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   # 1 3©

F E B R U A R Y   2 7 ,   2 0 1 6

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*, 1.23x10^1, 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.

1. 5340 + 3670 --- 1=_____

2. −71 − 40 + 67 --- 2=_____

3. −2180 + 4820 − 4360 -- 3=_____

4. 11 + 21 + 30 + 29 --- 4=_____

5. 48 + 42 − 76 − 80 --- 5=_____

6. 111 − 65.5 − 119 + 62.7 + 22.8 ---------------------------------- 6=_____

7. 1.32 + 3.75 + 2.57 + 3.23 + 1.47 ------------------------------- 7=_____

8. 1.63 − 2.62 + 3.79 − 6.11 − 4.87 ------------------------------- 8=_____

9. 411 x 90.7 x 265 --- 9=_____

10. 306 x 1170 x 41.4 x 880 ---10=_____

11. Sean pays $72 a month for medical insurance. At the end of four years of this, he is hospitalized. The insurance company pays his hospital bills of $10,560. Calculate the amount he saved by having insurance. -11=$_____

12. Calculate the number of liters a five gallon bucket will hold. --------12=_____l

13. What is the quotient when eighty-five percent of pi is divided by pi percent of eighty-five? ---13=_____

14.   (685/471)[662 – 364] --14=_____

15.   (–382)[108 x 55/367] --15=_____

16. $\left[\dfrac{189}{364}\right]$ [(809/393) – 0.758] --16=_____

17.   {766/473}$\left[\dfrac{165}{291 + 254}\right]$ --17=_____

18. $\left[\dfrac{25/58}{110/65}\right]$ {0.0655 + 0.0347 – 0.0126} ------------------------18=_____

19. $\dfrac{(136/93) + (117/53)}{(0.661 - 0.781)}$ --19=_____

20. $\dfrac{2.97x10^{-4} + 3.52x10^{-4} + 1.59x10^{-4}}{(6190)(0.00143)(6.13x10^{-4})}$ -------------------------20=_____

21. $\dfrac{(\pi)(19/8)(22/22)}{317}$ --21=_____

22. $\left[\dfrac{1550 + 249}{769 - 226}\right]\left[\dfrac{1740}{495}\right]$ --22=_____

23. $\dfrac{(0.121 + 0.21 - 0.0902)}{\{(10.2 - 3.82)/(35.5)\}}$ --23=_____

24. The mean of four positive integers is 19. When the smallest number is dropped, the mean of the remaining integers is twenty-two. What number was removed? --24=_____INT.

25. If f(x) = 7x^2 + 4x – 8, calculate f(-7). ---------------------------------25=_____

26. Miller found that the sum of negative seven and three times the opposite of a number is twenty-one larger than the number. Calculate the value of the number. --26=_____

27. $\dfrac{(1.83 - 1.68)(0.841 + \pi)}{(4.38 \times 10^{12})}$ --27=_____

28. $\dfrac{(2.84 \times 10^{13}) + (4.19 \times 10^{13})}{(-0.00882)(0.0216) - 1.05 \times 10^{-4}}$ ------------------------------------28=_____

29. $[1600 - (4860 + 2290)] + [(-0.705)(5480 - 2880)]$ -----------29=_____

30. $(4.74)\left[(3.42 \times 10^7) - (3.93 \times 10^7)\right]$ ------------------------------30=_____

31. $\dfrac{(0.0748 + 0.0745)}{(7.01 \times 10^{11})}$ --31=_____
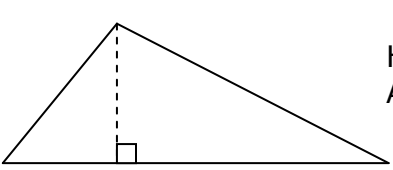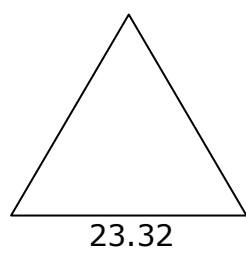
32. $(343)\left[\dfrac{38}{(1.34 \times 10^7)}\right]$ --32=_____

33. $\left[\dfrac{1/182}{1/448}\right] + [0.683]$ --33=_____

34. $1/(0.149 - 0.249) - 1/(-0.0795)$ ------------------------------34=_____

35. Calculate the value of x in the equation:
                        $-2\ 1/3 + (7/8)x = 19\ 1/16$ ------------------35=_____

36. Leaving at the same time, Car A heads north at an average speed of 52 mph and Car B west at an average speed of 67 mph from the same spot. Calculate the time it will take the cars to be 500 miles apart-------36=_____hrs.

SCALENE TRIANGLE	EQUILATERAL TRIANGLE
Height = 63.87 Area = 4378.61 Base = ?	Area = ? 23.32
37=_____	38=_____

39. $(0.354 + 0.325)^2(10.3 + 12.6)^2$ ----------------------------------39=_____

40. $\sqrt[4]{\dfrac{29.7 + 11.5}{526 - 356}}$ ---40=_____

41. $\dfrac{(8770 + 5830)^3}{(0.176 - 0.0518)^2}$ ---41=_____

42. $\sqrt{38700 - 31800 + 15800} - \sqrt{22000}$ ---------------------------42=_____

43. $(1/(0.00101))(5020 - 2040)^3$ -------------------------------------43=_____
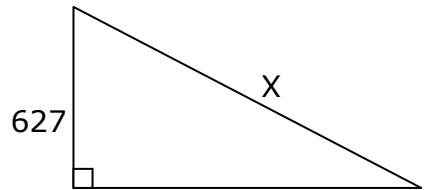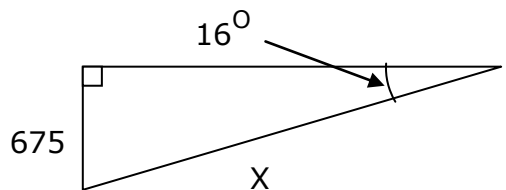
44. $(1/\pi)\sqrt[4]{\dfrac{2.88 + 1.26}{0.0471 - 0.0141}}$ -------------------------------------44=_____

45. $\left[\sqrt[3]{(3500/8630)(2890)}\right]^5$ -------------------------------------45=_____

46. $\dfrac{(7300 + 27000)^{1/5}}{(2480 - 774)^{1/2}}$ ---46=_____

47. Calculate the area of a circle that has its center at the origin and a
point on the circle at (-2,7). ---47=_____

48. Calculate -872^{711}. ---48=_____

RIGHT TRIANGLE	RIGHT TRIANGLE
X = ?	X = ?
49=_____	50=_____

51. $\dfrac{(412 + 791 - 1280)^2}{\sqrt{3.28 + 8.68 + 9.31}}$ --51=_____

52. $\left[\dfrac{5810 - 3380 + \sqrt{6.25 \times 10^7 / 12.2}}{-32.6 + 60.8}\right]^4$ ----------------------------52=_____

53. $\left[\dfrac{3400 + 376 + \sqrt{1.33 \times 10^7 + 1.69 \times 10^6}}{3780/889}\right]^4$ ----------------------53=_____

54. $11300 + \sqrt{(16500)(11500)} - (16700 + 10500)$ ------------------54=_____

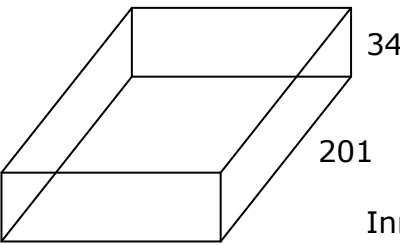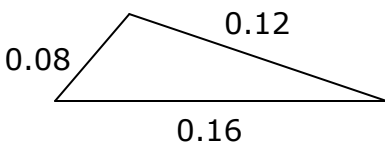55. $3.17 + \sqrt{(1230)/(42.8)} - (1.82 + 1.1)^2$ --------------------------55=_____

56. $\sqrt{\dfrac{1/(255 - 229)}{(88.3)(34.5 + 40.2)^3}}$ ---56=_____

57. $\sqrt{\dfrac{1/(12.8 - 11.9)}{(207)(127 + 130)^6}}$ ---57=_____

58. (deg) $\tan(78.5°) + (1120/2310)$ ------------------------------------58=_____

59. The volume of a sphere is 22 cubic inches. Calculate the diameter
of the sphere in inches. --59=_____in.

60. A circular spinner is divided into equal sections. Three sections are
red, two sections are green and four sections are blue. Calculate the
probability of spinning the spinner five times and always landing
on green. --60=_____

RECTANGULAR PRISM	SCALENE TRIANGLE
34 201 102 Inner Diagonal = ? 61=_____	0.12 0.08 0.16 Area = ? 62=_____

63. $\dfrac{6!}{13!}$ --63=_____

64. $(13.5 - \pi)e^{0.324}$ ---64=_____

65. (deg) $(12.2 - 10.3)\sin(8.18°)$ ------------------------------------65=_____

66. (rad) $\tan\left[\dfrac{(188)(\pi)}{(1.44)(1.61)}\right]$ --66=_____

67. (deg) $(37.1 - 78.2)\sin(0.819°) + 0.501$ ------------------------67=_____
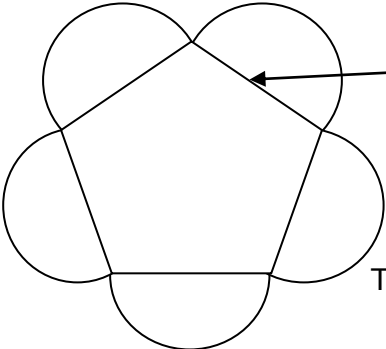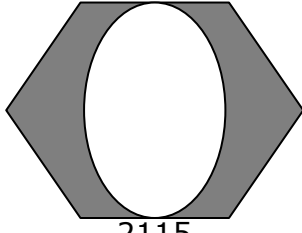
68. (rad) $\sin[(0.627 - 0.153)(22)]$ ------------------------------------68=_____

69. (deg) $\dfrac{\tan(9.67°)}{114 + 352}$ --69=_____

70. $(4480 - 1680)^{0.415 - 0.387}$ ------------------------------------70=_____

71. Calculate the sum of the exterior angles of a regular polygon with
one hundred seventy-five sides. ---------------------------------------71=_____°

72. A California redwood grew to a height of 112 m. This tree is
90° to the ground and casts a shadow that is 100 m long. Calculate
the angle made from the tip of the shadow to the top of the tree. -------72=_____°

REGULAR PENTAGON AND SEMICIRCLES

371.1 = side of pentagon and diameter of semicircles.

Total Area = ?

73=_____

REGULAR HEXAGON AND ELLIPSE

Minor axis and side of hexagon are equal.

2115

Shaded Area = ?

74=_____

75. $\dfrac{2.8 + \sqrt{(7.53)(1.6)} + (0.729)(3.93)}{\sqrt{\sqrt{0.0279 + 0.0221}}}$ -----------------------------75=_____

76. $\dfrac{\text{Log}(5.89 \times 10^7 + 5.94 \times 10^7)}{10.6}$ --76=_____

77. $(8050)10^{(0.426)(6.85)}$ ---77=_____

78. $(0.107)^{\pi}(0.828)^3(297 - 132)^2$ -----------------------------------78=_____

79. $4 + 6 + 8 + \ldots + 486$ --79=_____

80. $\dfrac{1}{(0.67)} + \dfrac{1}{3(0.67)^3} + \dfrac{1}{5(0.67)^5} + \dfrac{1}{7(0.67)^7}$ ------------------80=_____

2015-2016 TMSCA Middle School Calculator Test #13 Answer Key

Page 1	Page 2	Page 3	Page 4

Page 1

1 = 9010
  = 9.01×10^3

2 = -44.0
  = -4.40×10^1

3 = -1720
  = -1.72×10^3

4 = 91.0
  = 9.10×10^1

5 = -66.0
  = -6.60×10^1

6 = 12.0
  = 1.20×10^1

7 = 12.3
  = 1.23×10^1

8 = -8.18
  = -8.18×10^0

9 = 9.88×10^6

10 = 1.30×10^{10}

11 = $7104.00

12 = 18.9
  = 1.89×10^1

13 = 1.00
  = 1.00×10^0

Page 2

14 = 433
  = 4.33×10^2

15 = -6180
  = -6.18×10^3

16 = 0.675
  = 6.75×10^{-1}

17 = 0.490
  = 4.90×10^{-1}

18 = 0.0223
  = 2.23×10^{-2}

19 = -30.6
  = -3.06×10^1

20 = 0.149
  = 1.49×10^{-1}

21 = 0.0235
  = 2.35×10^{-2}

22 = 11.6
  = 1.16×10^1

23 = 1.34
  = 1.34×10^0

24 = 10 INT.

25 = 307
  = 3.07×10^2

26 = -7.00
  = -7.00×10^0

Page 3

27 = 1.36×10^{-13}

28 = -2.38×10^{17}

29 = -7380
  = -7.38×10^3

30 = -2.42×10^7

31 = 2.13×10^{-13}

32 = 0.000973
  = 9.73×10^{-4}

33 = 3.14
  = 3.14×10^0

34 = 2.58
  = 2.58×10^0

35 = 24.5
  = 2.45×10^1

36 = 5.90
  = 5.90×10^0

37 = 137
  = 1.37×10^2

38 = 235
  = 2.35×10^2

Page 4

39 = 242
  = 2.42×10^2

40 = 0.702
  = 7.02×10^{-1}

41 = 2.02×10^{14}

42 = 2.34
  = 2.34×10^0

43 = 2.62×10^{13}

44 = 1.07
  = 1.07×10^0

45 = 130000
  = 1.30×10^5

46 = 0.195
  = 1.95×10^{-1}

47 = 167
  = 1.67×10^2

48 = -5.10×10^{2090}

49 = 1040
  = 1.04×10^3

50 = 2450
  = 2.45×10^3

2015-2016 TMSCA Middle School Calculator Test #13 Answer Key

Page 5	**Page 6**	**Page 7**

Page 5

51 = 1290
   = 1.29×10^3

52 = 7.67×10^8

53 = 1.05×10^{13}

54 = -2130
   = -2.13×10^3

55 = 0.00441
   = 4.41×10^{-3}

56 = 3.23×10^{-5}

57 = 4.32×10^{-9}

58 = 5.40
   = 5.40×10^0

59 = 3.48
   = 3.48×10^0

60 = 0.000542
   = 5.42×10^{-4}

Page 6

61 = 228
   = 2.28×10^2

62 = 0.00465
   = 4.65×10^{-3}

63 = 1.16×10^{-7}

64 = 14.3
   = 1.43×10^1

65 = 0.270
   = 2.70×10^{-1}

66 = 0.292
   = 2.92×10^{-1}

67 = -0.0865
   = -8.65×10^{-2}

68 = -0.843
   = -8.43×10^{-1}

69 = 0.000366
   = 3.66×10^{-4}

70 = 1.25
   = 1.25×10^0

71 = 360
   = 3.60×10^2

72 = 48.2
   = 4.82×10^1

Page 7

73 = 507000
   = 5.07×10^5

74 = 5540000
   = 5.54×10^6

75 = 19.3
   = 1.93×10^1

76 = 0.762
   = 7.62×10^{-1}

77 = 6.67×10^6

78 = 13.8
   = 1.38×10^1

79 = 59300
   = 5.93×10^4

80 = 6.44
   = 6.44×10^0

11. 10,560 − 72(12)(4) Look at SHOW key to get full answer.

12. On RPN calculator, 5 ▸ L

13. $.85\pi \div \left(\frac{\pi}{100}(85)\right)$

24. $19(4) - 3(22)$

25. $7(-7)^2 + 4(-7) - 8$

26. -7 + 3(-n) = n + 21
$-28 = 4n$ so n = -7.00

35. $-2\frac{1}{3} + \frac{7}{8}x = 19\frac{1}{16}$
$x = 1\left(9\frac{1}{16} + 2\frac{1}{3}\right) \div \frac{7}{8}$

36. x = time. 52x = distance traveling north; 67x = distance traveling west. This forms a right triangle. Use the a² + b² = c² to solve for x.
$(52x)^2 + (67x)^2 = 500^2$
$(52^2 + 67^2)x^2 = 250000$
$x = \sqrt{\frac{250000}{(52^2 + 67^2)}}$

37. $A = \frac{1}{2}bh$
$4378.61 = \frac{1}{2}b(63.87)$ so
$b = \frac{4378.61(2)}{63.87}$

38. $A = \frac{side^2\sqrt{3}}{4} =$
$\frac{(23.32)^2\sqrt{3}}{4}$

47. The radius is the distance from the origin to (-2,7) =
$\sqrt{(7-0)^2 + (-2-0)^2}$

$= \sqrt{53}.$ $Area\ of\ circle = \pi r^2$
$= \pi\left(\sqrt{53}\right)^2 = \pi(53)$

48. 711 [ENTER] 872
[LOG] [x] [SHOW]

(Look at the digits to the left of the decimal. This gives 2090 for the exponent. Write down 2090.)

2090 [−] [10ˣ]

(This gives 5.10 E0 which is the first part of your answer. Assign a negative to the answer.
The answer is -5.10 x 10²⁰⁹⁰). This is done on the RPN calculator.

49. $\sqrt{627^2 + 827^2}$

50. $\frac{\sin 16}{1} = \frac{675}{x}$; $x = \frac{675}{\sin 16}$

59. $V = \frac{4}{3}\pi r^3$ $22 = \frac{4}{3}\pi r^3$
Therefore $r = \sqrt[3]{\frac{22}{\left(\frac{4}{3}\right)\pi}}$
Multiply by 2 to get diameter.

60. There are 9 sections and 2 are green. Probability of getting 5 greens is $\left(\frac{2}{9}\right)^5$

61.
$\sqrt{(102)^2 + (201)^2 + (34)^2}$

62. The area of a scalene triangle can be found with formula:
$$\sqrt{s(s-a)(s-b)(s-c)}$$
S = ½ perimeter and a,b,c are the sides of the triangle. $S = \frac{.08 + .12 + .16}{2} = .18$
$= \sqrt{.18(.18-.08)(.18-.12)(.18-.16)}$

71. The sum of the exterior angles of any regular polygon is ALWAYS 360⁰.

72. $\frac{\tan x}{1} = \frac{112}{100}$ $angle = ATAN\left(\frac{112}{100}\right)$

73. Area of pentagon plus 2 ½ circles
Great formula for area of any regular polygon:
$$\frac{perimeter^2}{\tan\left(\frac{180}{n}\right)4n}$$
Where n = number of sides. Here n = 5.
Pentagon:
$$\frac{(371.1 \cdot 5)^2}{\tan\left(\frac{180}{5}\right)4(5)}$$
Circles: $A = \pi\left(\frac{371.1}{2}\right)^2(2.5)$
Add these two answers.

74. Shaded region = hexagon minus ellipse
Hexagon: six equilateral triangles.
$A = 6\left(\frac{side^2\sqrt{3}}{4}\right) = 6\left(\frac{(2115)^2\sqrt{3}}{4}\right)$
Ellipse: A =
$\left(\frac{1}{2}major\ axis\right)\left(\frac{1}{2}minor\ axis\right)\pi$
½ of the major axis is the same as the height of one equilateral triangle = $\frac{2115}{2}\sqrt{3}$ and ½ of the minor axis is $\frac{2115}{2}$
$6\left(\frac{(2115)^2\sqrt{3}}{4}\right) - \left(\frac{2115}{2}\sqrt{3}\right)\left(\frac{2115}{2}\right)\pi$