Name _____

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

UIL Calculator Applications

Test 24F

(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*, $1.23x10^{0*}$

                $1.23x10^{1}$, $1.23x10^{01}$, .0190, 0.0190, $1.90x10^{-2}$

       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. 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}.
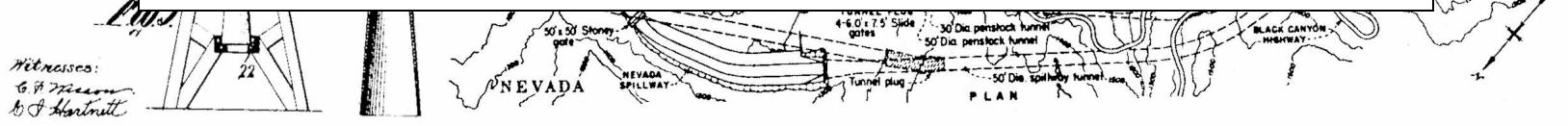
24F-1.　(2.17 − 0.855)/(−86.7) --- 1=_____

24F-2.　(−0.972 + 0.549 − 0.292) x 0.759 ------------------------------------- 2=_____

24F-3.　(−9.97 + 20.5 − 3.32)/(−7.63) + 0.731 ------------------------------ 3=_____

24F-4.　$\dfrac{(5770 - 5750)}{\{(0.256)/(8.45)\}}$ + (328 − 87.6) -------------------------------------- 4=_____

24F-5.　$1.62 \times 10^8 + 6.64 \times 10^7 - 1.45 \times 10^8 + \dfrac{(-28000 + 14600)}{(0.00121)(-0.0817)}$ ----------- 5=_____

24F-6. What is 706 divided by 0.0593? -- 6=_____

24F-7. What is the remainder of 5870 divided by 9.81? ----------------------- 7=_____

24F-8. Sam walks 6 laps around a 440-yd track. How far did he walk? ------- 8=_____ yd
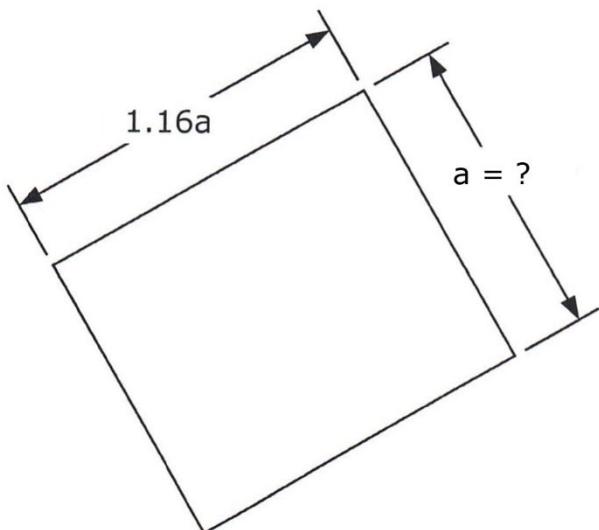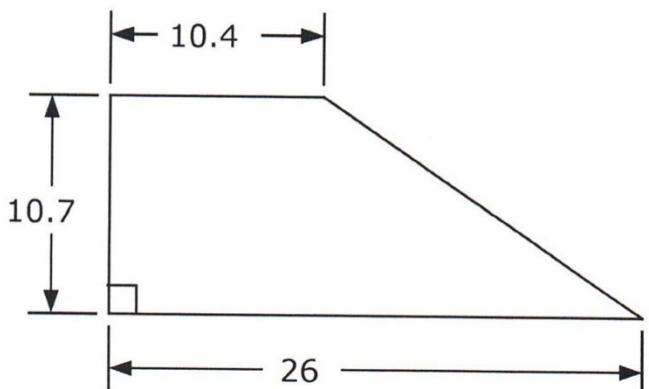
24F-9.	24F-10.
RECTANGLE	RIGHT TRAPEZOID
1.16a	10.4
a = ?	10.7
Area = 5.28	26
	Perimeter = ?
24F-9 =_____	24F-10 =_____

24F-11. $\dfrac{(-218)(851) - (-217)(226) + 1.24 \times 10^5}{-8.72 \times 10^5 + (-642)(824)}$ ------------------------ 11=_____

24F-12. $\dfrac{(0.0888 + 0.0267 - 0.036)(-0.0225)(-0.055)}{(7.15 - 6.84)(-0.074 - 0.175)}$ ------------------ 12=_____

24F-13. $\dfrac{(-9.27 \times 10^{-5} - 1.28 \times 10^{-4})\{-30.4 + (\pi)(-2.46)\}}{(6.57)(-0.821 + 0.544)(-7.46)(4.01)}$ --------------- 13=_____

24F-14. $\dfrac{(64.4 + 28)(4.21 + 14.6)(74.9 - 566)}{(-0.616 + 0.399)(0.993)\{(-0.172)/(-0.144)\}}$ ------------------ 14=_____

24F-15. $\dfrac{(16000 + 12700 - 29500)(0.985 - 0.851 - 1.13)}{(9.98)(8.26)(\pi)(6.12 + 2.92 + 7.55)}$ -------------- 15=_____

24F-16. Text 0.5 in tall is easily legible from 6 ft away. What should the text on a billboard be to be easily legible for someone in a car 0.1 mi away? --- 16=_____ in

24F-17. Don and Mary celebrated their 50th wedding anniversary. How long were they married? -- 17=_____ sec

24F-18. Ted invested $1250 but lost money. If the percent decrease was 12.7%, how much money did he lose? ------------------------------------ 18=$_____

24F-19.

RIGHT TRIANGLE

82.5

69.1
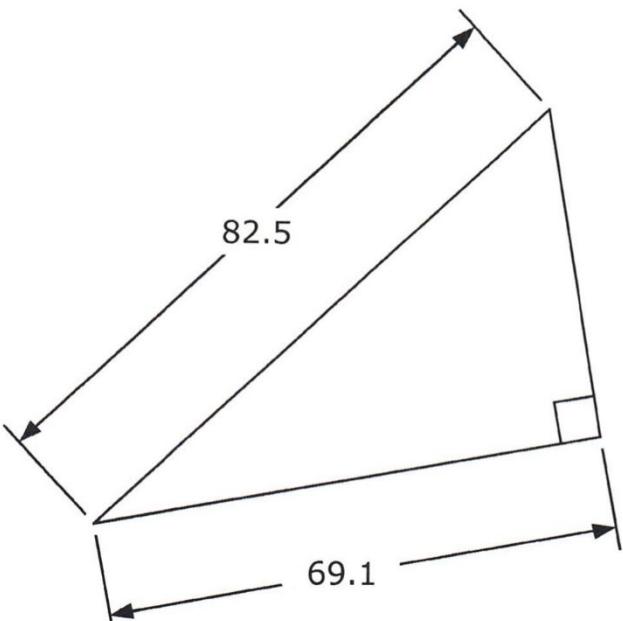
Perimeter = ?

24F-19 =_____

24F-20.

RIGHT TRIANGLE

7010

32.5°
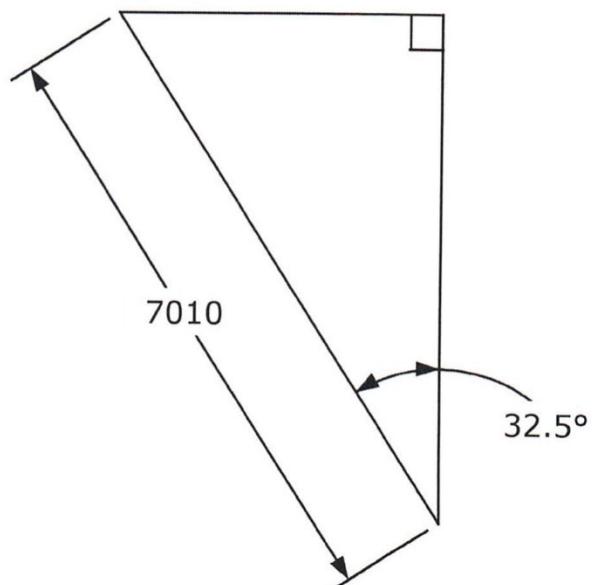
Area = ?

24F-20 =_____

24F-21. $\sqrt{\dfrac{(4.57)(1.79)}{193 + 137}} + 0.0794$ -- 21=_____

24F-22. $\left[\dfrac{(0.314)(0.546)}{-8.84} + 0.018\right]^2 + \sqrt{1.09\text{x}10^{-12}}$ ----------------------- 22=_____

24F-23. $\left[-77.1 + \sqrt{2590}\right]^2 \times \left[665 + 1330\right]^2 \times \sqrt{0.552/0.824}$ -------------- 23=_____

24F-24. $(0.198)(94.7) + \sqrt{(24.2)/(5.29)} + \left[(0.272)(\pi)\right]^2$ ------------------ 24=_____

24F-25. $\dfrac{\sqrt{0.0565 + 0.0289 + (0.00691)/(0.0823)}}{-0.0107 + 0.00663}$ -------------------------- 25=_____

24F-26. A Farmer Pat walked off a square, one-acre field. She estimated the side dimension to be 195 ft. What was the percent error in her measurement? --- 26=_____ %(SD)

24F-27. The mass of earth's moon is $7.34767309 \times 10^{22}$ kg. A meteorite weighing 11,000 lbs crashes into the moon. What is the percent change in moon mass? --- 27=_____ %

24F-28. The product of two consecutive, positive integers is 407,682. What is their sum? -- 28=_____ integer

24F-29.
RECTANGULAR SOLID

46.3

?

30.2
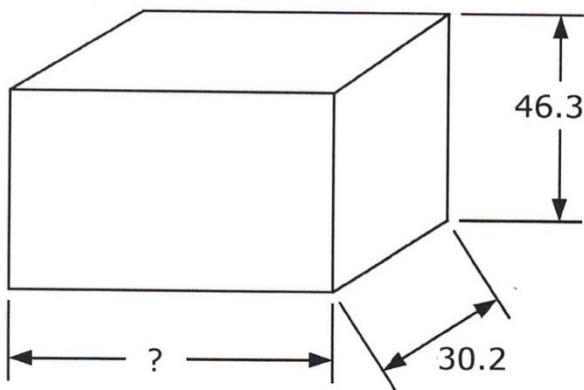
Volume = 101,000

24F-29 =_____

24F-30.
SQUARE PYRAMID

0.344

0.294
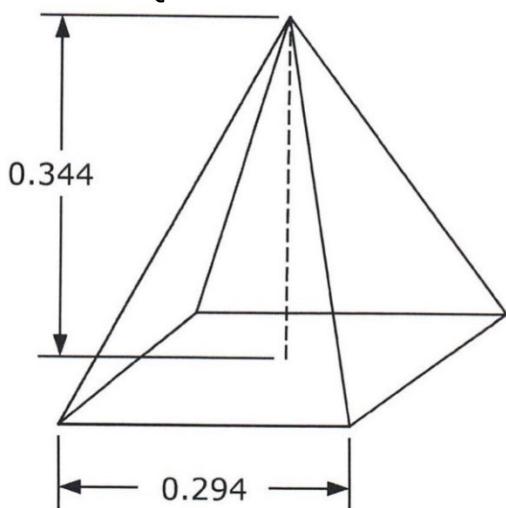
Total Surface Area = ?

24F-30 =_____

24F-31. $\dfrac{(-6.97 \times 10^6 + 8.58 \times 10^6)^2}{\sqrt{29.4 - 4.96}} + \dfrac{4.52 \times 10^{14}}{\sqrt{6.20 \times 10^6 + 1.29 \times 10^7}}$ ------------- 31=_____

24F-32. $\dfrac{1}{0.00216} + \dfrac{1}{\sqrt{5.98 \times 10^{-6}}} + \dfrac{(8.97 + 12.9 - 11.5)^2}{\sqrt{0.443 - 0.1}}$ ------------------ 32=_____

24F-33. $\dfrac{(9.09 \times 10^5)^2 (1.17 \times 10^{-12} + 1.89 \times 10^{-13})}{8.67 + (-0.858)(-11.2)} + \dfrac{1}{\dfrac{1}{0.038} + \dfrac{1}{(-0.0405)}}$ --- 33=_____

24F-34. $\dfrac{[(0.397 - 0.12)(0.803/0.306)]^{1/2}}{(0.268)^2 + (0.157 + 0.232)^2 + 0.113}$ --------------------------------- 34=_____

24F-35. $\dfrac{\left[\dfrac{\sqrt{4540 + 4800}}{(2110)(3160)+(2590)^2}\right]}{\sqrt{639 + 1200} + (5.6 - 0.705)^2}$ --- 35=_____

24F-36. In a room full of people, 40% are men. One third of the women are blond. Of the blond women, one third have military experience. If 9 blond women have military experience, how many people are in the room? ---------- 36=_____ integer

24F-37. What is the positive slope of the line passing through the point (2,10) that is tangent to the circle $x^2 + y^2 = 30$? --------------------------------- 37=_____

24F-38. Japanese high-speed trains travel at 190 mph. They require 5 min to accelerate to this speed from rest or to decelerate to rest from this speed. How long would it take to go from Tokyo to Osaka, a distance of 493 km? ---- 38=_____ hr

24F-39.

SCALENE TRIANGLE AND CIRCUMSCRIBED CIRCLE
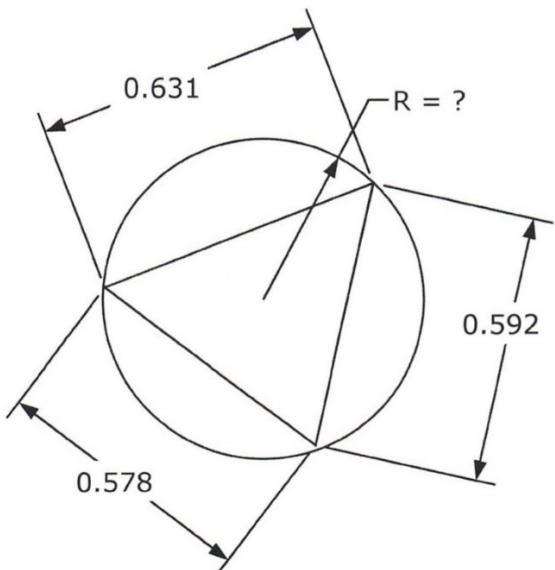
24F-39 =_____

24F-40.

ISOSCELES AND SCALENE TRIANGLES
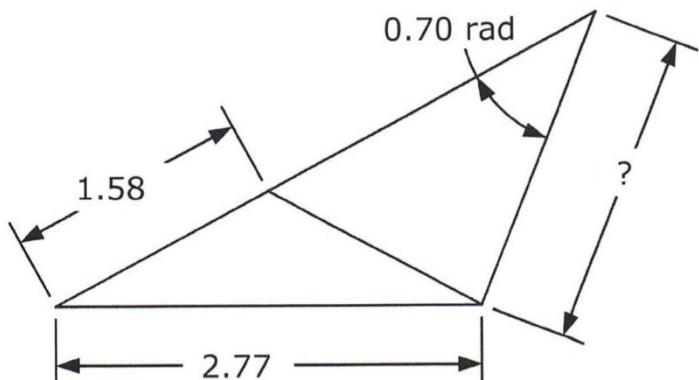
24F-40 =_____

24F-41.　$(-93700)(-23800)10^{\{72300/26700\}}$　----------------------------- 41=_____

24F-42.　$\dfrac{(-50400)}{(9.51 \times 10^5)} \left[1 - e^{-(0.745)(0.592)} \right]$　----------------------------- 42=_____

24F-43.　$\dfrac{(0.00423)\text{Log}(0.0038 - 0.00309)}{(-0.00326)}$　----------------------------- 43=_____

24F-44.　$(0.0715 + 0.186)^{-(0.687 + 0.673)}$　----------------------------- 44=_____

24F-45.(deg)　$\sin \left[90° \times \dfrac{(3.21)}{(4.38)} \right] + \cos \{127° - 37.9°\}$　-------------------- 45=_____

24F-46. A 12-in pillow requires 11 wads of stuffing. How many wads does
a 30-in pillow need? -- 46=_____ wads

24F-47. The growth of a beagle dog is measured based on its height and
weight: (9 in, 9.5 lbs), (9.7 in, 11.25 lbs), (10.3 in, 13 lbs),
(10.9 in, 15 lbs), (11.3 in, 16 lbs), and (12 in, 18.5 lbs). Estimate the
weight of a full-grown beagle that stands 14 in tall. --------------------------- 47=_____ lbs

24F-48. What is x if $x^5 = 3x^2 + 1$? -- 48=_____

24F-49. HALF CYLINDER PRISM AND RECTANGULAR SOLID	24F-50. HEMISPHERE WITH CONICAL CAVITY
  R = ? 660 1510 Total Volume = 2.10x10⁹	 R = ? Total Surface Area = 0.475
24F-49 =_____	24F-50 =_____
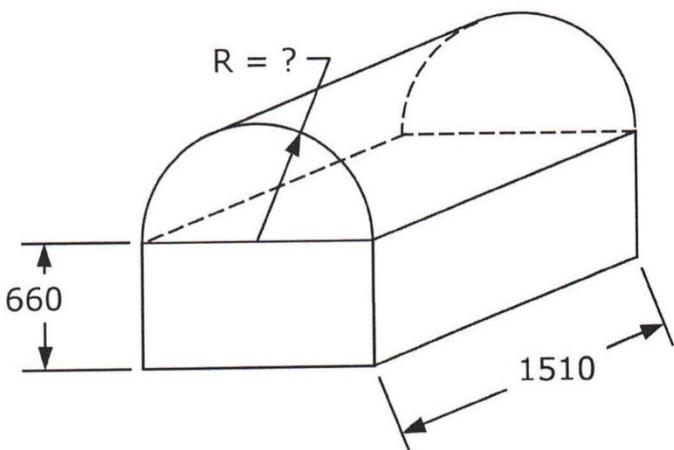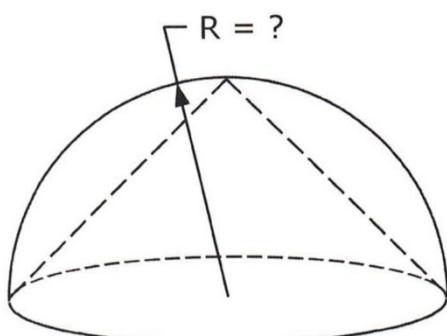
24F-51. $\dfrac{10^{(0.916)} \times 10^{-(0.47)} + 0.528}{10^{(5.59 + 0.886)}}$ ----------------------------------- 51=_____

24F-52. $\dfrac{(-3.92\times10^{-5} - 4.25\times10^{-6})\, e^{(0.838)(0.523)}}{e^{-(8.88 - 6.11)}}$ ---------------------- 52=_____

24F-53. $\dfrac{\text{Ln}\left\{(4.13\times10^5)(4.82\times10^5)(9.34\times10^5)\right\}}{1.85\times10^5 + (22600)\,\text{Ln}(1.82\times10^5)}$ --------------------------- 53=_____

24F-54. $\dfrac{(7.49)^{0.39} - (1.91)^{-0.309}}{3.54\times10^{-4} + 5.89\times10^{-5}}$ --- 54=_____

24F-55.(rad) $\arctan\left[\dfrac{(4280)(0.324)}{(3.78)(73.1)}\right] + (0.36)(1.46)$ ---------------------- 55=_____

24F-56. (rad) Solve for A if the area under the curve y = Asin(x) equals 6 for 0<x<π. --- 56=_____

24F-57. A car accelerates from rest. Its acceleration a increases according to a = (5 ft/s^3)t. How far has the car traveled when its velocity reaches 100 mph? --- 57=_____ ft

24F-58. What is D_{11} if **D** = 3**F**+5**N**, **F** = $\begin{bmatrix} -8 & 16 \\ 27 & -22 \end{bmatrix}$, and **N** = $\begin{bmatrix} 13 & -8 \\ 26 & 14 \end{bmatrix}$? --------- 58=_____

24F-59.
SOLID OF REVOLUTION (y = 0)

y = x^2

y = 2x

Volume = ?
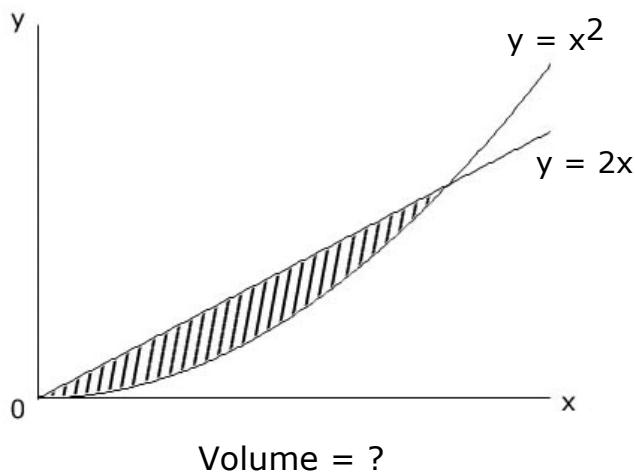
24F-59 =_____

24F-60.
THREE IDENTICAL CIRCLES AND SMALL TANGENT CIRCLE

R = 776

D = ?
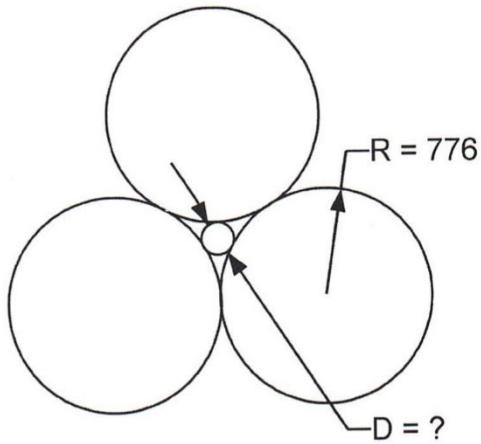
24F-60 =_____

24F-61. The tensile failure load of a rod is proportional to the rod's cross-sectional area. A 0.25 in diameter steel rod may be loaded in tension by a force equal to 1400 lb before it fails. It is loaded to 650 lb and placed in a corrosive environment. The surface is lost at a rate of 0.002 in/hr. How long is the loaded rod in the corrosive environment before it fails? ------------ 61=_____ hr

24F-62. Calculate $(378,856^{14})^{151}$. --- 62=_____

24F-63. A smoke bomb has a fuse that burns at 0.7 in/s. Hank lights the fuse and immediately throws it with a release velocity of 45 mph and release angle of 65° relative to the ground. If the smoke bomb activates 2 s after hitting the ground, how long should the fuse be? The initial and final elevations are equal. -- 63=_____ in

---

24F-64.

REGULAR PENTAGON
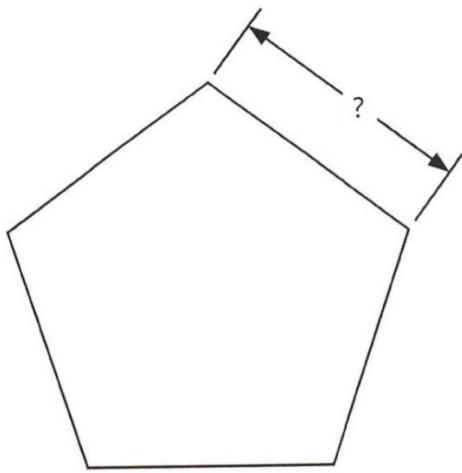
Area = 117

24F-64 =_____

24F-65.

RECTANGLE AND EQUILATERAL TRIANGLE
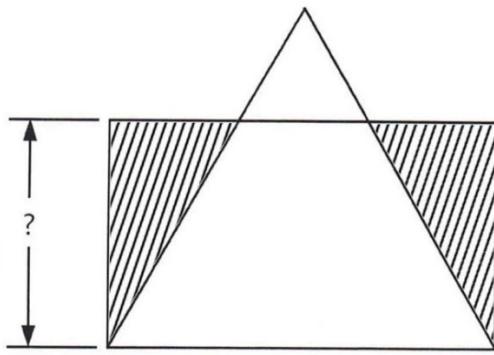
$$\frac{\text{Hatched}}{\text{Area}} = \frac{\text{Isosceles Trapezoidal Area}}{2} = 3.39$$

24F-65 =_____

24F-66. $\dfrac{(10^{1.89})(10^{5.96})(10^{0.314})}{10^{\{(8.25)(0.335)\}}}$ --- 66=_____

24F-67. (rad) $\sin(4.3)\cos(3.32) - \cos(4.3)\sin(3.32)$ --------------------------- 67=_____

24F-68. (deg) $\sqrt{1 + \left[\dfrac{\cos(133°)}{\sin(133°)}\right]^2} \times \dfrac{\cos(-62.6°)}{\sin(-62.6°)}$ ------------------------------- 68=_____

24F-69. $(0.64) - \dfrac{(0.64)^2}{2} + \dfrac{(0.64)^3}{3} - \dfrac{(0.64)^4}{4}$ --------------------------------- 69=_____

24F-70. $\dfrac{0.545}{\sqrt{0.138}} \ \text{Ln}\left[\dfrac{\sqrt{(0.244)^2 + (0.0426)} + \sqrt{0.0685}}{\sqrt{0.453} + (39.8)(0.00979)}\right]$ -------------------- 70=_____

24F-1   = −0.0152
       = -1.52×10^{-2}

24F-11   = 0.00891
       = 8.91×10^{-3}

24F-21   = 0.237
       = 2.37×10^{-1}

24F-2   = −0.543
       = -5.43×10^{-1}

24F-12   = −0.00127
       = -1.27×10^{-3}

24F-22   = 2.99×10^{-6}

24F-3   = −0.214
       = -2.14×10^{-1}

24F-13   = 0.000155
       = 1.55×10^{-4}

24F-23   = 2.24×10^{9}

24F-24   = 21.6
       = 2.16×10^{1}

24F-4   = 901
       = 9.01×10^{2}

24F-14   = 3.32×10^{6}

24F-25   = −101
       = -1.01×10^{2}

24F-15   = 0.185
       = 1.85×10^{-1}

24F-5   = 2.19×10^{8}

24F-26   = −6.6   (2SD)
       = -6.6×10^{0}

24F-6   = 11900
       = 1.19×10^{4}

24F-16   = 44.0
       = 4.40×10^{1}

24F-27   = 6.79×10^{-18}

24F-7   = 3.62
       = 3.62×10^{0}

24F-17   = 1.58×10^{9}

24F-28   = 1277   integer

24F-18   = $158.75

24F-8   = 2640
       = 2.64×10^{3}

24F-29   = 72.2
       = 7.22×10^{1}

24F-19   = 197
       = 1.97×10^{2}

24F-9   = 2.13
       = 2.13×10^{0}

24F-30   = 0.306
       = 3.06×10^{-1}

24F-20   = 1.11×10^{7}

24F-10   = 66.0
       = 6.60×10^{1}

24F-31 $= 6.28 \times 10^{11}$

24F-32 $= 1060$
$= 1.06 \times 10^3$

24F-33 $= 0.677$
$= 6.77 \times 10^{-1}$

24F-34 $= 2.54$
$= 2.54 \times 10^0$

24F-35 $= 1.08 \times 10^{-7}$

24F-36 $= 135$ integer

24F-37 $= 1.04$
$= 1.04 \times 10^0$

24F-38 $= 1.70$
$= 1.70 \times 10^0$

24F-39 $= 0.347$
$= 3.47 \times 10^{-1}$

24F-40 $= 2.07$
$= 2.07 \times 10^0$

24F-41 $= 1.14 \times 10^{12}$

24F-42 $= -0.0189$
$= -1.89 \times 10^{-2}$

24F-43 $= 4.09$
$= 4.09 \times 10^0$

24F-44 $= 6.33$
$= 6.33 \times 10^0$

24F-45 $= 0.929$
$= 9.29 \times 10^{-1}$

24F-46 $= 172$
$= 1.72 \times 10^2$

24F-47 $= 27.8$
$= 2.78 \times 10^1$

24F-48 $= 1.51$
$= 1.51 \times 10^0$

24F-49 $= 610$
$= 6.10 \times 10^2$

24F-50 $= 0.210$
$= 2.10 \times 10^{-1}$

24F-51 $= 1.11 \times 10^{-6}$

24F-52 $= -0.00107$
$= -1.07 \times 10^{-3}$

24F-53 $= 8.67 \times 10^{-5}$

24F-54 $= 3330$
$= 3.33 \times 10^3$

24F-55 $= 1.90$
$= 1.90 \times 10^0$

24F-56 $= 3.00$
$= 3.00 \times 10^0$

24F-57 $= 374$
$= 3.74 \times 10^2$

24F-58 $= 41.0$
$= 4.10 \times 10^1$

24F-59 $= 13.4$
$= 1.34 \times 10^1$

24F-60 $= 240$
$= 2.40 \times 10^2$

24F-61 $= 19.9$
$= 1.99 \times 10^1$

24F-62 $= 7.84 \times 10^{11,792}$

24F-63 $= 4.00$
$= 4.00 \times 10^0$

24F-64 $= 8.25$
$= 8.25 \times 10^0$

24F-65 $= 2.42$
$= 2.42 \times 10^0$

24F-66 $= 251,000$
$= 2.51 \times 10^5$

24F-67 $= 0.830$
$= 8.30 \times 10^{-1}$

24F-68 $= -0.709$
$= -7.09 \times 10^{-1}$

24F-69 $= 0.481$
$= 4.81 \times 10^{-1}$

24F-70 $= -0.885$
$= -8.85 \times 10^{-1}$