Name _____

Tie Breaker: Points scored on Stated and Geometry Problems

+_____ +_____ +_____

5x(Last Problem Attempted)	+	+	+
7x(Number Incorrect)	−	−	−
2x(Number Incorrect SDs)	−	−	−
TOTAL SCORE			

UIL Calculator Applications

Test 22F

(District)

DO NOT OPEN THE TEST UNTIL INSTRUCTED TO BEGIN

I. Calculator Applications rules and scoring—See UIL Constitution

II. How to write the answers

A. For all problems except stated problems as noted below—write three significant digits.

1. Examples (* means correct but not recommended)

Correct: 12.3, 123, 123.*, 1.23x10*, $1.23\text{x}10^{0}$*, $1.23\text{x}10^{1}$, $1.23\text{x}10^{01}$, .0190, 0.0190, $1.90\text{x}10^{-2}$

Incorrect: 12.30, 123.0, $1.23(10)^{2}$, $1.23\cdot10^{2}$, $1.230\text{x}10^{2}$, $1.23*10^{2}$, 0.19, $1.9\text{x}10^{-2}$, $19.0\text{x}10^{-3}$, 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. Answers must be in fixed notation. The decimal point and cents are required for exact-dollar answers.

4. Significant digit problems are indicated by underlined numbers and by (SD) in the answer blank. See the UIL Constitution and Contest Manual for details.

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); exp(u) means e^{u}.

22F-1. $-44.5 + 27.6 - 134$ ---------- 1=_____

22F-2. $(0.754 + 0.0227) \times (0.805) - 1.62$ ---------- 2=_____

22F-3. $(0.437 + 0.845 - 0.607)/(0.909) + 0.25$ ---------- 3=_____

22F-4. $\dfrac{9530 + 10500 - 3420}{(0.0731)(0.0476)(-0.0884)}$ ---------- 4=_____

22F-5. $-4.50\text{x}10^{7} + 1.37\text{x}10^{7} - 1.01\text{x}10^{8} + \dfrac{(-65000 + 13000)}{(-0.0853)(-0.0441)}$ --------- 5=_____

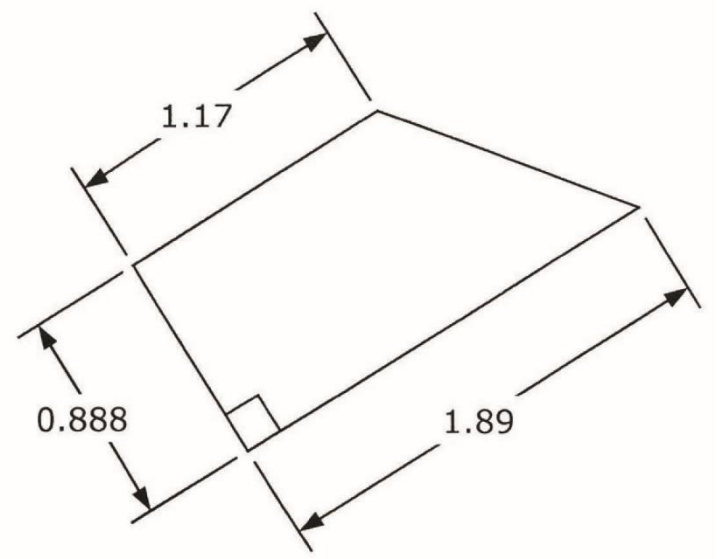
22F-6. What is 201 divided by 3.23? ---------- 6=_____

22F-7. What is the square of the sum of 16.8 and 13.3? ---------- 7=_____

22F-8. What is d if Log(d) = 0.6631? ---------- 8=_____

22F-9.

RIGHT TRAPEZOID

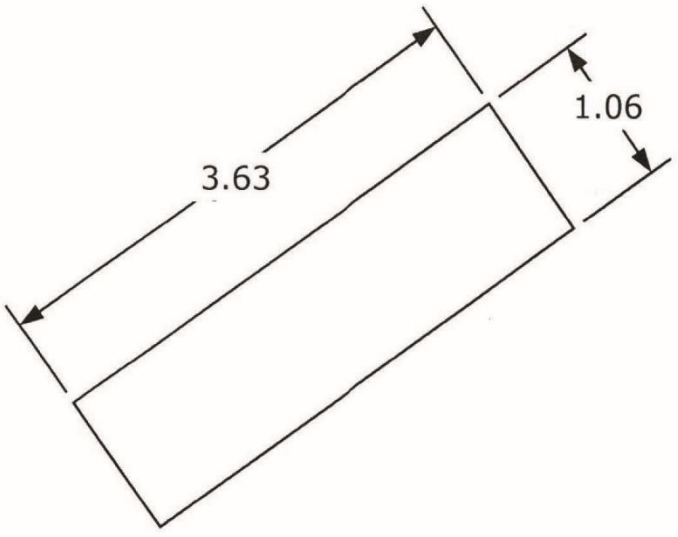


Area = ?

22F-9 =_____

22F-10.

RECTANGLE



Area = ?

22F-10 =_____

22F-11. $\dfrac{(8.5)(\pi) - (5.93)(-7.27) + 12.9}{48.6 + (-1.68)(-9.05)}$ ---------- 11=_____

22F-12. $\dfrac{(3.38)(-7.24) - (\pi + 3.78)(-4.74)}{(-2.27 + 2.8 + 0.57)(-6.09)}$ ---------- 12=_____

22F-13. $\dfrac{(-7.69\text{x}10^{-5} - 1.49\text{x}10^{-4})\{-0.922 + (0.477)(-0.976)\}}{(0.973)(-0.43 + 0.224)(0.654)(0.209)}$ ---------- 13=_____

22F-14. $\dfrac{\{(0.309 + 0.384)(7.4 + 12.9) + 17.3 - 11.7\}}{(-198 - 29.9)(-95 + 655 - 346)}$ ---------- 14=_____

22F-15. $\dfrac{(0.0353 + 0.0696)}{1.72 - 3.55} + \dfrac{-0.0586}{26.7 + 54.2} + \dfrac{(0.266)(351 - 95)}{(-860)(0.501)}$ ---------- 15=_____

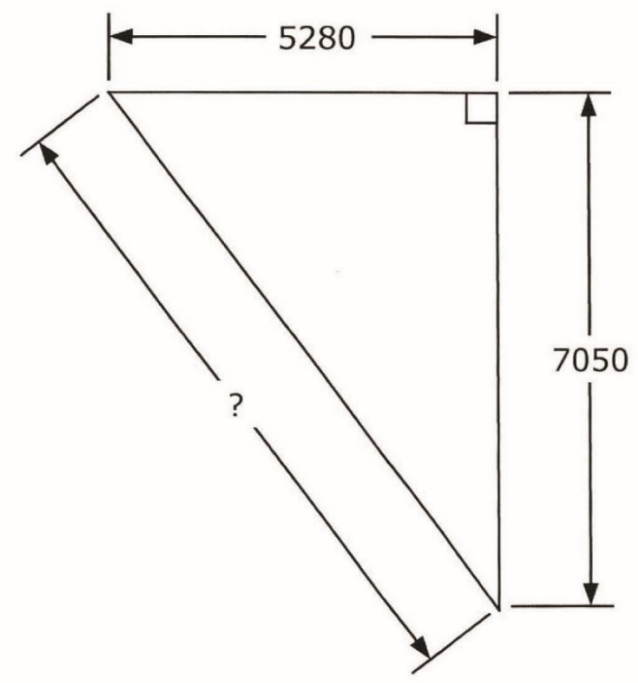
22F-16. Sam wants to lose 6 pounds in 30 days. If 3500 calories correspond to one pound of weight, by what amount should he reduce his daily caloric intake? ---------- 16=_____calories

22F-17. Danny wants to buy lunch at a restaurant. What is the most expensive menu item he can order if the total, including the 8.125% tax and tip, is no more than $20? Tax is charged only on the menu item, but the tip is 18% of the (menu item + tax) sum. ---------- 17=$_____

22F-18. A dozen breakfast tacos at Taco Cabana costs $10.99. A single taco costs $1.09. What are the most tacos one can buy for which it is cheaper to buy them singly rather than get the dozen? ---------- 18=_____integer

22F-19.

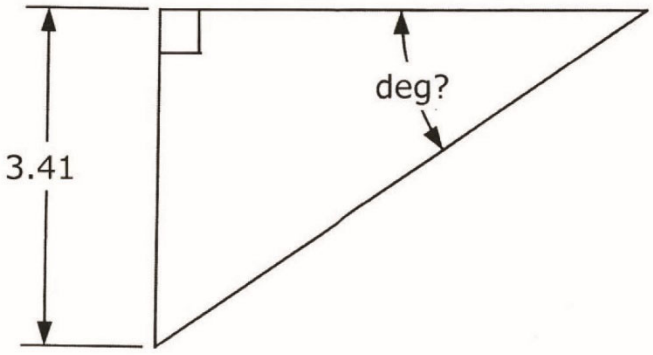
RIGHT TRIANGLE



22F-19 =_____

22F-20.

RIGHT TRIANGLE



Area = 8.62

22F-20 =_____

22F-21. $\dfrac{1}{7.79 + 12.8} + \dfrac{1}{5.39 - 5.56} + \dfrac{1}{(4.16)}$ ---------- 21=_____

22F-22. $\left[\dfrac{\sqrt{1.17 - 0.978}}{6.82} + \dfrac{(0.00632)}{0.219}\right]^2$ ---------- 22=_____

22F-23. $\left[-56.1 + \sqrt{2620}\right]^2 \times \left[664 + 1660\right]^2 \times \sqrt{48.4/27.8}$ ---------- 23=_____

22F-24. $\left[\dfrac{5.42 + 3.89 + \sqrt{0.542/0.33}}{-7.32 + 6.39}\right]^2$ ---------- 24=_____

22F-25. $(-0.0803)(-10.3)\sqrt{(-0.979)^2/0.325} + 1/\sqrt{0.43 + 3.92}$ ---------- 25=_____

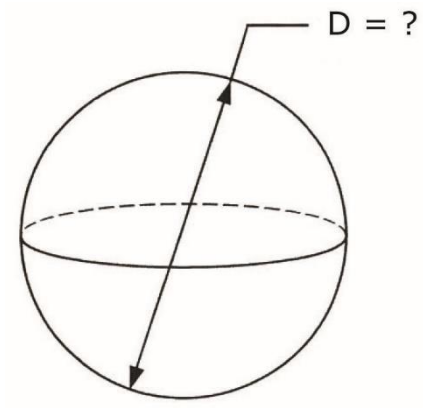
22F-26. In a large university math class of 100π (i.e., 314) students, the professor noticed that the number of male students equaled $\sqrt{2}$ times the number of female students. How many male students were in the class? ----- 26=_____integer

22F-27. Wendy left her house and walked along streets which are parallel and orthogonal to avenues. She was at one point a straight-line distance of 1.607 mi from home. What was her maximum walking distance, assuming she was always walking away from home? ---------- 27=_____mi

22F-28. The planet Neptune has a mean radius of 24,622 km. It has 17.147 earth masses. The mean density of earth is 5.514 g/cm^3. What is the mean density of Neptune? ---------- 28=_____g/cm^3(SD)

22F-29.

SPHERE

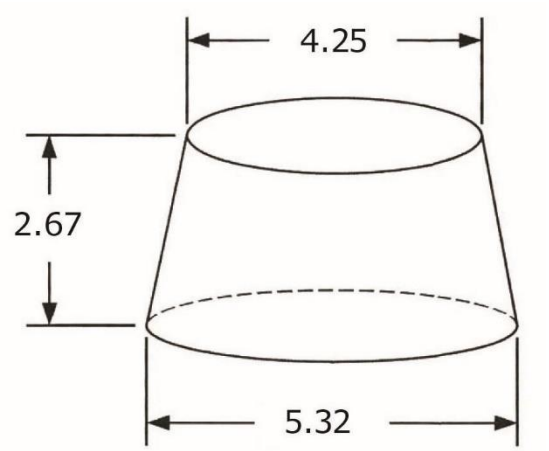


Volume = 44.6

22F-29 =_____

22F-30.

FRUSTUM



Volume = ?

22F-30 =_____

22F-31. $\dfrac{(-5.62 + 8.63)^2}{\sqrt{38.7 - 31.5}} + \dfrac{12.5}{\sqrt{7.14 + 52.8}}$ ---------- 31=_____

22F-32. $\dfrac{1}{1.25\text{x}10^{-4}} + \dfrac{1}{\sqrt{8.87\text{x}10^{-7}}} + \dfrac{(8.85 + 48.9 - 21.5)^2}{\sqrt{2.71 - 0.537}}$ ---------- 32=_____

22F-33. $\dfrac{(3.53\text{x}10^{5})^2(3.25\text{x}10^{-12} + 2.06\text{x}10^{-12})}{4.47 + (-0.292)(50.8)} + \dfrac{1}{\dfrac{1}{-0.0168} + \dfrac{1}{(0.0506)}}$ 33=_____

22F-34. $\dfrac{\sqrt{(4.63)/\left\{(0.0266)/\sqrt{1.94}\right\}}}{8.59 + (0.95)(5.4)} + \{0.365 + 0.783\}^{1/2}$ ---------- 34=_____

22F-35. $\dfrac{\left[\dfrac{(0.0461 + 0.0445)}{(486 + 676)}\right]^2 + \sqrt{\dfrac{6.58\text{x}10^{-18} + 1.46\text{x}10^{-17}}{\sqrt{0.455}}}}{\{(0.0162)/(-0.0445)\}^2}$ --------- 35=_____

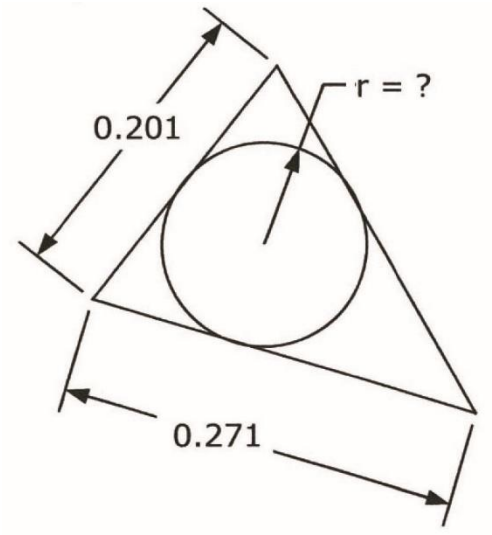
22F-36. A bacteria doubles in number every 6 hr. How long would it take to triple in number? ---------- 36=_____ hr

22F-37. What is the roaming area of a dog on a 20-ft leash tied to the corner of a 12 ft by 12 ft shed? ---------- 37=_____ ft^2

22F-38. A blue moon is the second full moon in a month. If a moon cycles every 29.5 days, how many blue moons occur on average in a year? ---------- 38=_____

22F-39.

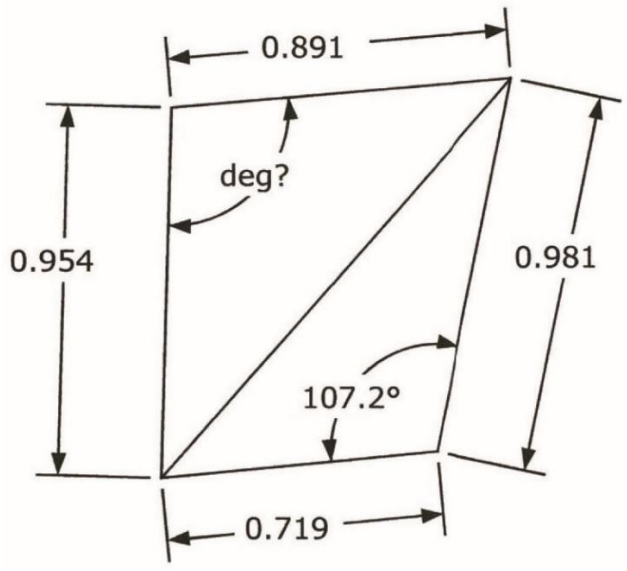
CIRCLE AND ISOSCELES TRIANGLE



22F-39 =_____

22F-40.

SCALENE TRIANGLES



22F-40 =_____

22F-41. $\dfrac{10^{-(2.9\,-\,\pi)}}{8.59\text{x}10^{-7} + 1.22\text{x}10^{-7}}$ ---------- 41=_____

22F-42. $\dfrac{e^{+0.373} + e^{-0.729}}{(191 + 408)}$ ---------- 42=_____

22F-43. $(764)\text{Log}\,\{(8110)(2.22 + 1/0.375)\}$ ---------- 43=_____

22F-44. $(4.4)^{3} + (8.72 - 3.86)^{1.48}$ ---------- 44=_____

22F-45.(deg) $\dfrac{\cos\{(70.7°)/(8.85)\}}{\sin\{63.6° - 256°\}}$ ---------- 45=_____

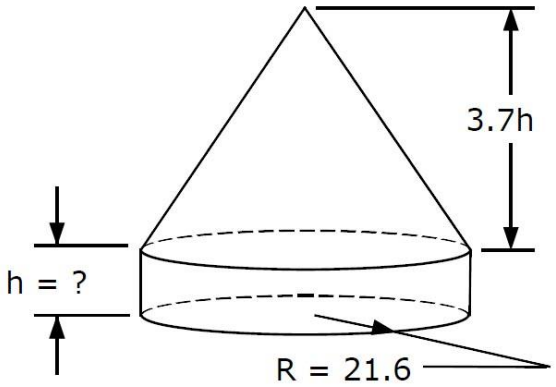
22F-46. A 6-in tall puppy eats 0.15 can of dogfood daily. How much would the dog eat daily when full-grown, 14-in tall? ---------- 46=_____cans

22F-47. Pine 2x4 lumber is priced by its length: (8 ft, $10.27), (12 ft, $15.42), and (16 ft, $20.35). What is the percent error in the interpolated cost of a 10-ft 2x4 if the actual cost is $12.47? ---------- 47=_____%

22F-48. Solve for s>1 if $5\sqrt{s} = s^{2}+0.25$. ---------- 48=_____

22F-49.

CYLINDER AND CONE

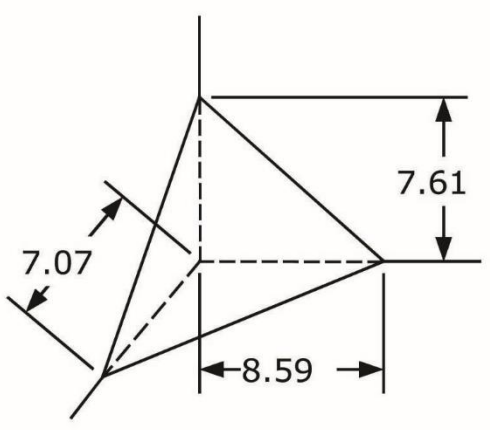


Total Surface Area(Cylinder) = Total Surface Area (Cone)

22F-49 =_____

22F-50.

CORNER OF A CUBE



Volume = ?

22F-50 =_____

22F-51. $\dfrac{10^{(0.381)} \times 10^{-(0.631)} + 0.736}{10^{(0.885 + 0.505)}}$ ---------- 51=_____

22F-52. $\dfrac{1 + e^{+\{0.255 + (0.65)(4.82)\}}}{(-8.49\times10^{-6})(1.7 - e^{(-0.427)})}$ ---------- 52=_____

22F-53. $(4.25\times10^{-5})\ \text{Ln}\left[\dfrac{5.05\times10^{-4} + (6.81\times10^{-4})(0.17)}{7.24\times10^{-4} + 7.31\times10^{-4}}\right]$ ---------- 53=_____

22F-54. $\dfrac{(-27.4 + 45.3)^{-0.815}}{(\pi)^{-(0.459 + 0.179)}}$ ---------- 54=_____

22F-55.(rad) $\dfrac{\arctan\{3.17 + (8.93)(0.2)\}}{\arcsin\{(593 + 250)/3380\}}$ ---------- 55=_____

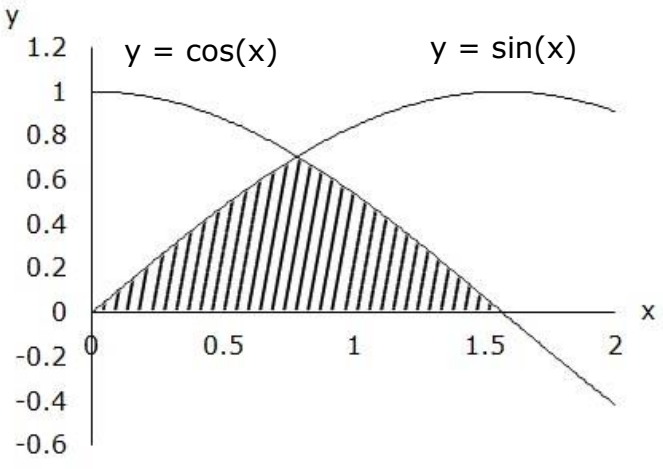
22F-56. What is the slope of the curve y = sin(x)/x when x = π/4? ---------- 56=_____

22F-57. Baseball bases are 90 ft apart. A batter hits a single and runs towards first base at 12 ft/s. A runner already on first base heads for second with no lead-off, running at 17 ft/s. What is their distance of closest approach? ---------- 57=_____ ft

22F-58. What is P_{22} if $P = \begin{bmatrix}1 & -1 & -3\\ -1 & -4 & 4\\ -3 & 4 & 2\end{bmatrix}\begin{bmatrix}9 & 7\\ 6 & 7\\ -5 & -3\end{bmatrix}$? ---------- 58=_____

22F-59.

radians

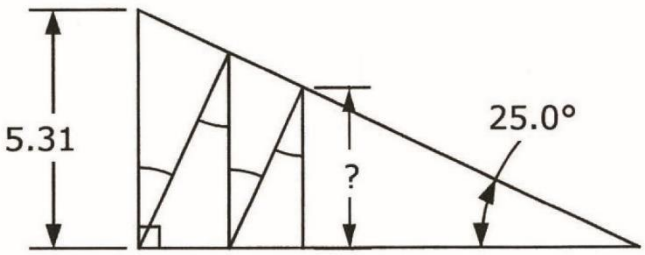


Hatched Area = ?

22F-59 =_____

22F-60.

RIGHT TRIANGLES



All marked angles = 25°

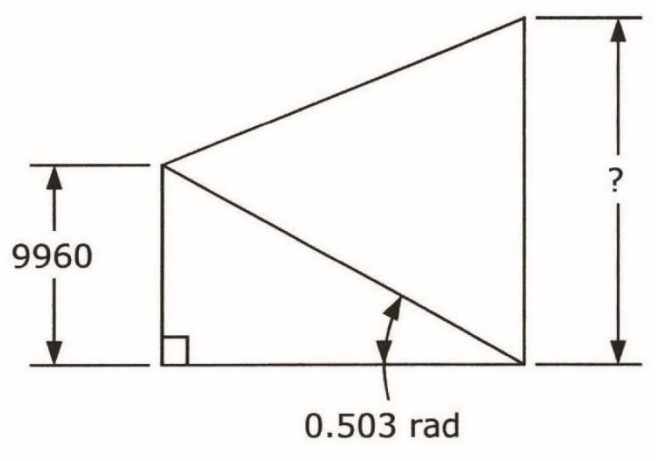
22F-60 =_____

22F-61. The Lambert-Beer Law defines what fraction of light I_o transmits through a plate t thick: $I = I_o\exp(-\mu t)$ where I is the intensity transmitted and μ is a constant. If a plate 0.25 in thick transmits 80% of the light, what plate thickness transmits 5% of the incident light? ---------- 61=_____ in

22F-62. The odds of finding a pearl in an oyster is 1/12,000. What is this fraction raised to the 28,335 power? ---------- 62=_____

22F-63. Ellie stands on a tall ladder. She tosses a screwdriver from an elevation of 20 ft with a release velocity of 45 fps at a 35° angle relative to the horizontal. At what horizontal distance from the ladder does the screwdriver hit the ground? ---------- 63=_____ ft

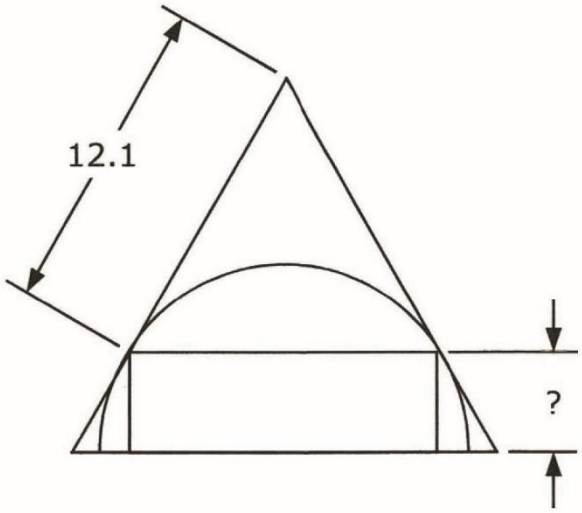
22F-64.
RIGHT TRAPEZOID, RIGHT AND SCALENE TRIANGLE



Area(Trapezoid) = $2.48\text{x}10^8$

22F-64 =_____

22F-65.
EQUILATERAL TRIANGLE, SEMICIRCLE AND RECTANGLE



22F-65 =_____

22F-66. $\dfrac{\left\{e^{0.137} + e^{-0.137}\right\}^2}{\sqrt{e^{(-44.7)(0.21)} \text{ x } \left(1/e^{(-5.67)}\right)}}$ ---------- 66=_____

22F-67. (rad) sin(5.41)cos(3.1) – cos(5.41)sin(3.1) ---------- 67=_____

22F-68. (rad) $(8.67)\left[\dfrac{\cos(-2.91)}{(-2.91)} + \dfrac{\cos(9.71)}{(9.71)}\right]$ ---------- 68=_____

22F-69. $\dfrac{1}{(0.39)} + \dfrac{1}{3(0.39)^3} + \dfrac{1}{5(0.39)^5} + \dfrac{1}{7(0.39)^7}$ ---------- 69=_____

22F-70. $\dfrac{(0.25)}{(-1.31)} - \dfrac{(6.11)}{(9.52)^2}\,\text{Ln}\left[\dfrac{(-0.0976)^2 + (0.00582)}{(1.81) + \sqrt{3.95}}\right]$ ---------- 70=_____

22F-1 = -151
= -1.51×10^{2}

22F-2 = -0.995
= -9.95×10^{-1}

22F-3 = 0.993
= 9.93×10^{-1}

22F-4 = -5.40×10^{7}

22F-5 = -1.46×10^{8}

22F-6 = 62.2
= 6.22×10^{1}

22F-7 = 906
= 9.06×10^{2}

22F-8 = 4.60
= 4.60×10^{0}

22F-9 = 1.36
= 1.36×10^{0}

22F-10 = 3.85
= 3.85×10^{0}

22F-11 = 1.30
= 1.30×10^{0}

22F-12 = -1.24
= -1.24×10^{0}

22F-13 = -0.0114
= -1.14×10^{-2}

22F-14 = -0.000403
= -4.03×10^{-4}

22F-15 = -0.216
= -2.16×10^{-1}

22F-16 = 700
= 7.00×10^{2}

22F-17 = $15.67

22F-18 = 10 integer

22F-19 = 8810
= 8.81×10^{3}

22F-20 = 34.0
= 3.40×10^{1}

22F-21 = -5.59
= -5.59×10^{0}

22F-22 = 0.00867
= 8.67×10^{-3}

22F-23 = 1.72×10^{8}

22F-24 = 130
= 1.30×10^{2}

22F-25 = 1.90
= 1.90×10^{0}

22F-26 = 184 integer

22F-27 = 2.27
= 2.27×10^{0}

22F-28 = 1.640
= 1.640×10^{0} (4SD)

22F-29 = 4.40
= 4.40×10^{0}

22F-30 = 48.2
= 4.82×10^{1}

22F-31 = 4.99
= 4.99×10^{0}

22F-32 = 9950
= 9.95×10^{3}

22F-33 = -0.0890
= -8.90×10^{-2}

22F-34 = 2.21
= 2.21×10^{0}

22F-35 = 8.82×10^{-8}

22F-36 = 9.51
= 9.51×10^{0}

22F-37 = 1040
= 1.04×10^{3}

22F-38 = 0.382
= 3.82×10^{-1}

22F-39 = 0.0681
= 6.81×10^{-2}

22F-40 = 96.5
= 9.65×10^{1}

22F-41 = 1.78×10^{6}

22F-42 = 0.00323
= 3.23×10^{-3}

22F-43 = 3510
= 3.51×10^{3}

22F-44 = 95.6
= 9.56×10^{1}

22F-45 = 4.61
= 4.61×10^{0}

22F-46 = 1.91
= 1.91×10^{0}

22F-47 = 2.86
= 2.86×10^{0}

22F-48 = 2.87
= 2.87×10^{0}

22F-49 = 8.92
= 8.92×10^{0}

22F-50 = 77.0
= 7.70×10^{1}

22F-51 = 0.0529
= 5.29×10^{-2}

22F-52 = -3.44×10^{6}

22F-53 = -3.62×10^{-5}

22F-54 = 0.198
= 1.98×10^{-1}

22F-55 = 5.44
= 5.44×10^{0}

22F-56 = -0.246
= -2.46×10^{-1}

22F-57 = 73.5
= 7.35×10^{1}

22F-58 = -47.0
= -4.70×10^{1}

22F-59 = 0.586
= 5.86×10^{-1}

22F-60 = 3.58
= 3.58×10^{0}

22F-61 = 3.36
= 3.36×10^{0}

22F-62 = $2.51 \times 10^{-115,584}$

22F-63 = 80.2
= 8.02×10^{1}

22F-64 = 17400
= 1.74×10^{4}

22F-65 = 3.49
= 3.49×10^{0}

22F-66 = 26.1
= 2.61×10^{1}

22F-67 = 0.739
= 7.39×10^{-1}

22F-68 = 2.04
= 2.04×10^{0}

22F-69 = 134
= 1.34×10^{2}

22F-70 = 0.181
= 1.81×10^{-1}