8

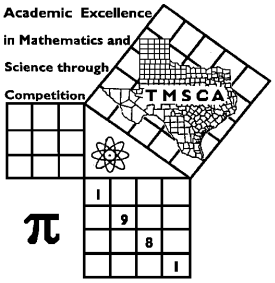
1st Score: _____	2nd Score: _____	3rd Score: _____	
S & G _____	S & G _____	S & G _____	_____. _____
Grader: _____	Grader: _____	Grader: _____	**Final Score**

PLACE LABEL BELOW

Name:_____ School:_____

SS/ID Number:_____ City:_____

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



TMSCA MIDDLE SCHOOL CALCULATOR TEST #12 ©

FEBRUARY 22, 2020

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, $1.23(10)^{2}$, $1.23\cdot10^{2}$, $1.230x10^{2}$, $1.23*10^{2}$, 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.

2019-2020 TMSCA Middle School Calculator Test #12

1. 1340 – 1090 ---------- 1=_____

2. 48 – 60 – 72 ---------- 2=_____

3. 49 + 82.5 + 96 ---------- 3=_____

4. π + 14 + 10 + 5 ---------- 4=_____

5. –104 – 342 – 435 – 504 ---------- 5=_____

6. 44.9 + 265 – 102 – 122 + 269 ---------- 6=_____

7. 1.33 – 0.257 + 0.437 – 0.335 – 0.426 ---------- 7=_____

8. 7.18 + 5.58 – 7.76 + 7.2 + 7.84 ---------- 8=_____

9. 564 x 82.7 x 454 ---------- 9=_____

10. 1840 x 1490 x 45.6 x 455 ---------- 10=_____

11. In degrees Fahrenheit, calculate the difference between the boiling point of water and the freezing point of water. ---------- 11=_____

12. Rebecca measured the angle as $\frac{11\pi}{6}$ radians. Calculate this in degrees. ---------- 12=_____°

13. The natural log of 36 is what percent of one million. ---------- 13=_____%

14. $(184)[150 \times 183 \times 78]$ ---------- 14=_____

15. $433/[414 \times 158 \times 363]$ ---------- 15=_____

16. $(150 + 139)[89 - 50 - 44]$ ---------- 16=_____

17. $\left[\frac{118}{60}\right][(118/29) + 2.66]$ ---------- 17=_____

18. $\left[\frac{(3.37 \times 10^{-4} + 0.00199)}{116/169}\right]\left[\frac{3.49}{0.000749}\right]$ ---------- 18=_____

19. $\frac{(122/155) + (654/361)}{(133 - 239)}$ ---------- 19=_____

20. $\frac{0.0538 + 0.0646 + 0.0508}{(40.6)(3530)(14.7)}$ ---------- 20=_____

21. $\frac{100}{(227 - 48)} - \frac{(308 - 398)}{71}$ ---------- 21=_____

22. $\frac{(284 \times 688)/1490}{(314 \times 7.68) + 844}$ ---------- 22=_____

23. $\frac{(\pi)(49/48)(45/51)}{(55/90)}$ ---------- 23=_____

24. Three roommates went in on a new TV for their apartment. If the cost of the TV was $1259.98 and then 5.75% tax was added, calculate the cost for each roommate. ---------- 24=$_____

25. Calculate the interest rate needed to earn $1000 in interest per year on $50,000 simple interest. ---------- 25=_____%

26. The sum of three consecutive odd integers is 1575. Calculate the value of the smallest of those integers. ---------- 26=_____INT.

27. $[1570 - (1450 + 818)] + [(0.553)(324 - 1240)]$ -------- 27=_____

28. $\dfrac{(3.93\text{x}10^{9}) + (6.00\text{x}10^{9})}{(-0.606)(0.496) - 0.283}$ ---------- 28=_____

29. $(0.00219)[[541/(198)][0.0917/(0.0495)]]$ ---------- 29=_____

30. $\dfrac{1}{-8.74} + \dfrac{1}{(\pi)(26.8 - 35.1)}$ ---------- 30=_____

31. $\dfrac{1}{-999} + \dfrac{1}{(1120 - 1710)}$ ---------- 31=_____

32. $[0.0412]\left[\dfrac{1/0.00101}{1/(0.00596)}\right]$ ---------- 32=_____

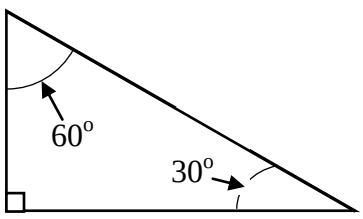
33. $\dfrac{1}{439} - \dfrac{1}{(124 + 437)}$ ---------- 33=_____

34. $\dfrac{1}{320} - \dfrac{1}{180} + \dfrac{1}{319}$ ---------- 34=_____

35. A train track and highway are parallel and are one-half mile apart. A car is traveling 75 mph parallel to the train traveling 62 mph. Once the car has passed the train and traveled for one and a half hours, calculate the straight-line distance in feet between the train and the car. ---------- 35=_____ft.

36. A distribution center sits on one square mile of land. The company sold it off for $5.5 million dollars. Calculate the price per square foot of the complete square mile. ---------- 36=$_____

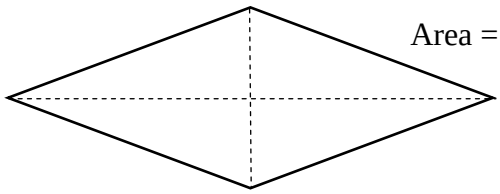
30-60-90- RIGHT TRIANGLE



Area = ?

37=_____

RHOMBUS



Area = $1.302\text{x}10^{7}$

Long Diagonal = $8.40\text{x}10^{3}$

Short Diagonal = ?

38=_____

39. $\left[\frac{16300 + (1/(6.61\text{x}10^{-5}))}{(8520/13500) - 0.114}\right]^2$ ---------- 39=_____

40. $(0.17 + 0.2 + 0.306)^2(16.2 + 13.2)^2$ ---------- 40=_____

41. $\sqrt{\frac{1470 + 1370}{86.5 - 55.5}}$ ---------- 41=_____

42. $(1/(0.0193))(25300 - 24900)^3$ ---------- 42=_____

43. $\sqrt{448 - 416 + 684} - \sqrt{338}$ ---------- 43=_____

44. $(88.1)\sqrt{43000 + 35400 + 13800}$ ---------- 44=_____

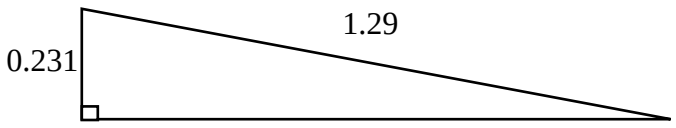
45. $\frac{1}{\sqrt{367 + 247 + 127}} + \left(\frac{1}{\sqrt{26.6}}\right)^2$ ---------- 45=_____

46. $(4540)\sqrt{1400 + 1990 - 1240}$ ---------- 46=_____

47. The earth, according to a reputable website, has approximately five quadrillion, five hundred two trillion, five hundred thirty-two billion one hundred twenty-seven million square feet of surface. Out of this about 71% is covered with water. Using this information, calculate the number of acres of dry land on earth. ---------- 47=_____ac.

48. Calculate 9745^{4619}. ---------- 48=_____

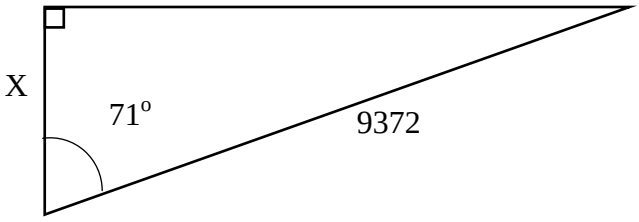
RIGHT TRIANGLE



Perimeter = ?

49=_____

RIGHT TRIANGLE



X = ?

50=_____

51. $\sqrt{\frac{102}{(23000)(1.04)}} + \frac{(0.24 - 0.156)}{(0.546 + 0.545)}$ ---------- 51=_____

52. $\frac{\sqrt{28.8 + \pi + 49.5}}{(8.56 - 26.5 + 21)^2}$ ---------- 52=_____

53. $\frac{(21 + 3.66 - 22)^4}{\sqrt{0.015 + 0.0166 + 0.0128}}$ ---------- 53=_____

54. $(211)^2 \sqrt{(533)/(0.836)} - (1.50\text{x}10^5 + 9.36\text{x}10^5)$ --------- 54=_____

55. $\sqrt{\frac{(12300)(18300)}{(2.66\text{x}10^5)(30300)}} - 0.156 + 0.167$ ---------- 55=_____

56. $(2.02)(9.06\text{x}10^9)^{1/2} - [(1.52\text{x}10^7)(5.41\text{x}10^8)]^{1/3}$ ------ 56=_____

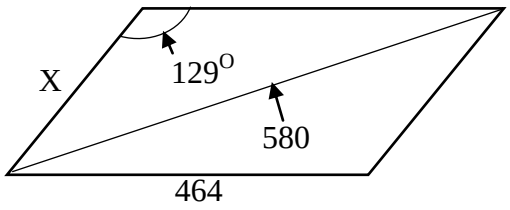
57. (deg) $\tan(231^\circ) + (0.974/0.505)$ ---------- 57=_____

58. $\sqrt{\frac{1/(61.4 - 16.2)}{(373)(1290 + 752)^{-5}}}$ ---------- 58=_____

59. Calculate the odds of rolling a sum that is a prime number on a standard pair of dice. ---------- 59=_____

60. There are 100 members of the local chapter of the FFA. They need to elect officers for their chapter. There are five places to be filled, president, vice president, secretary, treasurer, and sentinel. A person can only hold one office. Calculate the number of possible ways these positions can be filled. ---------- 60=_____

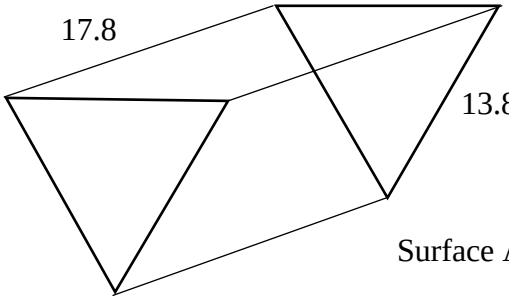
PARALLELOGRAM



X = ?

61=_____

EQUILATERAL TRIANGULAR PRISM



Surface Area = ?

62=_____

63. $\frac{26! - 27!}{7!}$ ---------- 63=_____

64. (deg) $\frac{\cos(437°)}{1580}$ ---------- 64=_____

65. $(5.73 \times 10^{9} - 4.77 \times 10^{9})^{-4}(1.60 \times 10^{8})$ ---------- 65=_____

66. (deg) [70.2]tan(173° – 74.7°) ---------- 66=_____

67. (rad) $\frac{\sin(1.27)}{981/501}$ ---------- 67=_____

68. (deg) $\frac{\sin(73.4°)}{\tan(73.4°)}$[15.9] ---------- 68=_____

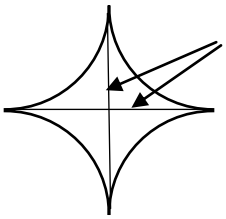
69. (deg) $\frac{\sin(505°) - \tan(505°)}{\sin(505°)}$ ---------- 69=_____

70. $(332 - 106 + 416)^{5/3}$ ---------- 70=_____

71. Calculate the slope of the line that is perpendicular to the line that passes through the points (4, 9) and (-3, 7). ---------- 71=_____

72. Calculate the value of the 25th triangular number. ---------- 72=_____INT.

CONCAVE SHAPE

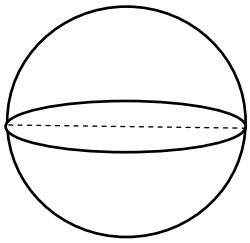


Length of diagonals = 22.8

Area = ?

73=_____

SPHERE



Diameter = 59285

Ratio of the Volume
to the Surface Area = ?

74=_____

75. $\dfrac{\text{Log}(89800 + 1.31\text{x}10^{5})}{0.697}$ ---------- 75=_____

76. $\dfrac{92.4 + \sqrt{(91.7)(43.6)} + (5.6)(19.8)}{\sqrt{\sqrt{4.27 + 3.73}}}$ ---------- 76=_____

77. $\text{Log}(5970 + 3590 + 7770)$ ---------- 77=_____

78. $\dfrac{\text{Log}[231 + (0.704)(638)]}{0.949 + \text{Log}[3.27 + 7.52]}$ ---------- 78=_____

79. $2 + 4 + 6 + \ldots + 810$ ---------- 79=_____

80. $\dfrac{1}{(0.61)} + \dfrac{1}{3(0.61)^3} + \dfrac{1}{5(0.61)^5} + \dfrac{1}{7(0.61)^7}$ ---------- 80=_____

2019-2020 TMSCA Middle School Calculator Test #12 Answer Key

Page 1

1 = 250
= 2.50×10^{2}

2 = -84.0
= -8.40×10^{1}

3 = 228
= 2.28×10^{2}

4 = 32.1
= 3.21×10^{1}

5 = -1380
= -1.38×10^{3}

6 = 355
= 3.55×10^{2}

7 = 0.749
= 7.49×10^{-1}

8 = 20.0
= 2.00×10^{1}

9 = 2.12×10^{7}

10 = 5.69×10^{10}

11 = 180
= 1.80×10^{2}

12 = 330
= 3.30×10^{2}

13 = 0.000358
= 3.58×10^{-4}

Page 2

14 = 3.94×10^{8}

15 = 1.82×10^{-5}

16 = -1450
= -1.45×10^{3}

17 = 13.2
= 1.32×10^{1}

18 = 15.8
= 1.58×10^{1}

19 = -0.0245
= -2.45×10^{-2}

20 = 8.03×10^{-8}

21 = 1.83
= 1.83×10^{0}

22 = 0.0403
= 4.03×10^{-2}

23 = 4.63
= 4.63×10^{0}

24 = $444.14

25 = 2.00
= 2.00×10^{0}

26 = 523 INT.

Page 3

27 = -1200
= -1.20×10^{3}

28 = -1.70×10^{10}

29 = 0.0111
= 1.11×10^{-2}

30 = -0.153
= -1.53×10^{-1}

31 = -0.00270
= -2.70×10^{-3}

32 = 0.243
= 2.43×10^{-1}

33 = 0.000495
= 4.95×10^{-4}

34 = 0.000704
= 7.04×10^{-4}

35 = 103000
= 1.03×10^{5}

36 = $0.20

37 = 183000
= 1.83×10^{5}

38 = 3100
= 3.10×10^{3}

Page 4

39 = 3.69×10^{9}

40 = 395
= 3.95×10^{2}

41 = 9.57
= 9.57×10^{0}

42 = 3.32×10^{9}

43 = 8.37
= 8.37×10^{0}

44 = 26800
= 2.68×10^{4}

45 = 0.0743
= 7.43×10^{-2}

46 = 211000
= 2.11×10^{5}

47 = 3.66×10^{10}

48 = 1.53×10^{18424}

49 = 2.79
= 2.79×10^{0}

50 = 3050
= 3.05×10^{3}

2019-2020 TMSCA Middle School Calculator Test #12 Answer Key

Page 5

51 = 0.142
$= 1.42 \times 10^{-1}$

52 = 0.964
$= 9.64 \times 10^{-1}$

53 = 238
$= 2.38 \times 10^{2}$

54 = 38200
$= 3.82 \times 10^{4}$

55 = 0.178
$= 1.78 \times 10^{-1}$

56 = -9570
$= -9.57 \times 10^{3}$

57 = 3.16
$= 3.16 \times 10^{0}$

58 = 1.45×10^{6}

59 = 0.714
$= 7.14 \times 10^{-1}$

60 = 9.03×10^{9}

Page 6

61 = 162
$= 1.62 \times 10^{2}$

62 = 902
$= 9.02 \times 10^{2}$

63 = -2.08×10^{24}

64 = 0.000142
$= 1.42 \times 10^{-4}$

65 = 1.88×10^{-28}

66 = -481
$= -4.81 \times 10^{2}$

67 = 0.488
$= 4.88 \times 10^{-1}$

68 = 4.54
$= 4.54 \times 10^{0}$

69 = 2.22
$= 2.22 \times 10^{0}$

70 = 47800
$= 4.78 \times 10^{4}$

71 = -3.50
$= -3.50 \times 10^{0}$

72 = 325 INT.

Page 7

73 = 112
$= 1.12 \times 10^{2}$

74 = 9880
$= 9.88 \times 10^{3}$

75 = 7.67
$= 7.67 \times 10^{0}$

76 = 158
$= 1.58 \times 10^{2}$

77 = 4.24
$= 4.24 \times 10^{0}$

78 = 1.43
$= 1.43 \times 10^{0}$

79 = 164000
$= 1.64 \times 10^{5}$

80 = 10.0
$= 1.00 \times 10^{1}$

TMSCA 19-20 MS CA Test #12 Solutions to Word and Geometry Problems

11. 212- 32

12. $\frac{11(180)}{6}$

since $180^0 = \pi$ radians

13. $\frac{LN(36)}{1{,}000{,}000} = \frac{x}{100}$

$$x = \frac{100[LN(36)]}{1{,}000{,}000}$$

24. $\frac{1259.98(1.0575)}{3}$

25. $1000 = 50000x$

$x = .02 = 2.00\%$

26. $\frac{1575}{3}$ = middle integer

$\frac{1575}{3} - 2$ = smallest integer

35. The distance between the railroad track and road is .5 miles. Consider the distances the two vehicles have traveled since the time the car passed the train. The car traveled 75(1.5) = 112.5 miles and the train traveled 62(1.5) = 93 miles. Form a right triangle with the height being .5 miles and the base being 112.5 – 93 = 19.5 mi. Find the hypotenuse. Then change to feet by multiplying by 5280.

$$\left(\sqrt{19.5^2 + .5^2}\right)(5280)$$

36. $\frac{5{,}500{,}000}{5280^2}$

This is money so .197 rounds to $.20.

37. Short leg = $\frac{797}{\sqrt{3}}$

Area = $\left[\frac{797}{\sqrt{3}}(797)\right] \div 2$

38. $\frac{(8.40\ x\ 10^3)d}{2} = 1.302\ x10^7$

$$d = \frac{(1.302\ x10^7)(2)}{8.40\ x\ 10^3}$$

47. If 71% of the surface is water, then 29% of it is dry land. 640 acres = 1 mile^2

Divide 5,502,532,127,000,000 by 5280^2 to change ft^2 to mi^2. Then multiply by 640 to change to acres. Then times .29.

48. 9745^{4619}

4619 [ENTER] 9745 [log] [x]

[SHOW] *(Look at the digits to the left of the decimal. This gives 18424 for the exponent. Write down 10^{18424}.) Then punch*

18424 [–] [10^x]

(This gives 1.53 E0 which is the first part of your answer.

The answer is **1.53 x 10^{18424}**). *This is done on the HP RPN calculator.*

49.

$1.29 + .231 + \sqrt{(1.29)^2 - (.231)^2}$

50. $\frac{cos(71)}{1} = \frac{x}{9372}$

$$x = 9372[cos(71)]$$

59. Primes are 2,3,5,7,11

These are the number of ways these can be rolled: 1,2,4,6,2.

$$\frac{1+2+4+6+2}{36 - (1+2+4+6+2)} = \frac{15}{21}$$

60. Permutation of 5 people when choosing from 100.

$$\frac{100!}{(100-5)!}$$

61. Look at the top triangle with sides x and 464 and included angle of 129^0. Use law of sines to find angle on left ("A"). Then find the third angle ("B") of the triangle. Use law of sines again to find x.

$\frac{\sin 129}{580} = \frac{sinA}{464}$

$$A = sin^{-1}\left[\frac{464(\sin 129)}{580}\right]$$

B = 180 – 129 – A

$$\frac{sinB}{x} = \frac{\sin 129}{580}$$

$$x = \frac{580(sinB)}{sin129}$$

62. $2\left[\frac{13.8^2\sqrt{3}}{4}\right] + 13.8(3)(17.8)$

71. Slope of the perpendicular line = $-\frac{x_2 - x_1}{y_2 - y_1} = -\frac{4-(-3)}{9-7}$

72. $\frac{25(26)}{2}$

73. Area of square = 22.8^2

Area of a circle = $\left(\frac{22.8}{2}\right)^2 \pi$

Area of shape shown = area of square minus area of circle.

74. ratio of volume to ratio of surface area of sphere =

$\left(\frac{4}{3}\pi r^3\right) \div (4\pi r^2) = \frac{1}{3}$r =

$$\frac{1}{3}\left(\frac{59285}{2}\right)$$