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 # 7 ©

J A N U A R Y 1 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$^.$10^2, 1.230x10^2, 1.23*10^2, 0.19, 1.9x10^{-2}, 19.0x10^{-3}, 1.90E-02
      2. Plus or minus one digit error in the third significant digit is permitted.
   B. For stated problems:
      1. Except for integer, dollar sign, and significant digit problems, as detailed below, answers to stated problems should be written with three significant digits.
      2. Integer problems are indicated by (integer) in the answer blank. Integer problems answers must be exact, no plus or minus one digit, no decimal point or scientific notation.
      3. Dollar sign ($) 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.

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1. −684 − 1070 -- 1=_____

2. −38 − 7 − 16 -- 2=_____

3. 273 + 81 + 320 --- 3=_____

4. π + 6 + 9 + 6 -- 4=_____

5. −72 − 100 − 141 − 22 -- 5=_____

6. 193 + 254 − 195 − 84.9 − 36.2 ----------------------------- 6=_____

7. 2.29 + 3.76 − 4.49 + 2.56 + 1.88 ------------------------- 7=_____

8. (1.46 − 0.957) + (1.33 − 0.452 − 0.72) ------------------ 8=_____

9. 42.7 x 57.5 x 35.5 --- 9=_____

10. 4760 x 2560 x 365 x 3560 -------------------------------- 10=_____

11. The width of a rectangle is 2.05×10^3 meters. The perimeter of the
    rectangle is 2.14×10^4 meters. Calculate the area of the rectangle
    in square meters. --- 11=_____m^2

12. Calculate what percent 125 meters is of a mile. ------------------ 12=_____%

13. Jake purchased 5 items that cost $276.95 each. If the sales tax is
    8 ½ %, calculate the amount he will have to pay in sales tax. --- 13=$_____

14.   (297)[466 x 121 x 953] ------------------------------------ 14=_____

15.   (58/36)[23 − 31] -- 15=_____

16. $\{156/179\}\left[\dfrac{134}{130 + 264}\right]$ ------------------------- 16=_____

17.   {(−101)(55 − 78)(109)} − 34900 ----------------------- 17=_____

18. $\dfrac{[0.0416/(0.0548)]/1.67}{(4.54 \text{ x } 1.94)(0.0705)}$ ------------------------------------ 18=_____

19. $\left[\dfrac{218/244}{281/301}\right]\{0.00651 + 0.00906 − 0.00307\}$ -------------- 19=_____

20. $\dfrac{50}{(60 − 218)} − \dfrac{(206 − 53)}{132}$ ------------------------------------ 20=_____

21. $\dfrac{(0.0077)(14)}{1.52\text{x}10^{-4}}$ (0.0504 − 0.0508) ------------------------- 21=_____

22. $\left[\dfrac{452 + 1040}{1090 − 598}\right]\left[\dfrac{1110}{1410}\right]$ ------------------------------------ 22=_____

23. $\dfrac{(\pi)(91/158)(167/61)}{(69/156)}$ ------------------------------------ 23=_____

24. Calculate the Root Mean Square of the first five prime numbers.   24=_____

25. Sherry is a real estate agent that sells homes for a living. She
    lists and sells 5 homes. The agency she works for pays her $750
    for each house she sells and an 6% commission. Calculate the
    amount she would make if the 5 houses she sold averaged
    $287,550.00. -- 25=$_____

26.   The sum of three consecutive odd integers is 1,593. Calculate
         the value of the smallest integer. ------------------------------ 26=_____INT.

27. $\dfrac{(0.0247 + 0.0103)(14.1 + 13.9)}{(1.31 \times 10^{11})}$ ----------------------- 27=_____

28. $[3730 - (3100 + 3560)] + [(-0.415)(3430 - 491)]$ ------ 28=_____

29. $\dfrac{(8.54 \times 10^{12}) + (1.74 \times 10^{13})}{(-0.00401)(0.00359) - 1.16 \times 10^{-5}}$ ---------------------- 29=_____

30. $\dfrac{(0.0306 + 0.0208)}{(2.80 \times 10^{11})}$ -------------------------------------- 30=_____

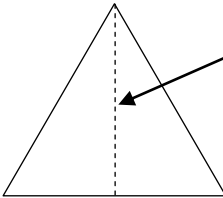31. $\dfrac{1}{31.1} + \dfrac{1}{(1740 - 1720)}$ -------------------------------- 31=_____
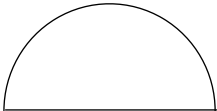
32. $\dfrac{1}{-0.0751} + \dfrac{1}{(\pi)(0.0183 - 0.0479)}$ ---------------------- 32=_____

33. $\left[\dfrac{1/3420}{1/3420}\right][2.45 \times 10^{5}]$ ------------------------------------ 33=_____

34. $1/(0.137 - 0.191) - 1/(-0.0158)$ ------------------------- 34=_____

35. Calculate the percent change from the number of feet in a mile to the number of cubic inches in a gallon. ------------------------- 35=_____%

36. Calculate -3679^{7111}. -- 36=_____

37.
SEMI-CIRCLE

Area = 34,579

Perimeter = ?

37=_____

38.
EQUILATERAL TRIANGLE

Height = 2.0015

Side = ?

38=_____

39. $$\dfrac{(46200 + 19300)^3}{(0.0143 - 0.0141)^2}$$ -- 39=_____

40. $$\sqrt[3]{\dfrac{9.93 + 9.97}{1150 - 1000}}$$ -- 40=_____

41. $(25.2 + 51.3 + 37.2)^2(1980 + 618)^2$ -------------------- 41=_____

42. $(163)\sqrt{504 + 342 + 507}$ ---------------------------------- 42=_____

43. $\sqrt{(1980/2020) + 0.927 - 0.916}$ -------------------------- 43=_____

44. $\sqrt{211 - 72.6 + 69.7} - \sqrt{183}$ ------------------------------ 44=_____

45. $\left[\sqrt[3]{(0.905/0.905)(4.57)}\right]^2$ ---------------------------------- 45=_____

46. $(22800)\sqrt{105 + 296 - 193}$ ---------------------------------- 46=_____

47. The sides of a certain quadrilateral are in the ratio 5:3:9:12. If the
    perimeter of the quadrilateral is 2,184 inches, calculate the length of
    the longest side. -- 47=_____in.

48. If the angles of a quadrilateral are in the same ratio as given in
    problem 47, calculate the measure of the smallest angle in
    degrees. -- 48=_____°

49.
RIGHT TRIANGLE

105
X

100.625

X = ?

49=_____

50.
RIGHT TRIANGLE

297   $X°$

990

$X° = ?$
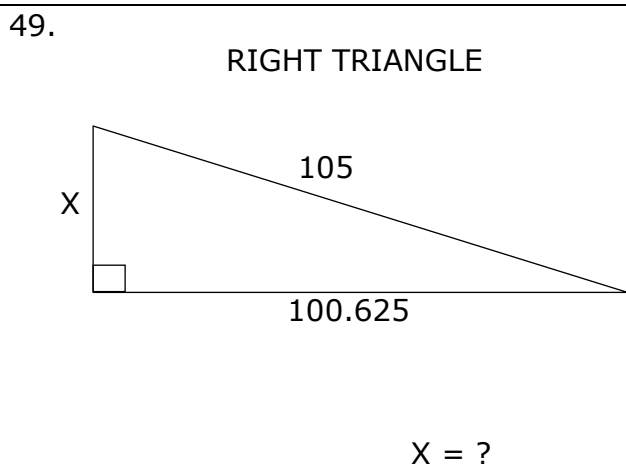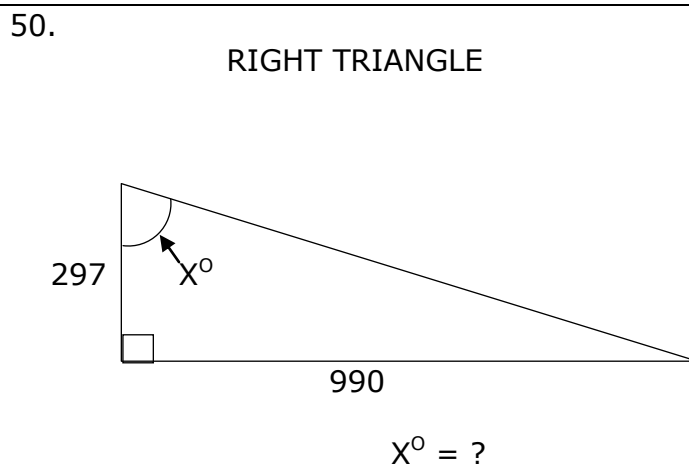
50=_____°

51. $\left[\dfrac{1330 - 1110 + \sqrt{2.16 \times 10^7 / 2710}}{-26.4 + 27.5} \right]^{-3}$ ----------------- 51=_____

52. $\dfrac{(0.391 + 0.613 - 0.649)^2}{\sqrt{0.705 + 0.219 + 0.113}}$ ----------------------------- 52=_____

53. $\sqrt{\dfrac{16.7}{(6.88 \times 10^5)(10300)}} + \dfrac{(0.894 - 1.07)}{(568 + 2800)}$ ----------------- 53=_____

54. $(8.59)^2 \sqrt{(6.83)/(13.6)} - (47.4 + 50.3)$ ------------------ 54=_____

55. $848 + \sqrt{(895)(840)} - (834 + 577)$ ----------------------- 55=_____

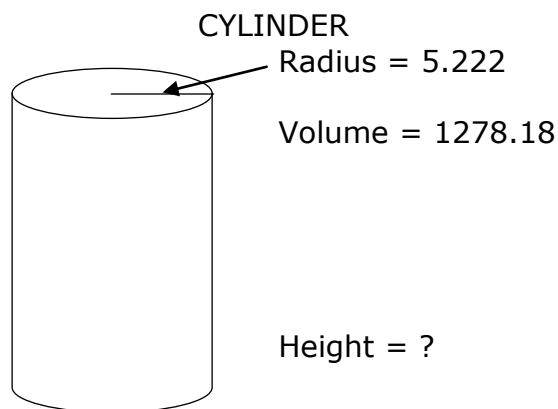56. $\sqrt{\dfrac{1/(267 - 54.5)}{(15.8)(149 + 78.9)^4}}$ --------------------------------- 56=_____

57. $\sqrt{\dfrac{1/(50.5 - 15.2)}{(130)(6740 + 5170)^3}}$ --------------------------------- 57=_____

58. $(\text{rad}) \sin(120) + (62.4/41)$ --------------------------------- 58=_____

59. A rocket must obtain a speed of 17,640 mph in order to reach space. Calculate this speed in meters per second. --------------- 59=_____mps
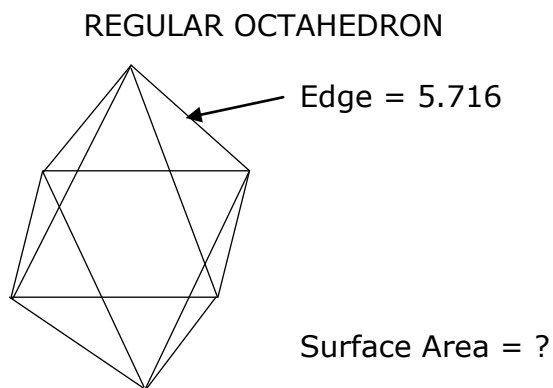
60. Calculate the 75th pentagonal number. --------------------------- 60=_____INT.

61.

CYLINDER

Radius = 5.222

Volume = 1278.18

Height = ?

61=_____

62.

REGULAR OCTAHEDRON

Edge = 5.716

Surface Area = ?

62=_____

63. $\dfrac{19! - 21!}{18!}$ -- 63=_____

64. (deg) $\dfrac{\sin(1.6°)}{1100}$ -- 64=_____

65. $(496 - \pi)e^{0.104}$ -- 65=_____

66. (rad) $\tan\left[\dfrac{(7.63)(\pi)}{(26.8)(59.6)}\right]$ ------------------------------------ 66=_____

67. (deg) $\sin(9.83° - 3.84°) + 0.0157$ ----------------------- 67=_____
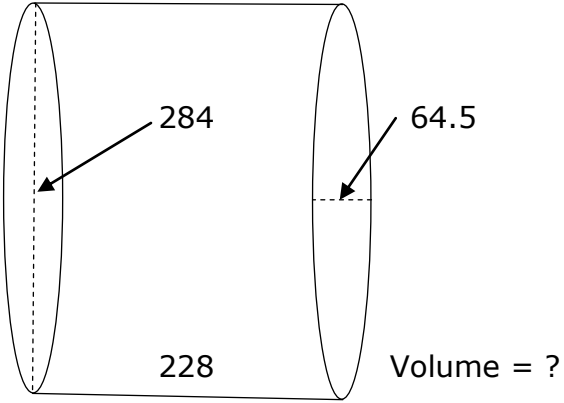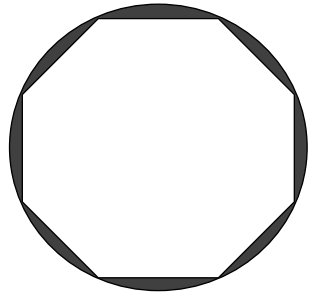
68. (deg) $\dfrac{\sin(86.3°)}{\tan(86.3°)}[63.9]$ ------------------------------------- 68=_____

69. (deg) $\dfrac{\tan(5.89°)}{279 + 132}$ -- 69=_____

70. $(8.13 + 6.82 + 7.63)^{4/5}$ ----------------------------------- 70=_____

71. Calculate the length of a 210° 23-minute arc on a circle with a radius of 210.23 inches. -- 71=_____in.

72. Twenty-two points are randomly marked on a circle. A spinner is made and capable at stopping at all degrees on the circle. If the spinner is spun, calculate the probability it will stop on one of the points. --- 72=_____

73.

RIGHT ELLIPTICAL SOLID

284

64.5

228   Volume = ?

73=_____

74.

CIRCLE, REGULAR OCTAGON

Radius of Circle = 2.12

Shaded Area = ?

74=_____

75. $\dfrac{\text{Log}(3.48\text{x}10^6 + 6.83\text{x}10^6)}{8.52}$ ------------------------------ 75=_____

76. $\dfrac{17.7 + \sqrt{(40.6)(51.3)} + (2.74)(40.4)}{\sqrt{\sqrt{5.51 + 7.2}}}$ -------------------- 76=_____

77. $(23900)10^{(0.549)(5.75)}$ ------------------------------- 77=_____

78. $(0.273)^{\pi}(2.51)^2(0.154 - 0.117)^2$ ------------------------- 78=_____

79. $2 + 4 + 6 + \ldots + 646$ -------------------------------------- 79=_____

80. $\dfrac{1}{(0.56)} + \dfrac{1}{3(0.56)^3} + \dfrac{1}{5(0.56)^5} + \dfrac{1}{7(0.56)^7}$ ----------- 80=_____

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2020 – 2021 TMSCA Middle School Calculator Test 7 Answer Key

<u>Page 1</u>	<u>Page 2</u>	<u>Page 3</u>	<u>Page 4</u> .
1 = -1750 = -1.75×10^3	14 = 1.60×10^{10}	27 = 7.48×10^{-12}	39 = 7.03×10^{21}
2 = -61.0 = -6.10×10^1	15 = -12.9 = -1.29×10^1	28 = -4150 = -4.15×10^3	40 = 0.510 = 5.10×10^{-1}
3 = 674 = 6.74×10^2	16 = 0.296 = 2.96×10^{-1}	29 = -9.98×10^{17}	41 = 8.73×10^{10}
4 = 24.1 = 2.41×10^1	17 = 218000 = 2.18×10^5	30 = 1.84×10^{-13} 31 = 0.0822 = 8.22×10^{-2}	42 = 6000 = 6.00×10^3
5 = -335 = -3.35×10^2	18 = 0.732 = 7.32×10^{-1}	32 = -24.1 = -2.41×10^1	43 = 0.996 = 9.96×10^{-1}
6 = 131 = 1.31×10^2	19 = 0.0120 = 1.20×10^{-2}	33 = 245000 = 2.45×10^5	44 = 0.898 = 8.98×10^{-1}
7 = 6.00 = 6.00×10^0	20 = -1.48 = -1.48×10^0	34 = 44.8 = 4.48×10^1	45 = 2.75 = 2.75×10^0
8 = 0.661 = 6.61×10^{-1}	21 = -0.284 = -2.84×10^{-1}		46 = 329000 = 3.29×10^5
9 = 87200 = 8.72×10^4	22 = 2.39 = 2.39×10^0		
10 = 1.58×10^{13}	23 = 11.2 = 1.12×10^1	35 = -95.6 = -9.56×10^1	47 = 904 = 9.04×10^2
11 = 1.77×10^7	24 = 6.45 = 6.45×10^0	36 = -8.03×10^{25355}	48 = 37.2 = 3.72×10^1
12 = 7.77 = 7.77×10^0	25 = $90,015.00	37 = 763 = 7.63×10^2	49 = 30.0 = 3.00×10^1
13 = $117.70	26 = 529 INT.	38 = 2.31 = 2.31×10^0	50 = 73.3 = 7.33×10^1

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51 = 4.50×10^{-8}

52 = 0.124
   = 1.24×10^{-1}

53 = -3.71×10^{-6}

54 = -45.4
   = -4.54×10^{1}

55 = 304
   = 3.04×10^{2}

56 = 3.32×10^{-7}

57 = 1.14×10^{-8}

58 = 2.10
   = 2.10×10^{0}

59 = 7890
   = 7.89×10^{3}

60 = 8400 INT.

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61 = 14.9
   = 1.49×10^{1}

62 = 113
   = 1.13×10^{2}

63 = -7960
   = -7.96×10^{3}

64 = 2.54×10^{-5}

65 = 547
   = 5.47×10^{2}

66 = 0.0150
   = 1.50×10^{-2}

67 = 0.120
   = 1.20×10^{-1}

68 = 4.12
   = 4.12×10^{0}

69 = 0.000251
   = 2.51×10^{-4}

70 = 12.1
   = 1.21×10^{1}

71 = 772
   = 7.72×10^{2}

72 = 0.0611
   = 6.11×10^{-2}

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73 = 3.28×10^{6}

74 = 1.41
   = 1.41×10^{0}

75 = 0.823
   = 8.23×10^{-1}

76 = 92.2
   = 9.22×10^{1}

77 = 3.43×10^{7}

78 = 0.000146
   = 1.46×10^{-4}

79 = 105000
   = 1.05×10^{5}

80 = 15.6
   = 1.56×10^{1}

11. $2L + 2W = Perimeter$
$2L + 2(2.05x10^3) = 2.14\,x10^4$
$$L = \frac{2.14\,x\,10^4 - 2(2.05\,x\,10^3)}{2}$$
$A = LW$; Multiply L by 2.05 x 10³

12. Some calculators will convert miles to km. 1 mi $\approx 1.609\,km$
$$\frac{.125km}{1.609} = \frac{x}{100}$$
$$x = \frac{.125(100)}{1.609}$$

13. $5(276.95)(.085)$

24. Find the mean of the squares of the first 5 prime numbers. Then take the square root.
$$\sqrt{\frac{4 + 9 + 25 + 49 + 121}{5}}$$

25. $5(750) + 5(287550)(.06)$

26. The middle integer is $\frac{1593}{3}$. The smallest is 2 less.
$$\frac{1593}{3} - 2$$

35. With the HP RPN calculator: 5280 enter 231 %chg.
Without the RPN calculator
$$\frac{231-5280}{5280} \text{ x } 100$$

36. This answer will be negative. Work it without using the negative. Assign the sign when finished.

36. contd.
7111 ⎡ENTER⎤ 3679 ⎡log⎤
⎡x⎤ ⎡SHOW⎤ *(Look at the digits to the left of the decimal. This gives 25355 for the exponent. Write down* 10^{25355}.)
Then punch 25355 ⎡−⎤
⎡10^x⎤
(This gives 8.03 E0. The answer is **- 8.03 x10^{25355}**. *Notice that the negative is inserted in the answer. This is done on the HP RPN calculator.*

37. $A = 34579 = \frac{1}{2}\pi r^2$
$$r = \sqrt{\frac{34579(2)}{\pi}}$$
P = $2r + \pi r = r(2 + \pi)$
$$\left(\sqrt{\frac{34579(2)}{\pi}}\right)(2 + \pi)$$

38. $\frac{2.0015}{\sqrt{3}}$ = half of the side
Side = $2\left(\frac{2.0015}{\sqrt{3}}\right)$

47.
$5x + 3x + 9x + 12x = 2184$
$29x = 2184$
$x = \frac{2184}{29}$
Longest is $12x = 12\left(\frac{2184}{29}\right)$

48. $5x + 3x + 9x + 12x = 360$
$29x = 360$
$x = \frac{360}{29}$
Smallest angle is $3x = 3\left(\frac{360}{29}\right)$

49. $x = \sqrt{(105)^2 - (100.625)^2}$

50. $\frac{\tan x}{1} = \frac{990}{297}$;
$$x = atan\left(\frac{990}{297}\right)$$

59.
$$\left(\frac{17640mi}{1\,hr}\right)\left(\frac{1.609\,km}{1\,mi}\right)\cdot$$
$$\left(\frac{1000m}{1km}\right)\left(\frac{1\,hr}{3600\,sec}\right)$$

60. $\frac{n(3n-1)}{2} = \frac{75[3(75)-1]}{2}$

61. $V = \pi r^2 h$
$1278.18 = \pi(5.222)^2 h$
$$h = \frac{1278.18}{\pi(5.222)^2}$$

62. This SA is 8 equilateral triangles. $8\left(\frac{5.716^2\sqrt{3}}{4}\right)$

71. $2\pi r\left(\frac{210\frac{23}{60}}{360}\right)$
$$2\pi(210.23)\left(\frac{210\frac{23}{60}}{360}\right)$$

72. $\frac{22}{360}$

73.
$$V = \pi\left(\frac{64.5}{2}\right)\left(\frac{284}{2}\right)(228)$$

74. Area of an octagon when given the radius is $2(r)^2\sqrt{2}$. Area of circle – area of octagon. $\pi r^2 - 2(r)^2\sqrt{2}$
$\pi(2.12)^2 - 2(2.12)^2\sqrt{2}$