

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

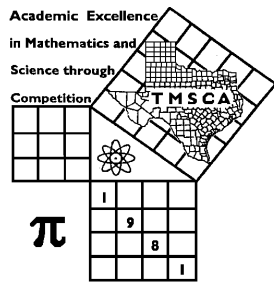
PLACE LABEL BELOW

Name: _____ School: _____

SS/ID Number: _____ City: _____

Grade: 5 6 7 8

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



TMSCA MIDDLE SCHOOL CALCULATOR

TEST #3 ©

NOVEMBER 5, 2016

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*, 1.23x10^{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.

2016-2017 TMSCA Middle School Calculator Test 3

1. $8010 + 7000$ ----- 1= _____

2. $24 - 28 - 11$ ----- 2= _____

3. $7.8 + 12.2 + 16.1$ ----- 3= _____

4. $14 - 20 - \pi + 13$ ----- 4= _____

5. $342 - 307 - 830 + 694$ ----- 5= _____

6. $19 - 114 - 152 - 51.2 + 28.5$ ----- 6= _____

7. $0.718 + \pi - 1.04 + 0.968 + 0.237$ ----- 7= _____

8. $\pi + 4.46 + 4.37 + 4.48 + 3.77$ ----- 8= _____

9. $72.1 \times 604 \times 53.3$ ----- 9= _____

10. $346 \times 583 \times 254 \times 90.3$ ----- 10= _____

11. Calculate the 5th root of pi to the 31st power. ----- 11= _____

12. Calculate the median of all the palindromes greater than ten and less than 100. ----- 12= _____ INT.

13. A certain set has 54 elements. Calculate the number of subsets that can be made from this set. ----- 13= _____

14. $(514/450)[158 - 403]$ -----14= _____

15. $49/[79 \times 76 \times 16]$ -----15= _____

16. $\left[\frac{141}{122}\right] [(102/194) + 0.23]$ -----16= _____

17. $\{165/267\} \left[\frac{88}{79 + 215}\right]$ -----17= _____

18. $\left[\frac{(0.074 + 0.0985)}{239/31}\right] \left[\frac{0.67}{0.284}\right]$ -----18= _____

19. $\frac{(55/109) + (47/64)}{(0.0591 - 0.0863)}$ -----19= _____

20. $\frac{(1090)(3.24)}{1.31} (1.2 - 3.49)$ -----20= _____

21. $(0.00692)[337/228 \times 344/242] - 0.00283$ -----21= _____

22. $\frac{(3700 \times 8650)/4360}{(7600 \times 0.179) + 1350}$ -----22= _____

23. $\left[\frac{1510 + 710}{1490 - 159}\right] \left[\frac{602}{752}\right]$ -----23= _____

24. Calculate the geometric mean of the largest 2 digit prime number and the square root of pi. -----24= _____

25. If the radius of a circle is doubled, calculate the ratio of the area of the original circle to the new circle. -----25= _____

26. A car salesman was trying to sell a certain used car for \$3,499.99. After a while on the lot, he reduced the price by 10%. It still did not sell so he reduced it again by 5%. Calculate the price of the car after the reductions. -----26=\$ _____

27. $\frac{(1.61 \times 10^{10}) + (5.08 \times 10^{10})}{(-0.359)(0.437) - 0.0691}$ -----27= _____

28. $(476)[(0.529/1.5)(10.6 + 17)]$ -----28= _____

29. $\frac{(0.103 + 0.0982)(0.621 + 0.386)}{(1.75 \times 10^{11})}$ -----29= _____

30. $(1.2) \left[\frac{172}{(4.95 \times 10^9)} \right]$ -----30= _____

31. $\frac{(0.196 + 0.163)}{(4.30 \times 10^{11})}$ -----31= _____

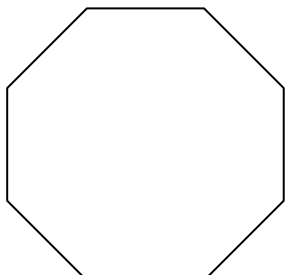
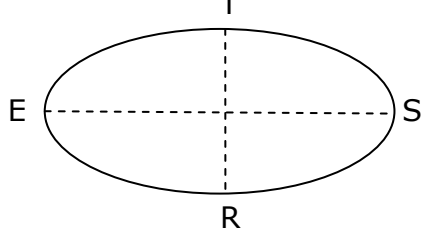
32. $\frac{1}{14400} + \frac{1}{(\pi)(8970 - 3090)}$ -----32= _____

33. $\frac{1}{707} - \frac{1}{339} + \frac{1}{258}$ -----33= _____

34. $1/(0.0467 - 0.0225) - 1/(0.0191)$ -----34= _____

35. If $y(x) = 2x^5 + 8x - 42$, calculate $y(13)$. -----35= _____

36. Two squares are similar. The area of the larger square is 5 times that of the smaller square. Calculate the ratio of a side of the larger square to that of a side from the smaller square. -----36= _____

<p>Regular Octagon</p>  <p style="text-align: right;">24.98</p> <p style="text-align: right;">Perimeter = ?</p> <p>37= _____</p>	<p>Ellipse</p>  <p style="text-align: right;">TR = 1.80 ES = 3.78</p> <p style="text-align: right;">Area = ?</p> <p>38= _____</p>
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39. $(0.0634 + 0.2 + 0.0607)^2(25.5 + 67.8)^2$ -----39= _____

40. $\left[\frac{457 + (1/(0.00167))}{(347/981) - 0.196} \right]^2$ -----40= _____

41. $\left[\frac{3.05}{3950} \right](41.9 + 49.5)^4$ -----41= _____

42. $\sqrt{5360 - 3520 + 2190} - \sqrt{8930}$ -----42= _____

43. $(1/(0.00194))(20500 - 13100)^2$ -----43= _____

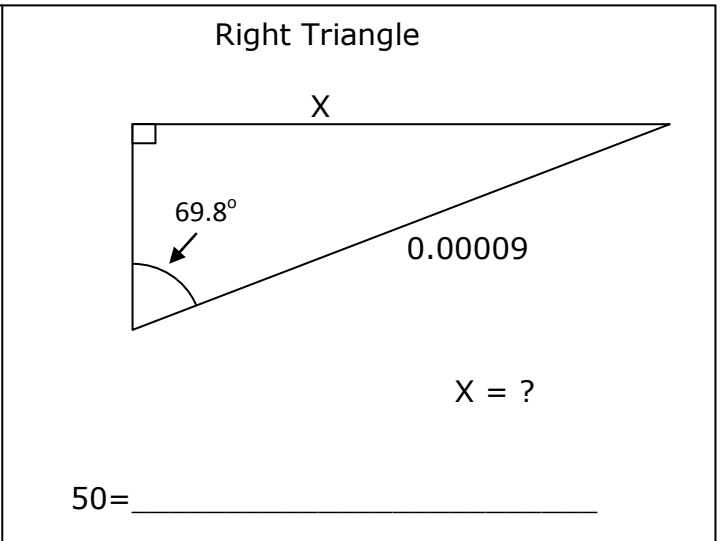
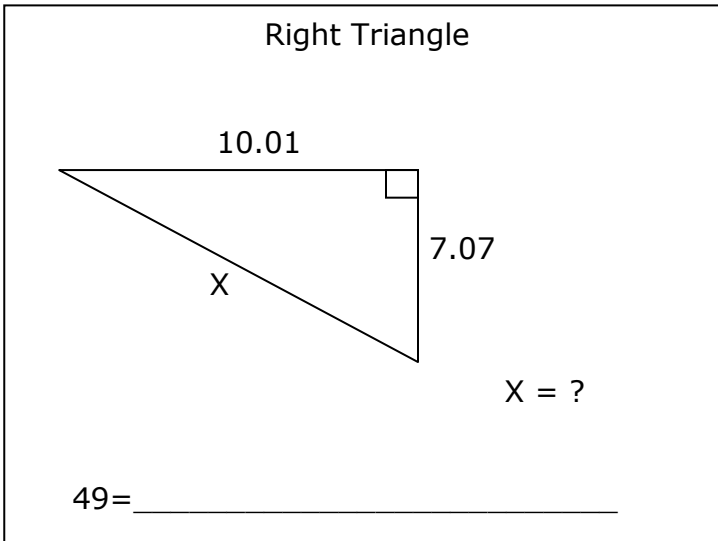
44. $(3150)\sqrt{30900 + 73900 + 94400}$ -----44= _____

45. $\frac{(21200 + 10100)^{1/5}}{(217 - 80.2)^{1/4}}$ -----45= _____

46. $\sqrt{3.88 - 99.6/126} + 1/\sqrt{0.0435 + 0.0469}$ -----46= _____

47. Calculate the value of t in the following equation.
 $(4/3)t - 1.56 = 63.24$ -----47= _____

48. Calculate the value of the 21st triangular number. -----48= _____ INT.



51. $\sqrt{\frac{53600}{(37.2)(32)} + \frac{(0.337 - 0.769)}{(0.0198 + 0.0146)}} \dots\dots\dots 51 = \underline{\hspace{2cm}}$

52. $\frac{\sqrt{1.23 + \pi + 0.449}}{(6.3 - 11.2 + 7.06)^2} \dots\dots\dots 52 = \underline{\hspace{2cm}}$

53. $\left[\frac{36.7 - 14.1 + \sqrt{5.37 \times 10^5 / 2400}}{-5.04 + 5.82} \right]^3 \dots\dots\dots 53 = \underline{\hspace{2cm}}$

54. $15300 + \sqrt{(13200)(40000)} - (35900 + 22700) \dots\dots\dots 54 = \underline{\hspace{2cm}}$

55. $\sqrt{\frac{1/(91.2 - 45.3)}{(4.06)(26.9 + 11.4)^2}} \dots\dots\dots 55 = \underline{\hspace{2cm}}$

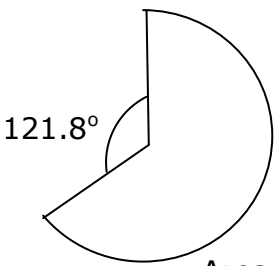
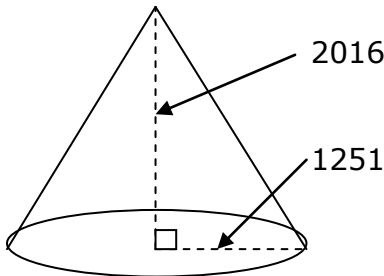
56. $\sqrt{\frac{(20200)(1.41 \times 10^5)}{(9400)(13900)}} - 4.5 + 1.34 \dots\dots\dots 56 = \underline{\hspace{2cm}}$

57. $(\text{deg}) \tan(51.6^\circ) + (1600/1060) \dots\dots\dots 57 = \underline{\hspace{2cm}}$

58. $(\text{rad}) \sin(23.1) + (30/21.7) \dots\dots\dots 58 = \underline{\hspace{2cm}}$

59. Calculate the slope of the line that is perpendicular to $y = (2/3)x + 8$ $\dots\dots\dots 59 = \underline{\hspace{2cm}}$

60. Calculate how many liters of water must be added to 500 liters of a 82% acid solution in order to obtain a 25% acid solution. $\dots\dots\dots 60 = \underline{\hspace{2cm}}$

<p style="text-align: center;">Sector Of A Circle</p>  <p style="text-align: right;">Radius = 20006</p> <p style="text-align: center;">Area of enclosed Sector = ?</p> <p>61= _____</p>	<p style="text-align: center;">Right Circular Cone</p>  <p style="text-align: center;">Lateral Surface Area = ?</p> <p>62= _____</p>
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63. $\frac{9!}{31!}$ -----63= _____

64. $(2.52 \times 10^6 - 1.90 \times 10^6)^4 (5.21 \times 10^9)$ -----64= _____

65. $(\text{deg}) \frac{\cos(6.29^\circ)}{5570}$ -----65= _____

66. $(\text{deg}) \cos(2.54^\circ - 0.956^\circ) + 0.177$ -----66= _____

67. $(\text{deg}) (21.8 - 68) \tan(235^\circ) + 29.6$ -----67= _____

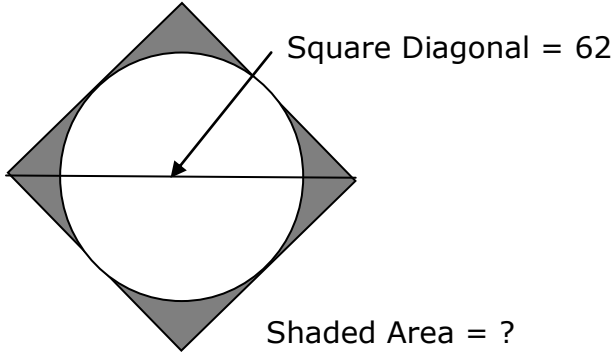
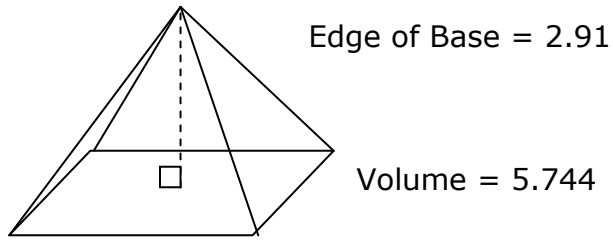
68. $(\text{deg}) \frac{\sin(74.2^\circ)}{\tan(74.2^\circ)} [3.32]$ -----68= _____

69. $(\text{rad}) \sin[(6.69 - 17.1)(5.44)]$ -----69= _____

70. $(41.6 - 17.2 + 6.77)^{2/3}$ -----70= _____

71. Two trains start toward each other from stations that are 300 miles apart. One train averages 62 mph and the other train averages 54 mph. Calculate the number of minutes they will travel till they meet. -----71= _____ min.

72. Calculate the probability of drawing the double 5 domino from a set of double 6 dominoes. A set of double six dominoes contains double blank to double 6. -----72= _____

<p style="text-align: center;">Circle Inscribed In A Square</p>  <p style="text-align: right;">Shaded Area = ?</p> <p>73= _____</p>	<p style="text-align: center;">Square Based Pyramid</p>  <p style="text-align: right;">Edge of Base = 2.91</p> <p style="text-align: right;">Volume = 5.744</p> <p style="text-align: right;">Height = ?</p> <p>74= _____</p>
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75. $\frac{10.8 + \sqrt{(6.36)(10.5) + (0.777)(3.46)}}{\sqrt{\sqrt{26.4 + 44.1}}}$ -----75= _____

76. $\ln\left[\frac{71.7 + 140 + 27.9}{115 + 121 - 30.5}\right]$ -----76= _____

77. $\text{Log}\sqrt{\frac{26.4 - 22.7}{(2.54)(0.286)}}$ -----77= _____

78. $(0.0712)^\pi(6.49)^2(28.9 - 22.4)^4$ -----78= _____

79. $1 + 2 + 3 + \dots + 577$ -----79= _____

80. $1 + \frac{(0.66)^4}{2} - \frac{(0.66)^6}{6} + \frac{(0.66)^8}{24} - \frac{(0.66)^{10}}{120}$ -----80= _____

2016-2017 TMSCA Middle School Calculator Test 3 Answer Key

Page 1	Page 2	Page 3	Page 4
1 = 15000 = 1.50×10^4	14 = -280 = -2.80×10^2	27 = -2.96×10^{11}	39 = 914 = 9.14×10^2
2 = -15.0 = -1.50×10^1	15 = 0.000510 = 5.10×10^{-4}	28 = 4630 = 4.63×10^3	40 = 4.48×10^7
3 = 36.1 = 3.61×10^1	16 = 0.873 = 8.73×10^{-1}	29 = 1.16×10^{-12}	41 = 53900 = 5.39×10^4
4 = 3.86 = 3.86×10^0	17 = 0.185 = 1.85×10^{-1}	30 = 4.17×10^{-8}	42 = -31.0 = -3.10×10^1
5 = -101 = -1.01×10^2	18 = 0.0528 = 5.28×10^{-2}	31 = 8.35×10^{-13}	43 = 2.82×10^{10}
6 = -270 = -2.70×10^2	19 = -45.6 = -4.56×10^1	32 = 0.000124 = 1.24×10^{-4}	44 = 1.41×10^6
7 = 4.02 = 4.02×10^0	20 = -6170 = -6.17×10^3	33 = 0.00234 = 2.34×10^{-3}	45 = 2.32 = 2.32×10^0
8 = 20.2 = 2.02×10^1	21 = 0.0117 = 1.17×10^{-2}	34 = -11.0 = -1.10×10^1	46 = 5.08 = 5.08×10^0
9 = 2.32×10^6	22 = 2.71 = 2.71×10^0	35 = 743000 = 7.43×10^5	47 = 48.6 = 4.86×10^1
10 = 4.63×10^9	23 = 1.34 = 1.34×10^0	36 = 2.24 = 2.24×10^0	48 = 231 INT.
11 = 1210 = 1.21×10^3	24 = 13.1 = 1.31×10^1	37 = 200 = 2.00×10^2	49 = 12.3 = 1.23×10^1
12 = 55 INT.	25 = 0.250 = 2.50×10^{-1}	38 = 5.34 = 5.34×10^0	50 = 0.0000845 = 8.45×10^{-5}
13 = 1.80×10^{16}	26 = \$2992.49		

2016-2017 TMSCA Middle School Calculator Test 3 Answer Key

Page 5

$$51 = -5.85$$
$$= -5.85 \times 10^0$$

$$52 = 0.471$$
$$= 4.71 \times 10^{-1}$$

$$53 = 112000$$
$$= 1.12 \times 10^5$$

$$54 = -20300$$
$$= -2.03 \times 10^4$$

$$55 = 0.00191$$
$$= 1.91 \times 10^{-3}$$

$$56 = 1.51$$
$$= 1.51 \times 10^0$$

$$57 = 2.77$$
$$= 2.77 \times 10^0$$

$$58 = 0.487$$
$$= 4.87 \times 10^{-1}$$

$$59 = -1.50$$
$$= -1.50 \times 10^0$$

$$60 = 1140$$
$$= 1.14 \times 10^3$$

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$$61 = 8.32 \times 10^8$$

$$62 = 9.32 \times 10^6$$

$$63 = 4.41 \times 10^{-29}$$

$$64 = 7.70 \times 10^{32}$$

$$65 = 0.000178$$
$$= 1.78 \times 10^{-4}$$

$$66 = 1.18$$
$$= 1.18 \times 10^0$$

$$67 = -36.4$$
$$= -3.64 \times 10^1$$

$$68 = 0.904$$
$$= 9.04 \times 10^{-1}$$

$$69 = -0.0816$$
$$= -8.16 \times 10^{-2}$$

$$70 = 9.90$$
$$= 9.90 \times 10^0$$

$$71 = 155$$
$$= 1.55 \times 10^2$$

$$72 = 0.0357$$
$$= 3.57 \times 10^{-2}$$

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$$73 = 412$$
$$= 4.12 \times 10^2$$

$$74 = 2.03$$
$$= 2.03 \times 10^0$$

$$75 = 7.48$$
$$= 7.48 \times 10^0$$

$$76 = 0.154$$
$$= 1.54 \times 10^{-1}$$

$$77 = 0.354$$
$$= 3.54 \times 10^{-1}$$

$$78 = 18.7$$
$$= 1.87 \times 10^1$$

$$79 = 167000$$
$$= 1.67 \times 10^5$$

$$80 = 1.08$$
$$= 1.08 \times 10^0$$

TMSCA 16-17 MS CA Test #3 Solutions to Word and Geometry Problems

11. $\sqrt[5]{\pi^{31}}$

12. Palindromes read the same forward or backward
11,22,33,44,55,66,77,88,99.
The median is the middle number in this group = 55

13. Subsets = 2^n , n = number of elements in the set. 2^{54}

24. Geometric Mean of two numbers is $\sqrt{ab} = \sqrt{97(\sqrt{\pi})}$

25. Since $A = \pi r^2$, when the radius is doubled, the area is r^2 or 2^2 times as big.

Therefore the new area is 4 times as big as the original.
The ratio of original to new area is $\frac{1}{4}$

26. Reducing 10% means paying 90%; reducing 5% means paying 95%.

Newest price:
 $3499.99(.9)(.95)$ See SHOW key for cents.

35. $2x^5 + 8x - 42$
 $\gamma(13) = 2(13)^5 + 8(13) - 42$

36. The ratio of the sides is $\sqrt{5}$

37. 24.98(8)

38. $\pi \left(\frac{1.80}{2}\right) \left(\frac{3.78}{2}\right)$

47. $t = \frac{63.24+1.56}{\frac{4}{3}}$

48. $\frac{n(n+1)}{2} = \frac{21(22)}{2}$

49. $\sqrt{10.01^2 + 7.07^2}$

50. $\frac{\sin 69.8}{1} = \frac{x}{.00009}$
 $x = .00009(\sin 69.8)$

59. Perpendicular slope is $\frac{-3}{2}$

60.

Liters	%acid	Pure acid
500	82	.82(500)
x	0	0
500+x	25	.25(500+x)

First row is original; 2nd row is water added; 3rd row is mixture. The amount of acid stays the same. Equation:

$$.82(500) = .25(500 + x)$$

$$410 = 125 + .25x$$

$$\frac{410 - 125}{.25} = x$$

61. Degrees in enclosed sector = $360 - 121.8 = 238.2$

$$A = \frac{238.2}{360} \pi(20006)^2$$

62. Slant ht. = $\sqrt{2016^2 + 1251^2}$
 $LSA = \pi r s$
 $\pi(1251)\sqrt{2016^2 + 1251^2}$

71. $62x + 54x = 300$
 $116x = 300; x = \frac{300}{116}$

Multiply by 60 to change to minutes.

72. There are 28 dominoes in the set. Probability is $\frac{1}{28}$

73. Area of square = $\frac{d^2}{2}$
 $A = \frac{62^2}{2}$ Draw a radius that forms a right isosceles triangle bisecting the side of the square. Radius is $\frac{62}{2} \div \sqrt{2}$
Shaded area = square minus circle =

$$\frac{62^2}{2} - \pi \left(\frac{62}{2} \div \sqrt{2}\right)^2$$

74. $V = \frac{1}{3} Bh$
 $5.744 = \frac{1}{3} (2.91)^2 h$
 $h = \frac{5.744(3)}{(2.91)^2}$