

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



TMSCA MIDDLE SCHOOL CALCULATOR

TEST #3 ©

NOVEMBER 4, 2017

GENERAL DIRECTIONS

I. About this test:

- A. You will be given 30 minutes to take this test.
- B. There are 80 problems on this test.

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*, 1.23x10⁰*, 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.

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2017-2018 TMSCA Middle School Calculator Test 3

1. $2710 + 5900$ ----- 1= _____
2. $18 - 56 - 15$ ----- 2= _____
3. $222 + 125 + 245$ ----- 3= _____
4. $21 - 14 + 19 - 50$ ----- 4= _____
5. $224 - 124 - 185 + 173$ ----- 5= _____
6. $24.6 + 98.6 - 74.6 - 186 - 99.9$ ----- 6= _____
7. $(1.59 + 0.614 - 0.64) - (\pi + 0.991)$ ----- 7= _____
8. $1.28 - 0.919 + 0.504 - 1.16 - 0.416$ ----- 8= _____
9. $352 \times 320 \times 27.2$ ----- 9= _____
10. $169 \times 56.5 \times 84.4 \times 44.4$ ----- 10= _____
11. Jims' BB gun fires BBs at 2.23×10^2 feet per second. Bullets from Mattis' M16 travel at 3.30×10^3 feet per second. Calculate the positive difference between these two speeds. ----- 11= _____ ft./sec.
12. The five wettest places on Earth receive 467, 411, 463, 464, and 453 inches of rain per year. Calculate the range of these inches of rainfall. ----- 12= _____ in.
13. What percent of a million is ten? ----- 13= _____ %

14. $(80/175)[132 - 108]$ ----- 14=_____

15. $72/[248 \times 167 \times 152]$ ----- 15=_____

16. $\{-352/191\} \left[\frac{570}{430 + 307} \right]$ ----- 16=_____

17. $\left[\frac{72}{194} \right] [(219/230) + 0.483]$ ----- 17=_____

18. $\frac{[0.0117/(0.0081)]/3.65}{(74.1 \times 56)(0.0379)}$ ----- 18=_____

19. $\left[\frac{(167 + 130)}{96/73} \right] \left[\frac{0.0195}{0.00456} \right]$ ----- 19=_____

20. $\frac{(\pi)(4/4)(9/8)}{120}$ ----- 20=_____

21. $(0.17)[17/71 \times 91/36] - 0.0457$ ----- 21=_____

22. $\frac{[-(910 + 5340)(8660 - 2780)]}{(0.547/(387))}$ ----- 22=_____

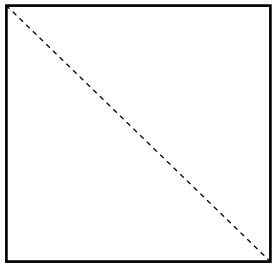
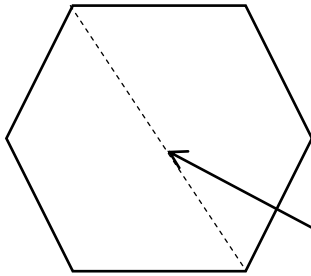
23. $\frac{(2620 \times 3320)/4740}{(4390 \times 0.0986) + 296}$ ----- 23=_____

24. At the gas pump, the number of gallons reads 21.672 and the total cost reads \$47.36. Calculate the price per gallon. ----- 24=\$_____

25. One of the angles in an isosceles triangle measures 105.21° . Calculate the measure of one of the other angles in degrees. ---- 25=_____°

26. Two angles are supplementary. One measures one-sixth of the other. Calculate the measure of the smallest angle in degrees. ----- 26=_____°

27. $\frac{(0.0127 - 0.0202)(\pi + 3.14)}{(1.04 \times 10^{12})}$ ----- 27=_____
28. $(482) \left[(37.1/34.7)(0.00144 + 5.20 \times 10^{-4}) \right]$ ----- 28=_____
29. $\frac{(1.05 \times 10^6) + (5.59 \times 10^5)}{(-4.88)(\pi) - 2.37}$ ----- 29=_____
30. $(11.4) \left[(3.75 \times 10^{12}) - (5.86 \times 10^{12}) \right]$ ----- 30=_____
31. $\frac{1}{-1120} + \frac{1}{(670 - 1540)}$ ----- 31=_____
32. $(0.00642) \left[\frac{74.8}{(6.79 \times 10^{-10})} \right]$ ----- 32=_____
33. $\left[\frac{1/645}{1/603} \right] + [0.271]$ ----- 33=_____
34. $\frac{1}{675} - \frac{1}{101} + \frac{1}{109}$ ----- 34=_____
35. Calculate the reciprocal of the cubed root of ten to the fiftieth power. ----- 35=_____
36. The size of a Poofla decreased from one hundred thousand to eight hundred fifty. Calculate the percent decrease. ----- 36=_____%

SQUARE	REGULAR HEXAGON
	
Perimeter = 8223 Diagonal = ?	Perimeter = 500100 = ?
37=_____	38=_____

39. $(0.0817 + 0.13)^2(0.207 + 0.161)^2$ ----- 39=_____

40. $\left[\frac{5.9}{1.6}\right](4.13 + 4.83)^4$ ----- 40=_____

41. $\left[\frac{367 + (1/(0.002))}{(1780/949) - 1.09}\right]^2$ ----- 41=_____

42. $\sqrt{2150 - 478 + 3610} - \sqrt{3060}$ ----- 42=_____

43. $(1/\pi)^3 \sqrt[3]{\frac{0.0683 + 0.0638}{6.93 - 3.37}}$ ----- 43=_____

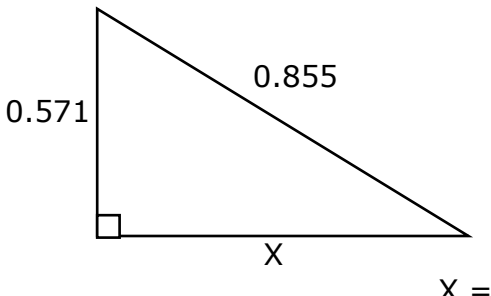

44. $\sqrt{28.5} + \sqrt{38.2 + 5.83} - (\pi)\sqrt{35.9}$ ----- 44=_____

45. $\sqrt[4]{0.676 - 603/1060} + 1/\sqrt{2230 + 6720}$ ----- 45=_____

46. $\frac{(301 + 44.8)^{1/4}}{(577 - 78.8)^{1/2}}$ ----- 46=_____

47. The sum of two positive integers is 729. Their difference is 85.
Calculate the value of the smaller integer. ----- 47=_____INT.

48. Calculate the slope of the line given by the equation $6x - 5y = 7$. 48=_____

RIGHT TRIANGLE	RIGHT TRIANGLE X
 <p style="text-align: right; margin-top: 10px;">$X = ?$</p>	 <p style="text-align: right; margin-top: 10px;">$X = ?$</p>
49=_____	50=_____

$$51. \quad \frac{(1.27 \times 10^5 + 1.10 \times 10^5 - 61900)^2}{\sqrt{16.2 + 3.97 + 20.1}} \quad \text{-----} \quad 51 = \underline{\hspace{2cm}}$$

$$52. \quad \left[\frac{41000 + 9500 + \sqrt{2.47 \times 10^9 + 2.34 \times 10^9}}{596/751} \right]^3 \quad \text{-----} \quad 52 = \underline{\hspace{2cm}}$$

$$53. \quad \left[\frac{\sqrt{\sqrt{5230 - 1190}}}{-(0.886 - 0.695)} \right]^2 [0.142 + 0.101] \quad \text{-----} \quad 53 = \underline{\hspace{2cm}}$$

$$54. \quad \sqrt{\frac{(2080)(21000)}{(3630)(1.54 \times 10^5)}} - 0.0364 + 0.273 \quad \text{-----} \quad 54 = \underline{\hspace{2cm}}$$

$$55. \quad (1.11)^2 \sqrt{(35)/(93)} - (0.558 + 0.331) \quad \text{-----} \quad 55 = \underline{\hspace{2cm}}$$

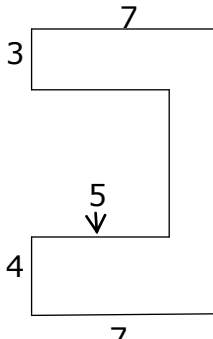
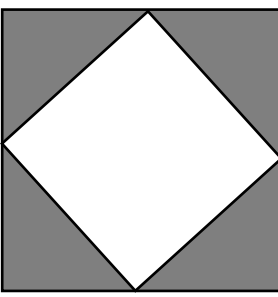
$$56. \quad 0.0984 + \sqrt{(220)/(5290)} - (0.165 + 0.128)^2 \quad \text{-----} \quad 56 = \underline{\hspace{2cm}}$$

$$57. \quad (\text{rad}) \sin(45.8) + (50.6/8.39) \quad \text{-----} \quad 57 = \underline{\hspace{2cm}}$$

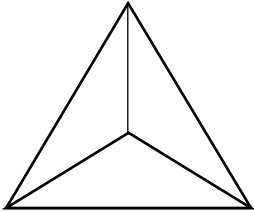
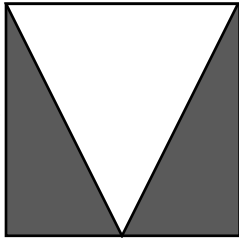
$$58. \quad \sqrt{\frac{(328)(2450)}{(577) + (189)}} - 81.7 \quad \text{-----} \quad 58 = \underline{\hspace{2cm}}$$

59. The diameter of a sphere is 83.2 feet. Calculate the surface area of the sphere in square feet. ----- 59 = ft.²

60. Calculate the probability of rolling a sum of 5 on a standard pair of dice. ----- 60 =

POLYGON	SQUARES
 <p style="text-align: center;">All angles are right angles</p> <p style="text-align: right;">Area = ?</p> <p>61 = _____</p>	 <p style="text-align: right;">Edge of small square = 2521</p> <p style="text-align: right;">Shaded Area = ?</p> <p>62 = _____</p>

63. $\frac{27!/15!}{12! + 11!}$ ----- 63 = _____
64. (deg) $\frac{\cos(1.03^\circ)}{163}$ ----- 64 = _____
65. (deg) $[(450)\cos(19.5^\circ)]$ ----- 65 = _____
66. (deg) $\sin(17.7^\circ - 18.2^\circ) + 0.00409$ ----- 66 = _____
67. (deg) $(5560 - 2600)\sin(20.5^\circ) + 756$ ----- 67 = _____
68. (rad) $(1.28)\cos(10)$ ----- 68 = _____
69. (deg) $\frac{\sin(39.9^\circ)}{\tan(39.9^\circ)}[82.3]$ ----- 69 = _____
70. $(222 - 213)^{0.112 - 0.205}$ ----- 70 = _____
71. Calculate the 31st triangular number. ----- 71 = _____ INT.
72. Chuck rides his bike 27 miles in 4 hours against the wind. He turns around and returns the same 27 miles in 3.23 hours with the wind. Calculate the rate of the wind. ----- 72 = _____ mph.

<p style="text-align: center;">TETRAHEDRON</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: right;"> <p>Edge = 27</p> <p>Surface Area = ?</p> </div> </div> <p>73= _____</p>	<p style="text-align: center;">ISOSCELES TRIANGLE AND SQUARE</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: right;"> <p>521</p> <p>Shaded Area = ?</p> </div> </div> <p>74= _____</p>
---	---

75. $\frac{\text{Log}(833 + 574)}{790 - 2940}$ ----- 75= _____

76. $\frac{0.025 + \sqrt{(0.0831)(0.0677)} + (0.0582)(0.384)}{\sqrt{\sqrt{19.3 + 7.88}}}$ ----- 76= _____

77. $(10100)_{10}^{(0.748)(4.42)}$ ----- 77= _____

78. $\text{Ln}\left[\frac{74.5 + 66.2 + 30.9}{59.2 - 24.6 - 31.9}\right]$ ----- 78= _____

79. $1 + 3 + 5 + \dots + 975$ ----- 79= _____

80. $-\frac{1}{(9.3)} + \frac{1}{3(9.3)^3} - \frac{1}{5(9.3)^5} + \frac{1}{7(9.3)^7}$ ----- 80= _____

2017-2018 TMSCA Middle School Calculator Test 3 Answer Key

Page 1	Page 2	Page 3	Page 4
1 = 8610 = 8.61×10^3	14 = 11.0 = 1.10×10^1	27 = -4.53×10^{-14}	39 = 0.00607 = 6.07×10^{-3}
2 = -53.0 = -5.30×10^1	15 = 1.14×10^{-5}	28 = 1.01 = 1.01×10^0	40 = 23800 = 2.38×10^4
3 = 592 = 5.92×10^2	16 = -1.43 = -1.43×10^0	29 = -90900 = -9.09×10^4	41 = 1.22×10^6
4 = -24.0 = -2.40×10^1	17 = 0.533 = 5.33×10^{-1}	30 = -2.41×10^{13}	42 = 17.4 = 1.74×10^1
5 = 88.0 = 8.80×10^1	18 = 0.00252 = 2.52×10^{-3}	31 = -0.00204 = -2.04×10^{-3}	43 = 0.106 = 1.06×10^{-1}
6 = -237 = -2.37×10^2	19 = 966 = 9.66×10^2	32 = 7.07×10^8	44 = -6.85 = -6.85×10^0
7 = -2.57 = -2.57×10^0	20 = 0.0295 = 2.95×10^{-2}	33 = 1.21 = 1.21×10^0	45 = 0.583 = 5.83×10^{-1}
8 = -0.711 = -7.11×10^{-1}	21 = 0.0572 = 5.72×10^{-2}	34 = 0.000755 = 7.55×10^{-4}	46 = 0.193 = 1.93×10^{-1}
9 = 3.06×10^6	22 = -2.60×10^{10}	35 = 2.15×10^{-17}	47 = 322 INT.
10 = 3.58×10^7	23 = 2.52 = 2.52×10^0		48 = 1.20 = 1.20×10^0
11 = 3080 = 3.08×10^3	24 = \$2.19	36 = 99.2 = 9.92×10^1	49 = 0.636 = 6.36×10^{-1}
12 = 56.0 = 5.60×10^1	25 = 37.4 = 3.74×10^1	37 = 2910 = 2.91×10^3	50 = 503 = 5.03×10^2
13 = 0.00100 = 1.00×10^{-3}	26 = 25.7 = 2.57×10^1	38 = 167000 = 1.67×10^5	

2017-2018 TMSCA Middle School Calculator Test 3 Answer Key

Page 5

$$51 = 4.83 \times 10^9$$

$$52 = 3.44 \times 10^{15}$$

$$53 = 423$$
$$= 4.23 \times 10^2$$

$$54 = 0.516$$
$$= 5.16 \times 10^{-1}$$

$$55 = -0.133$$
$$= -1.33 \times 10^{-1}$$

$$56 = 0.216$$
$$= 2.16 \times 10^{-1}$$

$$57 = 7.00$$
$$= 7.00 \times 10^0$$

$$58 = -49.3$$
$$= -4.93 \times 10^1$$

$$59 = 21700$$
$$= 2.17 \times 10^4$$

$$60 = 0.111$$
$$= 1.11 \times 10^{-1}$$

Page 6

$$61 = 61.0$$
$$= 6.10 \times 10^1$$

$$62 = 6360000$$
$$= 6.36 \times 10^6$$

$$63 = 1.60 \times 10^7$$
$$64 = 0.00613$$
$$= 6.13 \times 10^{-3}$$

$$65 = 424$$
$$= 4.24 \times 10^2$$

$$66 = -0.00464$$
$$= -4.64 \times 10^{-3}$$

$$67 = 1790$$
$$= 1.79 \times 10^3$$

$$68 = -1.07$$
$$= -1.07 \times 10^0$$

$$69 = 63.1$$
$$= 6.31 \times 10^1$$

$$70 = 0.815$$
$$= 8.15 \times 10^{-1}$$

$$71 = 496 \text{ INT.}$$

$$72 = 0.805$$
$$= 8.05 \times 10^{-1}$$

Page 7

$$73 = 1260$$
$$= 1.26 \times 10^3$$

$$74 = 136000$$
$$= 1.36 \times 10^5$$

$$75 = -0.00146$$
$$= -1.46 \times 10^{-3}$$

$$76 = 0.0536$$
$$= 5.36 \times 10^{-2}$$

$$77 = 2.04 \times 10^7$$

$$78 = 4.15$$
$$= 4.15 \times 10^0$$

$$79 = 238000$$
$$= 2.38 \times 10^5$$

$$80 = -0.107$$
$$= -1.07 \times 10^{-1}$$

11. $3.3 \times 10^3 - 2.23 \times 10^2$

12. Range = 467- 411

13.
$$\frac{x}{100} = \frac{10}{1,000,000}$$

24.
$$\frac{\$47.36}{21.672}$$

25.
$$\frac{180 - 105.21}{2}$$

26. Smaller angle = x
Larger angle = 6x
 $x + 6x = 180$; $x = 180/7$

35.
$$\frac{1}{\sqrt[3]{10^{50}}}$$

36. On HP RPN calculator:
100,000 ENTER 850; %
chg key
Without the RPN calculator
 $\left(\frac{850 - 100,000}{100,000}\right) 100$
Don't include the negative on
this answer since the word
"decrease" implies the
negative.

37. $Side = \frac{8223}{4}$
Diagonal = side times $\sqrt{2}$
 $= \frac{8223}{4}(\sqrt{2})$

38. Diagonal to opposite
vertices on a hexagon = 2
sides or 1/3 of Perimeter.
$$\frac{500100}{3}$$

47. $x = \text{larger \#}; y = \text{smaller \#}$
$$\begin{cases} x + y = 729 \\ x - y = 85 \end{cases} \text{ OR } \begin{cases} x + y = 729 \\ -x + y = -85 \end{cases}$$

Add these two equations to
get $2y = 644$; $y = 322$ INT

48. Slope of $ax + by = c$ is
$$\frac{-a}{b} = \frac{-6}{-5}$$

49.
$$\sqrt{.855^2 - .571^2} = x$$

50.
$$\frac{\sin 65}{1} = \frac{x}{555}$$

$$x = 555 [\sin (65)]$$

59. $SA = 4\pi r^2 = 4\pi \left(\frac{83.2}{2}\right)^2$

60. There are 4 ways to roll a
5 on two dice:
(1,4),(4,1),(2,3),(3,2). There
are 36 possible rolls.
$$\frac{4}{36}$$

61. Divide the figure into a
long rectangle on the right
that is 2 x 13; a shorter
rectangle at the top that is 3 x
5; and one at the bottom that
is 4 x 5.
Area = 2 (13) + 3(5) + 4(5)

62. The white area = the
shaded area = 2521^2

71.
$$\frac{n(n+1)}{2} = \frac{31(32)}{2}$$

72. **b = bike & w = wind rate**

	R	T	D
against	b-w	4	27
with	b+w	3.23	27

Equations:

$$\begin{cases} 4(b-w) = 27 \\ 3.23(b+w) = 27 \end{cases}$$

$$= \begin{cases} b-w = \frac{27}{4} \\ b+w = \frac{27}{3.23} \end{cases}$$

$$= \begin{cases} -b+w = -\frac{27}{4} \\ b+w = \frac{27}{3.23} \end{cases}$$

Adding these

$$2w = -\frac{27}{4} + \frac{27}{3.23}$$

$$w = \frac{-\frac{27}{4} + \frac{27}{3.23}}{2}$$

73. Tetrahedron = 4
equilateral triangles

$$4 \left(\frac{side^2 \sqrt{3}}{4} \right) = 27^2 \sqrt{3}$$

74. Shaded area = $\frac{1}{2}$ of
square =

$$\frac{521^2}{2}$$