thousand? 13=_____%

14. $(143)[391 \times 289 \times 510]$ ----- 14= _____
15. $(386/631)[504 - 386]$ ----- 15= _____
16. $(77 + 48)[86 - 122 - 50]$ ----- 16= _____
17. $\{456/131\} \left[\frac{422}{295 + 257} \right]$ ----- 17= _____
18. $\left[\frac{(37.4 + 46)}{57/245} \right] \left[\frac{0.016}{0.0173} \right]$ ----- 18= _____
19. $\frac{(83/87) + (113/115)}{(0.0438 - 0.241)}$ ----- 19= _____
20. $\frac{0.726 + 0.975 + 0.305}{(32.3)(21.9)(0.0848)}$ ----- 20= _____
21. $\frac{(0.0271)(0.05)}{0.119} (0.982 - 0.255)$ ----- 21= _____
22. $\frac{(\pi)(126/183)(79/60)}{(192/221)}$ ----- 22= _____
23. $\frac{(0.0126 + 0.0112 - 0.00838)}{\{(0.00156 - 0.0018)/(63.9)\}}$ ----- 23= _____
24. Calculate the number of acres in 2.81 square miles. ----- 24= _____ ac.
25. The sum of 3 consecutive odd integers is 3009. Calculate the largest of the integers. ----- 25= _____ INT.
26. A car dealership has 850 new cars in stock. They sold 5 cars on Monday, 3 on Tuesday, 4 on Wednesday, two on Thursday, and 13 on Friday. Calculate the percentage of cars not sold by Friday. 26= _____ %

27. $\frac{(3.76 \times 10^{12}) + (8.51 \times 10^{12})}{(-3.74)(1.44) - 3.32}$ ----- 27= _____

28. $(0.0713) [(2.87/2.43)(\pi + 6.38)]$ ----- 28= _____

29. $\frac{(0.0175 - 0.0119)(1.2 + 0.239)}{(1.31 \times 10^{11})}$ ----- 29= _____

30. $[0.0127] \left[\frac{1/56.1}{1/(38)} \right]$ ----- 30= _____

31. $\frac{1}{-40} + \frac{1}{(\pi)(39.3 - 65.6)}$ ----- 31= _____

32. $(8.61) [(7.26 \times 10^{-12}) - (3.26 \times 10^{-12})]$ ----- 32= _____

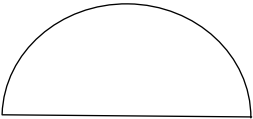
33. $\left[\frac{1/196}{1/94.6} \right] + [0.825]$ ----- 33= _____

34. $\frac{1}{179} - \frac{1}{(149 + 144)}$ ----- 34= _____

35. Lily can do the job in 4.2 hours. Laney joined her the following week and they got the job done in 2.3 hours. Calculate how long would take Laney to do the job on her own. ----- 35= _____ hrs.

36. A is 32% less than B and B is 14% less than C. Calculate what percent A is less than C. ----- 36= _____ %

SEMICIRCLE

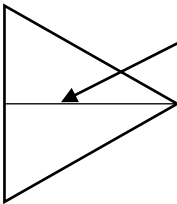


0.0057

Perimeter = ?

37= _____

EQUILATERAL TRIANGLE



Height = 1.25×10^5

Area = ?

38= _____

39. $(23.7 + 53.5 + 61.9)^2(850 + 672)^2$ ----- 39= _____

40. $\left[\frac{17000 + (1/(2.43 \times 10^{-4}))}{(18400/15600) - 0.686} \right]^2$ ----- 40= _____

41. $\sqrt[4]{\frac{8.24 + 9.07}{1210 - 204}}$ ----- 41= _____

42. $\sqrt{(10.6/35.7) + 0.0574 - 0.051}$ ----- 42= _____

43. $\sqrt{351 - 296 + 1580} - \sqrt{845}$ ----- 43= _____

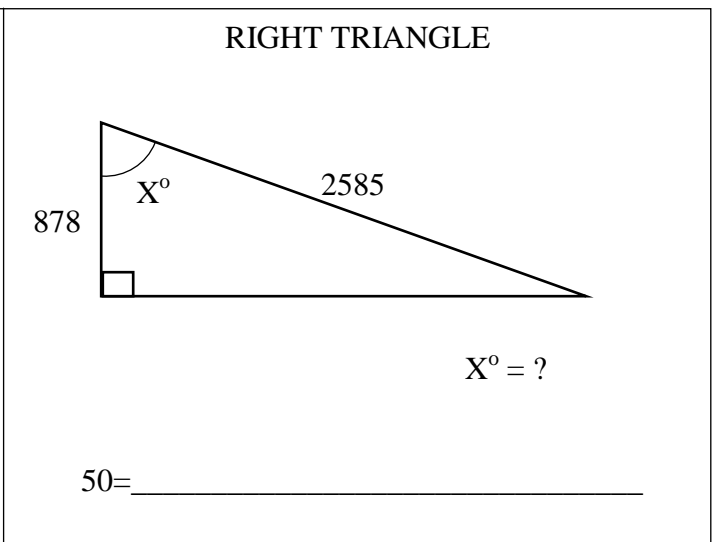
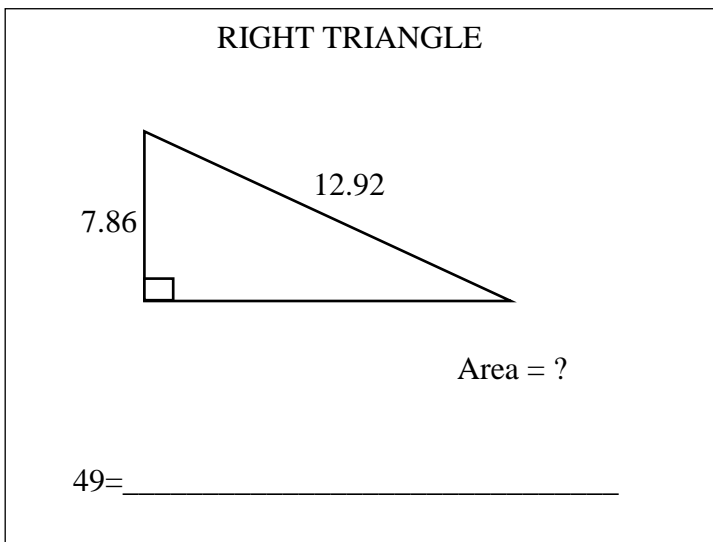
44. $\sqrt{66.9} + \sqrt{129 + 64.7} - (\pi)\sqrt{129}$ ----- 44= _____

45. $\left[\sqrt[3]{(6.22/5.59)(996)} \right]^2$ ----- 45= _____

46. $(1510)\sqrt{14900 + 6560 - 3520}$ ----- 46= _____

47. A 10" x 10" square is folded in half seven times. After all folds are made, what is the area of the smallest folded region? ----- 47= _____ in.²

48. Calculate the value of t in the following equation. Five-ninths t minus six-thirteenths equals seven-fifteenths. ----- 48= _____



51. $\left[\frac{16.3 + 36.5 + \sqrt{1260 + 1520}}{987/1310} \right]^4$ ----- 51= _____

52. $\frac{\sqrt{0.704 + \pi + 1.74}}{(767 - 2420 + 1460)^2}$ ----- 52= _____

53. $\left[\frac{146 - 139 + \sqrt{4580/182}}{-201 + 204} \right]^4$ ----- 53= _____

54. $(389)(3.18 \times 10^7)^{1/2} - [(8.59 \times 10^{11})(1.34 \times 10^{13})]^{1/4}$ ---- 54= _____

55. $0.261 + \sqrt{(31.5)/(382)} - (0.284 + 0.136)^2$ ----- 55= _____

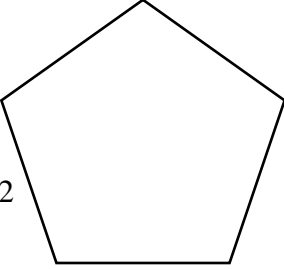
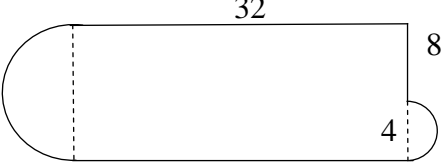
56. $3250 + \sqrt{(881)(2550)} - (3550 + 590)$ ----- 56= _____

57. $\sqrt{\frac{(24.7)(10.8)}{(30.7) + (35.5)}} - 3.23$ ----- 57= _____

58. $\sqrt{\frac{1/(763 - 709)}{(29)(475 + 257)^{-6}}}$ ----- 58= _____

59. In 1977 a dragster fueled by Hydrogen Peroxide traveled a quarter mile in 3.22 seconds. Calculate this speed in miles per hour. --- 59= _____ mph

60. R varies directly as S and inversely as the square of T. If R = 31 when S=65 and T= 4, calculate R when S = 22 and T = 1. ----- 60= _____

<p style="text-align: center;">REGULAR PENTAGON</p> <div style="text-align: center;">  </div> <p style="text-align: right;">Area = ?</p> <p>61= _____</p>	<p style="text-align: center;">POLYGON</p> <div style="text-align: center;">  </div> <p style="text-align: right;">Perimeter = ?</p> <p>62= _____</p>
---	--

63. $\frac{28! + 29!}{19!}$ ----- 63= _____

64. (deg) $\frac{\cos(42.2^\circ)}{1370}$ ----- 64= _____

65. $(1.74 \times 10^5 - 2.58 \times 10^5)^5 (7.16 \times 10^8)$ ----- 65= _____

66. (deg) $[20] \cos(110^\circ - 77.8^\circ)$ ----- 66= _____

67. (rad) $\cos \left[\frac{(0.899)(\pi)}{(1.46)(1.87)} \right]$ ----- 67= _____

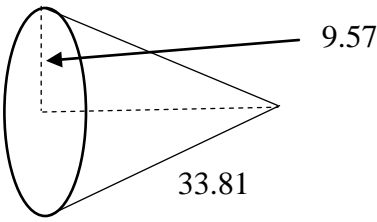
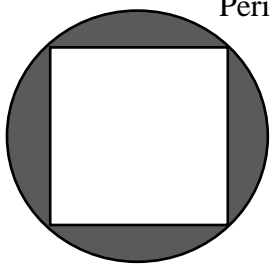
68. (rad) $(3.54) \tan(11.6)$ ----- 68= _____

69. (rad) $\cos[(0.42 - 0.126)(28.5)]$ ----- 69= _____

70. $(16.4 - 5.48 + 8.98)^{5/3}$ ----- 70= _____

71. Calculate the probability of drawing a black king from a standard deck of cards. ----- 71= _____

72. Calculate the number of different 10-digit numbers that can be created from the digits 0 thru 9 inclusive. Repetition is allowed. ----- 72= _____

<p style="text-align: center;">CONE</p>  <p style="text-align: center;">Volume = ?</p> <p>73= _____</p>	<p style="text-align: center;">CIRCLE WITH INSCRIBED SQUARE</p>  <p style="text-align: center;">Shaded Area = ?</p> <p>74= _____</p>
---	---

75. $\ln\left[\frac{173 + 66.9 + 222}{37.6 + 165 - 103}\right]$ ----- 75= _____

76. $\frac{0.0125 + \sqrt{(0.0188)(0.028)} + (0.0639)(0.156)}{\sqrt{\sqrt{0.692 + 0.567}}}$ ----- 76= _____

77. $\text{Log}(125 + 88.6 + 81.5)$ ----- 77= _____

78. $\frac{\text{Log}[1.15 + (1.85)(\pi)]}{0.341 + \text{Log}[1230 + 601]}$ ----- 78= _____

79. $2 + 4 + 6 + \dots + 248$ ----- 79= _____

80. $1 + \frac{(0.56)^4}{2} - \frac{(0.56)^6}{6} + \frac{(0.56)^8}{24} - \frac{(0.56)^{10}}{120}$ ----- 80= _____

2019-2020 TMSCA Middle School Calculator Test #2 Answer Key

Page 1	Page 2	Page 3	Page 4
1 = -1670 = -1.67×10^3	14 = 8.24×10^9	27 = -1.41×10^{12}	39 = 4.48×10^{10}
2 = 88.0 = 8.80×10^1	15 = 72.2 = 7.22×10^1	28 = 0.802 = 8.02×10^{-1}	40 = 1.83×10^9
3 = 4070 = 4.07×10^3	16 = -10800 = -1.08×10^4	29 = 6.15×10^{-14}	41 = 0.362 = 3.62×10^{-1}
4 = -9.86 = -9.86×10^0	17 = 2.66 = 2.66×10^0	30 = 0.00860 = 8.60×10^{-3}	42 = 0.551 = 5.51×10^{-1}
5 = 28.0 = 2.80×10^1	18 = 332 = 3.32×10^2	31 = -0.0371 = -3.71×10^{-2}	43 = 11.4 = 1.14×10^1
6 = -265 = -2.65×10^2	19 = -9.82 = -9.82×10^0	32 = 3.44×10^{-11}	44 = -13.6 = -1.36×10^1
7 = -0.290 = -2.90×10^{-1}	20 = 0.0334 = 3.34×10^{-2}	33 = 1.31 = 1.31×10^0	45 = 107 = 1.07×10^2
8 = 0.812 = 8.12×10^{-1}	21 = 0.00828 = 8.28×10^{-3}	34 = 0.00217 = 2.17×10^{-3}	46 = 202000 = 2.02×10^5
9 = 4.94×10^6	22 = 3.28 = 3.28×10^0	35 = 5.08 = 5.08×10^0	47 = 0.781 = 7.81×10^{-1}
10 = 3.94×10^{12}	23 = -4110 = -4.11×10^3	36 = 41.5 = 4.15×10^1	48 = 1.67 = 1.67×10^0
11 = 12.9 = 1.29×10^1	24 = 1800 = 1.80×10^3	37 = 0.0147 = 1.47×10^{-2}	49 = 40.3 = 4.03×10^1
12 = 3.18 = 3.18×10^0	25 = 1005 INT.	38 = 9.02×10^9	50 = 70.1 = 7.01×10^1
13 = 83.0 = 8.30×10^1	26 = 96.8 = 9.68×10^1		

2019-2020 TMSCA Middle School Calculator Test #2 Answer Key

Page 5

$$\begin{aligned} 51 &= 3.85 \times 10^8 \\ 52 &= 6.34 \times 10^{-5} \\ 53 &= 257 \\ &= 2.57 \times 10^2 \\ 54 &= 352000 \\ &= 3.52 \times 10^5 \\ 55 &= 0.372 \\ &= 3.72 \times 10^{-1} \\ 56 &= 609 \\ &= 6.09 \times 10^2 \\ 57 &= -1.22 \\ &= -1.22 \times 10^0 \\ 58 &= 9.91 \times 10^6 \\ 59 &= 280 \\ &= 2.80 \times 10^2 \\ 60 &= 168 \\ &= 1.68 \times 10^2 \end{aligned}$$

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$$\begin{aligned} 61 &= 0.00892 \\ &= 8.92 \times 10^{-3} \\ 62 &= 97.1 \\ &= 9.71 \times 10^1 \\ 63 &= 7.52 \times 10^{13} \\ 64 &= 0.000541 \\ &= 5.41 \times 10^{-4} \\ 65 &= -2.99 \times 10^{33} \\ 66 &= 16.9 \\ &= 1.69 \times 10^1 \\ 67 &= 0.511 \\ &= 5.11 \times 10^{-1} \\ 68 &= -5.13 \\ &= -5.13 \times 10^0 \\ 69 &= -0.501 \\ &= -5.01 \times 10^{-1} \\ 70 &= 146 \\ &= 1.46 \times 10^2 \\ 71 &= 0.0385 \\ &= 3.85 \times 10^{-2} \\ 72 &= 1.00 \times 10^{10} \end{aligned}$$

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$$\begin{aligned} 73 &= 3110 \\ &= 3.11 \times 10^3 \\ 74 &= 81.5 \\ &= 8.15 \times 10^1 \\ 75 &= 1.53 \\ &= 1.53 \times 10^0 \\ 76 &= 0.0429 \\ &= 4.29 \times 10^{-2} \\ 77 &= 2.47 \\ &= 2.47 \times 10^0 \\ 78 &= 0.234 \\ &= 2.34 \times 10^{-1} \\ 79 &= 15500 \\ &= 1.55 \times 10^4 \\ 80 &= 1.04 \\ &= 1.04 \times 10^0 \end{aligned}$$

TMSCA 19-20 MS CA Test #2 Solutions to Word and Geometry Problems

11.

$$\frac{2+3+5+7+11+13+17+19+23+29}{10}$$

12. $A = \pi r^2$ so $r = \sqrt{\frac{31.8}{\pi}}$

13. On HP RPN calculator, enter 5000. Then 852 %chg. You don't need the negative on the answer since the wording of the problem (percent decrease) implies the negative.

OR: $\frac{5000-852}{5000} = \frac{x}{100}$;
 $x = \frac{100(5000 - 852)}{5000}$

24. 640 acres in one mi.²
 640(2.81)

25. $\frac{3009}{3} = 1003$ = middle integer. The next odd integer is 1005.

26. $\frac{850-5-3-4-2-13}{850} = \frac{x}{100}$
 $x = \frac{100(850 - 27)}{850}$

35. $\frac{xy}{x+y} = \frac{4.2y}{4.2+y} = 2.3$
 $4.2y = 2.3(4.2 + y)$
 $y = \frac{9.66}{1.9}$

36. $B = .86C$; $A = .68B$ so
 $A = .68(.86C)$

$A = .585C$
 $1-.585 = .415$.
 Multiply by 100 to change to a percent

37. $\pi r + d$
 $\pi \left(\frac{.0057}{2}\right) + .0057$

38. $A = \frac{h^2\sqrt{3}}{3} = \frac{(1.25 \times 10^5)^2\sqrt{3}}{3}$

47. $\frac{10 \times 10}{2^7}$

48. $\frac{5}{9}t - \frac{6}{13} = \frac{7}{15}$

$$t = \frac{\frac{7}{15} + \frac{6}{13}}{\frac{5}{9}}$$

49. Base = $\sqrt{12.92^2 - 7.86^2}$

Area = $\frac{\text{base} (7.86)}{2}$

50. $\frac{\cos x}{1} = \frac{878}{2585}$

$$x = \arccos\left(\frac{878}{2585}\right)$$

59. 1 miles in 3.22(4) = 12.88 seconds.

$$\frac{1 \text{ mile}}{12.88 \text{ secs}} \cdot \frac{3600 \text{ secs}}{1 \text{ hour}}$$

60. $\frac{R_1(T_1)^2}{S_1} = \frac{R_2(T_2)^2}{S_2}$

$$\frac{31(4^2)}{65} = \frac{R(1)}{22}$$

$$R = \frac{4^2(31)(22)}{65}$$

61. $A = \frac{\text{Perimeter}^2}{\left(\tan \frac{180}{n}\right)(4n)}$
 $\frac{[.072(5)]^2}{\left(\tan \frac{180}{5}\right)(20)}$

62. Perimeter = $32(2) + \left(\frac{8+4}{2}\right)\pi + 8 + \left(\frac{4}{2}\right)\pi$

71. $\frac{2}{52}$

72. 10^{10}

73. height: $\sqrt{33.81^2 - 9.57^2}$

$$V = \frac{1}{3}\pi(9.57)^2h$$

74. Side of square: $\frac{47.8}{4}$
 Diameter = diagonal = $\left(\frac{47.8}{4}\right)\sqrt{2}$; radius = $\frac{\left(\frac{47.8}{4}\right)\sqrt{2}}{2}$

$$A = \pi \left[\frac{\left(\frac{47.8}{4}\right)\sqrt{2}}{2} \right]^2 - \left(\frac{47.8}{4}\right)^2$$