Name _____

5x(Last Problem Attempted) +_____ +_____ +_____

7x(Number Incorrect)   -_____ -_____ -_____

2x(Number Incorrect SDs)   -_____ -_____ -_____

TOTAL SCORE

UIL Calculator Applications
Test 09F
(District Week 1)

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.*, 1.23×10*, 1.23×10^0*
1.23×10^1, 1.23×10^{01}, .0190, 0.0190, 1.90×10^{-2}

Incorrect: 12.30, 123.0, $1.23(10)^2$, $1.23 \cdot 10^2$, 1.230×10^2,
$1.23*10^2$, 0.19, 1.9×10^{-2}, 19.0×10^{-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.

09F-1. 73.8 + 41.7 - 100 --- 1=_____

09F-2. -93.7/19.9 + 3.69 - 4.7 ---------------------------------- 2=_____

09F-3. (-4.38 - 2.68 + 4.18) x (5.57) - 86.7 ------------------ 3=_____

09F-4. $\dfrac{5670 + 11800 - 3120}{(0.0761)\,(-0.0404)\,(0.0353)}$ ------------------ 4=_____

09F-5. 47800 + 43800 - 74200 + $\dfrac{(-24600 + 8180)}{(-0.598)\,(0.88)}$ ----------------- 5=_____

09F-6. What is 3 minus the product of 0.36 and pi? ----------- 6=_____

09F-7. Diane gained 31 lbs during her 40-week pregnancy. What
was her average daily weight gain? ----------------------- 7=_____ oz

09F-8. Estimate the weight of the Mitchell-Hedges Crystal
Skull of Lubaantun. It measures 5 in high, 5 in wide and 7 in
long and is made of pure quartz which has a density of
0.0957 lb/in^3. Assume that the skull occupies 70% of the
rectangular volume. -- 8=_____ lbs

09F-9. PARALLELOGRAM	09F-10. RECTANGLE
Area = ?	Perimeter = ?
0.438 1.00	2890 5010
09F-9 = _____	09F-10 = _____
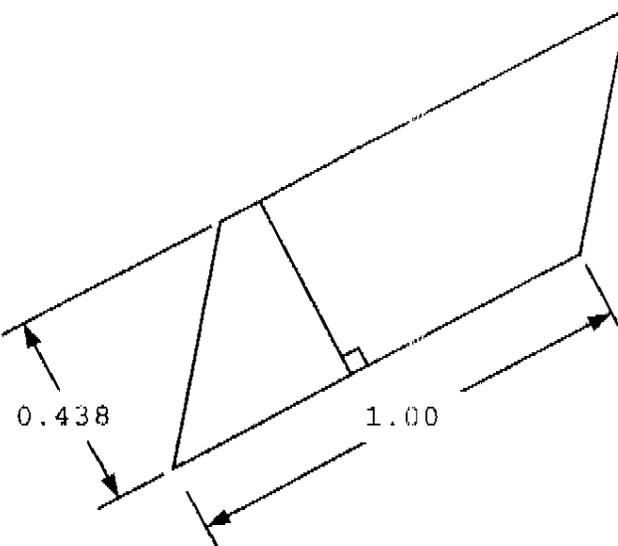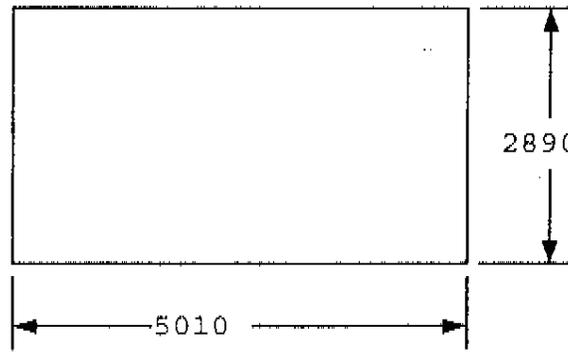
9F-11. $\dfrac{(3.41 + 2.38)(6.37 + 10.3)}{(-1.1)(0.388)(7470 - 12800)}$ ---------- --------- -------- 11=_____

9F-12. $\dfrac{(-557 + 526 - 663)(276)(370)}{(5.99 - 5.27)(-512 - 608)}$ -------- -------- ------- 12=_____

9F-13. $\dfrac{1.41 \times 10^5 + 1.53 \times 10^5}{(-1.62)(-0.225) + 3.24} + \dfrac{2690 - 797 + 1220}{(-0.239)(-0.0935)}$ ------------ 13=_____

9F-14. $\dfrac{-66.2}{-0.029} + \dfrac{648 + 333 - 2420}{0.968 - 1.27} + \dfrac{(8.84 \times 10^{-4} + 0.00156)}{\{(-1.40 \times 10^{-8})/(-0.0959)\}}$ ----- 14=_____

9F-15. $\dfrac{(57000 + 12900 - 27400)(0.299 - 0.149 - 0.188)}{(57.2)(12.8)(41.6)(3.85 + \pi + 2.05)}$ ------ ---- 15=_____

9F-16. The world population in 2007 was 6,602,224,175. Assuming you weren't born on a leap day, how many people on average share your birthday? ------------------------------ 16=_____

9F-17. A tuba costs $1000 and weighs 24 lbs. A piccolo costs 350 and weighs 13 ozs. What is the percent difference in the cost per pound? --- 17=_____ %

9F-18. To get diagonally across a square 5-acre field Fred can walk straight across or follow along two edges. What is the positive difference in these two travel options? --------- 18=_____ ft

09F-19.

RIGHT TRIANGLE

0.94 rad

7.2

?

09F-20.

RIGHT TRIANGLE

47.0°

Area = 0.051

09F-19 = _____

09F-20 = _____
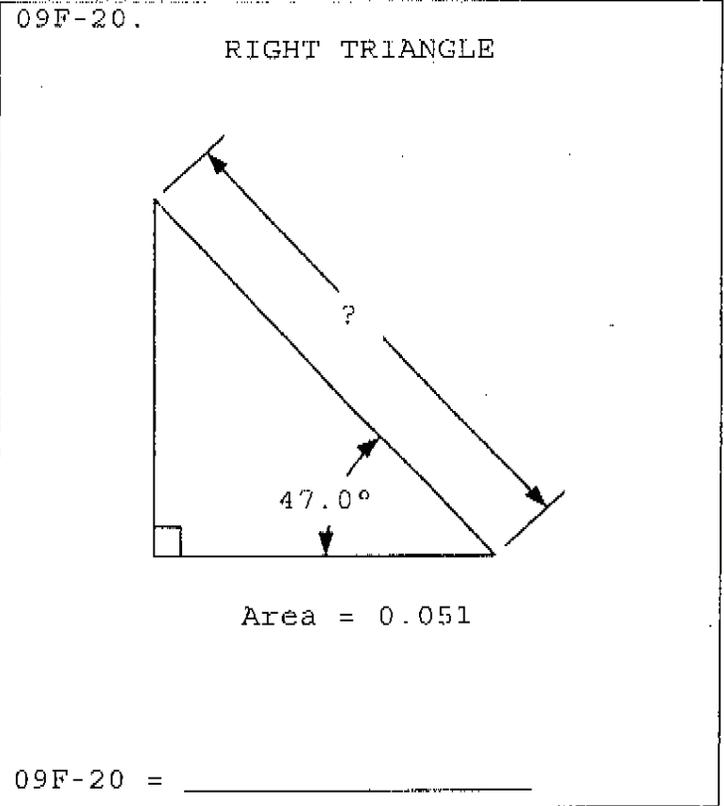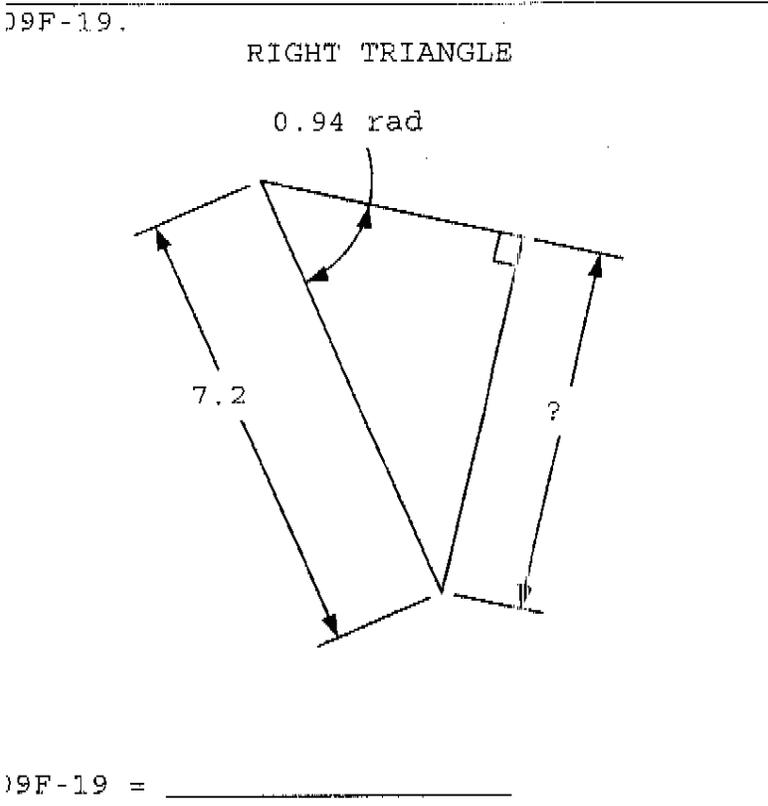
09F-21. $$\frac{0.0808 + 1/(2.42)}{1/(0.84) + 4.96} + \frac{1}{(5.73)}$$ ----------------------------------- 21=_____

09F-22. $$\left[\frac{(0.361)(0.384)}{4.4} + 0.00822\right]^2 + \sqrt{2.14\times10^{-6}}$$ --------------- 22=_____

09F-23. $$\frac{\sqrt{763 + 488 + (6.46\times10^5)/(993)}}{-512 + 365}$$ ------------------- 23=_____

09F-24. $(0.392)(9.54) + \sqrt{(16.1)/(1.92)} + [(0.528)(3.52)]^2$ ----------- 24=_____

09F-25. $$\left[\frac{2.16 + 0.494 + \sqrt{0.746/0.254}}{-0.00469 + 0.0015}\right]^2$$ ------------------- 25=_____

09F-26. Teletubbies was produced by BBC and ran four years in the late 1990s. If each of the four Teletubbies ate one piece of Tubby Toast per episode, there were 40 episodes per year and there were 20 slices in a loaf, how many loaves of Tubby Toast were consumed? ------------------------------------ 26=_____ loaves

09F-27. Samantha is contemplating purchasing a car that costs $24,900. She can pay cash from savings or take out a loan. The loan requires a $2000 down payment and 48 monthly payments of $545.72. If she does the loan, how much total interest will she pay? --------------------------------------- 27=$_____

09F-28. In 2007, a popular drink manufacturer reduced the empty weight of their 330 ml capacity glass bottle to 210 g. What is the total weight of a six-pack of filled drink bottles? --- 28=_____ lbs(SD)

09F-29.	09F-30.
SPHERE	CYLINDER

09F-29.

SPHERE

—Diameter = ?
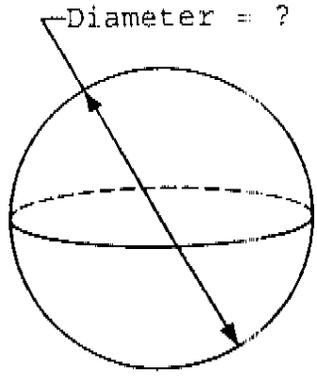
Volume = 7.88

09F-29 = _____

09F-30.

CYLINDER

—0.715—

?
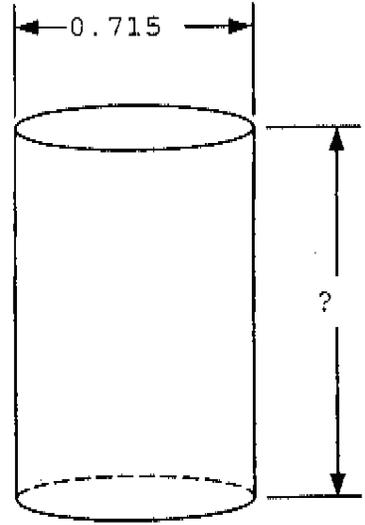
Lateral Surface Area = 2.59

09F-30 = _____

09F-31. $\left[\dfrac{-45.4}{79.4 + 29.3} + 0.612\right] \times \left\{288 + (-36)^2 - \sqrt{4.59 \times 10^6}\right\}$ --------- 31=_____

09F-32. $\sqrt{\dfrac{1/(590 - 296)}{(138)(1.17 + 0.176)^2}} + (-5.63 \times 10^7)^2 (2.01 \times 10^{-19})$ ------------ 32=_____

09F-33. $\dfrac{[(53800 - 42900)(0.264/0.878)]^{1/2}}{(0.839)^2 + (0.366 + 0.979)^2 + 1.01}$ ------------------- 33=_____

09F-34. $\dfrac{\sqrt{(8.45)/(0.536)/\sqrt{7.72}}}{3.34 + (0.846)(\pi)} + \{1.3 + 1.44\}^{1/2}$ -------------- 34=_____

09F-35. $\dfrac{\left[\dfrac{5.99}{339}\right]^2 + \sqrt{\dfrac{(0.822)(0.773)}{(7.96 \times 10^6)}} + (9.52 \times 10^{-4})}{0.178 + \sqrt{(-0.717)(-0.689)}}$ ----------- 35=_____

09F-36. What is the y value of the intersection of the line
y = 7x-10 and y = -5x+20? ------------------------------- 36=_____

09F-37. A pipe has an outside diameter of 1.25 in and an
inside diameter of 0.75 in. If Kelly hacksaws the pipe in
two, what fraction of the pipe cross sectional area is sawn
when the blade breaks through to the inside? ------------------- 37=_____ %

09F-38. If a person was locked in a perfectly insulated room
3ft by 8 ft by 10 ft, how long would it take the room
temperature to increase from 75°F to 100°F? The density of
air is 1.2 kg/cubic meter, and 1 watt sec/(g K) is its
specific heat. A person's body heat output is 100 watts and
their volume is 3 cubic feet. ------------------------------- 38=_____ hr

09F-39.
RIGHT TRIANGLE AND CIRCLE

Diameter = ?
0.429
0.52 rad
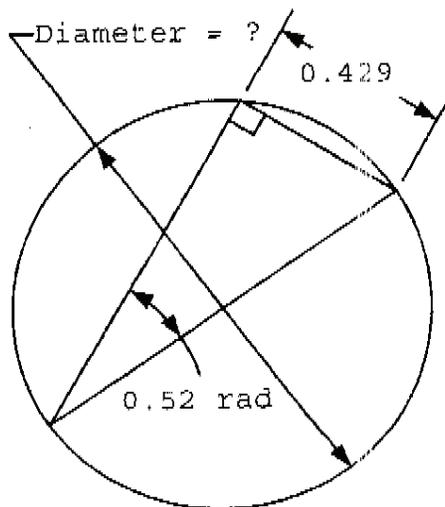
09F-40.
SCALENE TRIANGLE

238
56.6°
?
378

09F-39 = _____
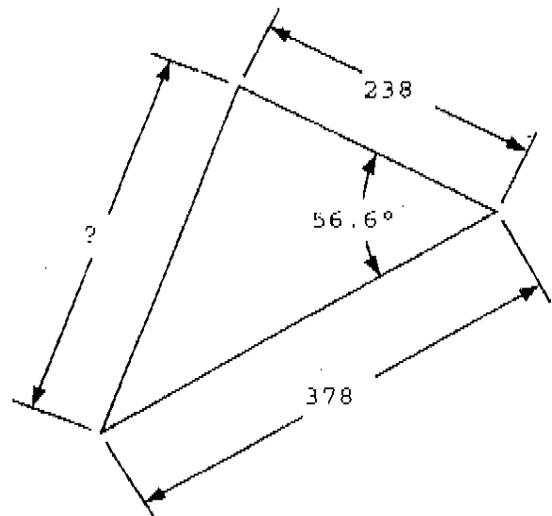
09F-40 = _____

09F-41. $10^{-((0.258-0.986) / (0.517+0.145))}$ ----------------------------- 41=_____

09F-42. $\dfrac{(3.00\times10^6)}{(-4.18\times10^6)}\left[1 - e^{-(0.752)(0.902)}\right]$ ----------------------- 42=_____

09F-43. $\dfrac{1.87\times10^5 - 5.53\times10^5}{\text{Log}(5.77\times10^5 + 1.60\times10^5)}$ ---------------------- 43=_____

09F-44. $(-49000 + 86100)^{-(0.467+0.808)}$ ------------------------ 44=_____

09F-45. (deg) $\dfrac{\cos((39.4°) / (6.23))}{\sin(72.9° - 78°)}$ ----------------------------- 45=_____

09F-46. A bucket is filled with marbles of diameter D. Each
marble's cost is proportional to the square of its volume. If
a bucket of 0.5 in diameter marbles costs $25, what is the
marble diameter for which the bucket cost is $50? ----------- 46=_____ in

09F-47. A company produces a spinning top. Their consecutive
monthly shipments of tops were 1000, 3500, 3800, 6500, 6500,
and 7500. After how many more months will their estimated
monthly shipments equal or exceed 30,000 tops? --------------- 47=_____ integer mo

09F-48. What is z if $z + \sqrt[5]{z - 17} = \pi^3$? ------------------------- 48=_____

09F-49.
TRUNCATED RECTANGULAR SOLID

18.8
21.7
6.9
deg?
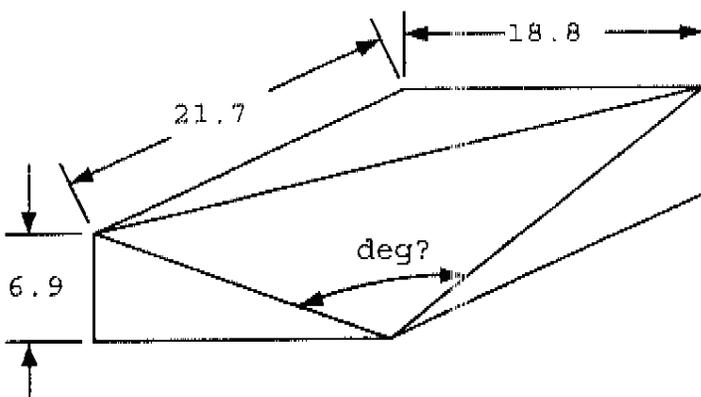
09F-49 = _____

09F-50.
CYLINDER AND FRUSTUM

43
?
30
67
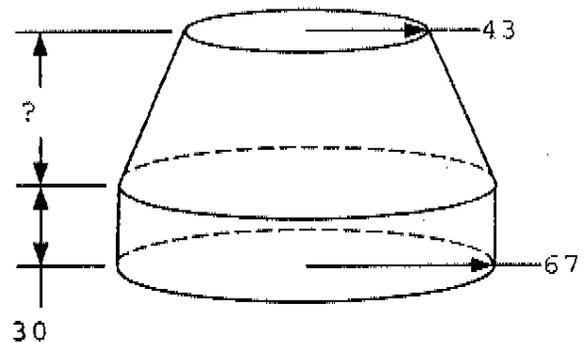
$\dfrac{\text{Cylinder Total}}{\text{Surface Area}} = \dfrac{\text{Frustum Total}}{\text{Surface Area}}$

09F-50 = _____

9F-51. $\dfrac{10^{(0.745)} \times 10^{-(0.614)} + 0.189}{10^{(\pi + 0.109)}}$ ----------------------- 51=_____

9F-52. $\dfrac{(-0.00961 - 0.00487)e^{(0.321)(1.44)}}{e^{-(6.34 - 1.77)}}$ ----------------- 52=_____

9F-53. $\dfrac{Ln\{(6730)(1130)(5620)\}}{9570 + (3250)Ln(7010)}$ ------------------- 53=_____

9F-54. $\dfrac{1}{(0.109)^{(-0.604)}} + (0.245 + 0.793)^{(0.939 - 0.783)}$ ----------- 54=_____

9F-55. (rad) $\arctan\left[\dfrac{(2310)(0.663)}{(8.74)(85.4)}\right] + (0.191)(6.09)$ ------------ 55=_____

9F-56. For what non-zero value of x is the slope of the curve = $8x^3 - 4x^2 + 17$ equal to x? ---------------------- 56=_____

9F-57. A rescuer throws a life preserver tied to a rope to a erson in the water. The rescuer pulls the rope at 3 ft/sec nd stands 5 ft above sea level. How fast is the person in he water moving toward the boat when 10 ft of rope is out? -- 57=_____ ft/s

9F-58. Calculate U_2 if $\mathbf{U} = \mathbf{VW}$, $\mathbf{V} = \begin{bmatrix} 3 & 5 & 1 \\ 4 & 7 & 7 \\ 9 & 2 & 8 \end{bmatrix}$ and $\mathbf{W} = \begin{bmatrix} 2 \\ 0 \\ 5 \end{bmatrix}$ ------------ 58=_____

09F-59.

RADIANS

$y = x^2 \cos(x - 1)$

$x_{min} = ?$

09F-59 = _____

09F-60.

RECTANGLE AND ISOSCELES TRIANGLES

508

B

rad?

A

830

992

AB is a straight line segment
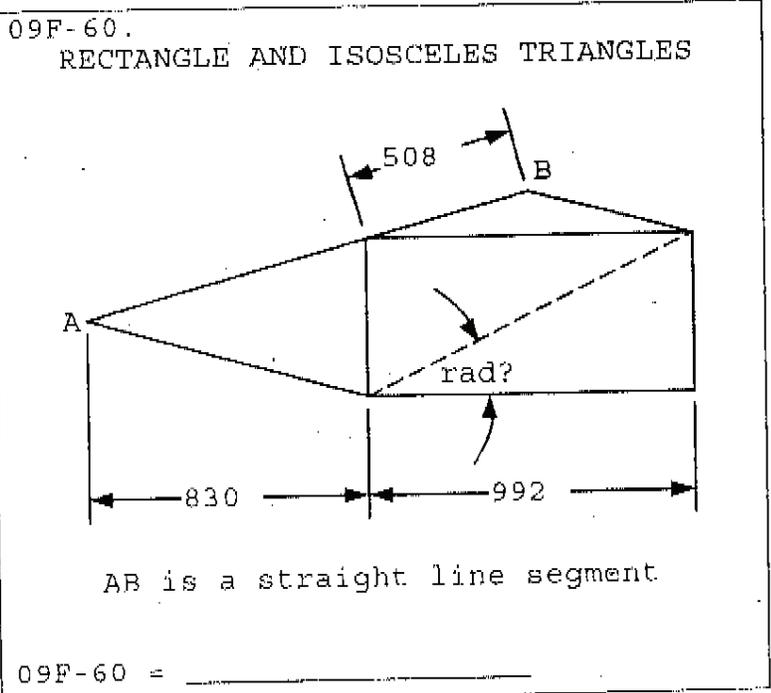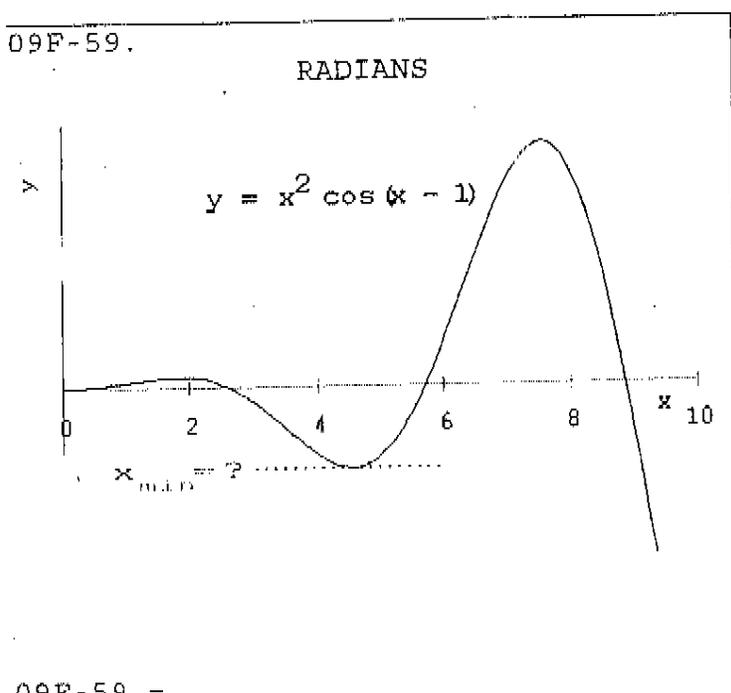
09F-60 = _____

09F-61. $2\text{Log}\sqrt{\dfrac{(3.53)(5.44)(3.6)}{(\pi)^3(1.44)^3}}$ -------------------------------- 61=_____

09F-62. (rad) $\cos(0.576 - 0.425) - \cos(0.576 + 0.425)$ -------------- 62=_____

09F-63. (deg) $\sin(-20°)\cos(25.1°) + \cos(-20°)\sin(25.1°)$ ------------- 63=_____

09F-64. $1 + 0.109 + (0.109)^2 + \dfrac{(0.109)^4}{8} - \dfrac{(0.109)^5}{15}$ -------------------- 64=_____

09F-65. (rad) $\dfrac{\arctan\left\{e^{-(0.863)(0.385)}\sqrt{(0.455)/(0.484)}\right\}}{(-0.598)\sqrt{(0.874)(0.15)(0.0853)}}$ ------------- 65=_____

09F-66. x and y are integers. If $x^2-y^2 = -656$ and
x-y = -8, what is y? --------------------------------------- 66=_____ integer

09F-67. Originally standing together, Dan runs away from Dana
at 17 mph. Dana throws a ball at 51 mph with a release angle
of 22°. How long after Dan starts running should she throw
the ball if he catches it in full stride? -------------------- 67=_____ s

09F-68. The pressure of an ideal gas is directly proportional
to the amount of gas present and inversely proportional to
the volume of the container. A certain amount of gas was
placed in a 10-ft long tank and the pressure was 30 psi. The
same amount of gas was placed in a 17-ft long tank of
identical shape and then the contents of both tanks were
mixed to get the same pressure in each. What is the final
pressure? -- 68=_____ psi

09F-69.
CONGRUENT SEMICIRCLES

Radius = 0.255

0.402

Hatched Area =?
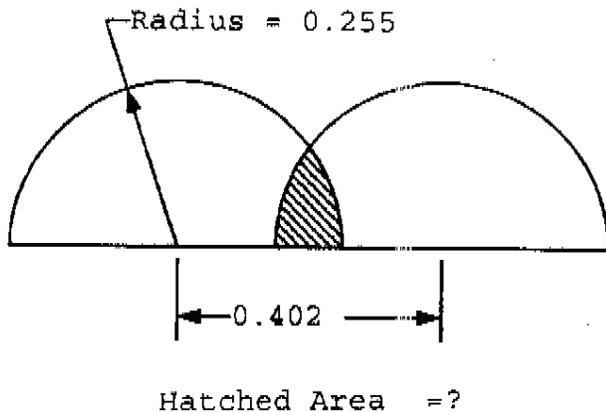
09F-69 = _____

09F-70.
SCALENE TRIANGLES

?

70°

1.16

36°

1.26
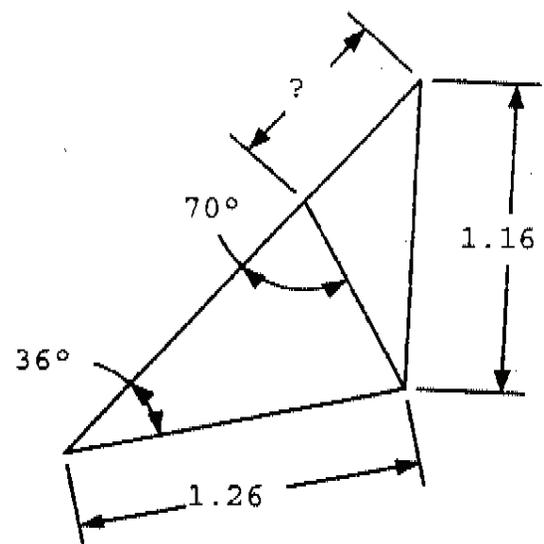
09F-70 = _____

09F-1 = 15.5
       = 1.55×10^1

09F-2 = -5.72
       = -5.72×10^0

09F-3 = -103
       = -1.03×10^2

09F-4 = -1.32×10^8

09F-5 = 48600
       = 4.86×10^4

09F-6 = 1.87
       = 1.87×10^0

09F-7 = 1.77
       = 1.77×10^0

09F-8 = 11.7
       = 1.17×10^1

09F-9 = 0.438
       = 4.38×10^{-1}

09F-10 = 15800
       = 1.58×10^4

09F-11 = 0.0424
       = 4.24×10^{-2}

09F-12 = 87900
       = 8.79×10^4

09F-13 = 221000
       = 2.21×10^5

09F-14 = 23800
       = 2.38×10^4

09F-15 = -0.00586
       = -5.86×10^{-3}

09F-16 = 1.81×10^7

09F-17 = 934
       = 9.34×10^2

09F-18 = 273
       = 2.73×10^2

09F-19 = 5.81
       = 5.81×10^0

09F-20 = 0.452
       = 4.52×10^{-1}

09F-21 = 0.255
       = 2.55×10^{-1}

09F-22 = 0.00304
       = 3.04×10^{-3}

09F-23 = -0.297
       = -2.97×10^{-1}

09F-24 = 10.1
       = 1.01×10^1

09F-25 = 1.87×10^6

09F-26 = 32.0
       = 3.20×10^1

09F-27 = $3294.56

09F-28 = 7.1 (2SD)
       = 7.1×10^0

09F-29 = 2.47
       = 2.47×10^0

09F-30 = 1.15
       = 1.15×10^0

09F-31 = -109 = -1.09×10^2

09F-32 = 0.00433 = 4.33×10^{-3}

09F-33 = 16.3 = 1.63×10^1

09F-34 = 2.76 = 2.76×10^0

09F-35 = 0.00176 = 1.76×10^{-3}

09F-36 = 7.50 = 7.50×10^0

09F-37 = 22.2 = 2.22×10^1

09F-38 = 0.835 = 8.35×10^{-1}

09F-39 = 0.863 = 8.63×10^{-1}

09F-40 = 317 = 3.17×10^2

09F-41 = 12.6 = 1.26×10^1

09F-42 = -0.353 = -3.53×10^{-1}

09F-43 = -62400 = -6.24×10^4

09F-44 = 1.49×10^{-6}

09F-45 = -11.2 = -1.12×10^1

09F-46 = 0.630 = 6.30×10^{-1}

09F-47 = 18 integer

09F-48 = 29.4 = 2.94×10^1

09F-49 = 84.0 = 8.40×10^1

09F-50 = 55.6 = 5.56×10^1

09F-51 = 0.000865 = 8.65×10^{-4}

09F-52 = -2.22 = -2.22×10^0

09F-53 = 0.000638 = 6.38×10^{-4}

09F-54 = 1.27 = 1.27×10^0

09F-55 = 2.28 = 2.28×10^0

09F-56 = 0.375 = 3.75×10^{-1}

09F-57 = 3.46 = 3.46×10^0

09F-58 = 43.0 = 4.30×10^1

09F-59 = 4.56 = 4.56×10^0

09F-60 = 0.355 = 3.55×10^{-1}

09F-61 = -0.127 = -1.27×10^{-1}

09F-62 = 0.449 = 4.49×10^{-1}

09F-63 = 0.0889 = 8.89×10^{-2}

09F-64 = 1.12 = 1.12×10^0

09F-65 = -9.61 = -9.61×10^0

09F-66 = 45 integer

09F-67 = 3.10 = 3.10×10^0

09F-68 = 10.1 = 1.01×10^1

09F-69 = 0.0116 = 1.16×10^{-2}

09F-70 = 0.623 = 6.23×10^{-1}