Name _____

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

UIL Calculator Applications

Test 24B

(Invitational B)

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.
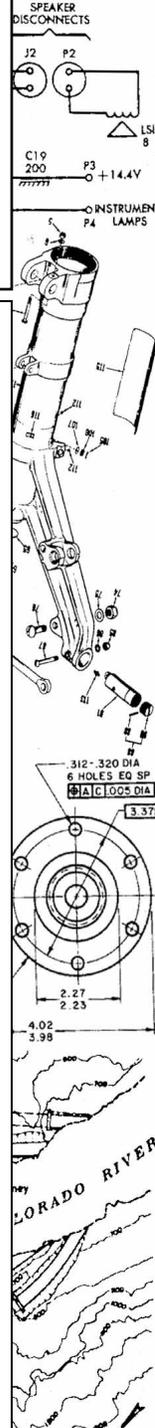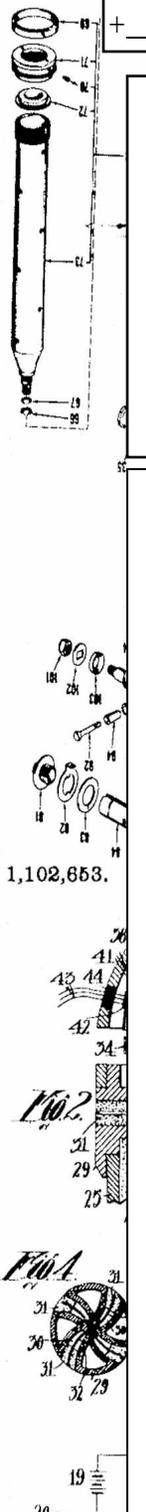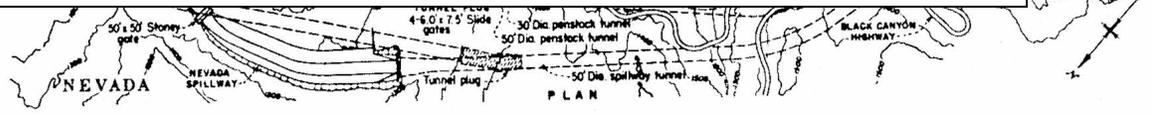
24B-1. $(-96.6/54) + \pi$ -- 1=_____

24B-2. $(-34.8 + 30.6 - 16.5) \times 69$ --- 2=_____

24B-3. $(0.969 - 0.421 + 2.16) \times (0.937) - 3.3$ ------------------------------ 3=_____

24B-4. $\dfrac{9780 + 23600 - 18700}{(0.0885)(-0.0587)(-0.0579)}$ -- 4=_____

24B-5. $\dfrac{(1.77 + 1.33 - 2.46)(-3.7)}{(2.9)(-6.8)(-1.14)}$ -- 5=_____

24B-6. What is the product of 237 and 0.362? ----------------------------------- 6=_____

24B-7. What is the sum of 1.63 and the product of 2.1 and 0.796? ------------ 7=_____

24B-8. A lizard grows from 4.32 in to 9.75 in over 2 months. What is the
positive change in length? -- 8=_____in
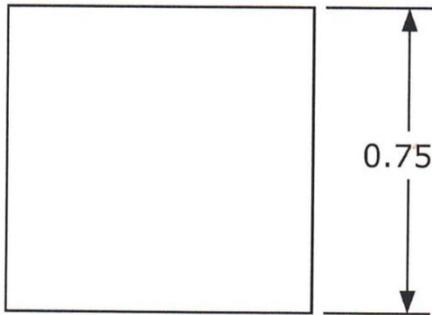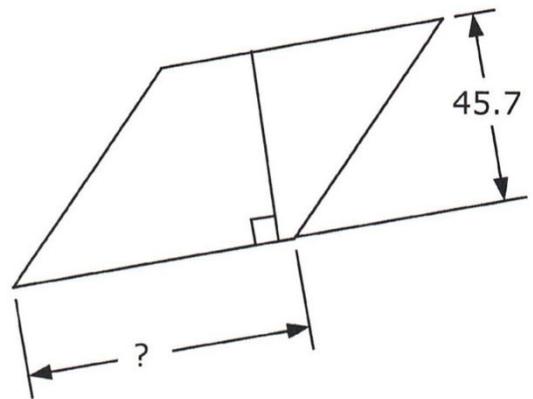
24B-9.	24B-10.
SQUARE	RHOMBUS
0.75	45.7
Perimeter = ?	?
	Area = 3170
24B-9 =_____	24B-10 =_____

24B-11. $\dfrac{(5420 + 1730)}{(0.981 - 1.59)} + \dfrac{(-20800 + 54200)}{(2.74 - 0.677)}$ ------------------------------- 11=_____

24B-12. $\dfrac{-0.0971(5.45\times10^{-5} + 2.54\times10^{-5})}{(528 - 3340)(-0.0154)} - \dfrac{-3.20\times10^{-7}}{-0.699 - 0.609}$ -------------- 12=_____

24B-13. $\dfrac{(-2.65\times10^{-5} - 3.88\times10^{-5})\{22.2 + (-2.48)(-8.48)\}}{(4.27)(-0.395 + 0.132)(-1.64)(8.76)}$ -------------- 13=_____

24B-14. $\dfrac{238 + 207 - 592}{(0.199)(2.92)} - \dfrac{(-30500)(9.76\times10^{-4} + 3.56\times10^{-4})}{0.987 + 0.745 - 0.823}$ ------------ 14=_____

24B-15. $\dfrac{4.60\times10^5 + 5.54\times10^5 - (77900 + 2.01\times10^5)(2.83 - 0.991)}{(-897)(-0.0638)(-0.492)(185 - 32.5 + 209)}$ ------- 15=_____

24B-16. Monica wants to read *A Tale of Two Cities*. If she reads 178 words per minute, and the book is 146,500 words. How long will it take her to finish the book? --- 16=_____ hr

24B-17. What is the y value of the intersection of the lines y = x/4−8 and y = −3x+6? -- 17=_____

24B-18. Grant Woods sold his painting, *American Gothic,* to the Art Institute of Chicago in 1930. It is worth 75 million dollars in 2024. If the annual appreciation rate was 14.1%, what was the original sales price? ------- 18=$_____

24B-19.

RIGHT TRIANGLE

93.8

142

?

24B-19 =_____

24B-20.

RIGHT TRIANGLE

0.62 rad

1.83

Area = ?

24B-20 =_____
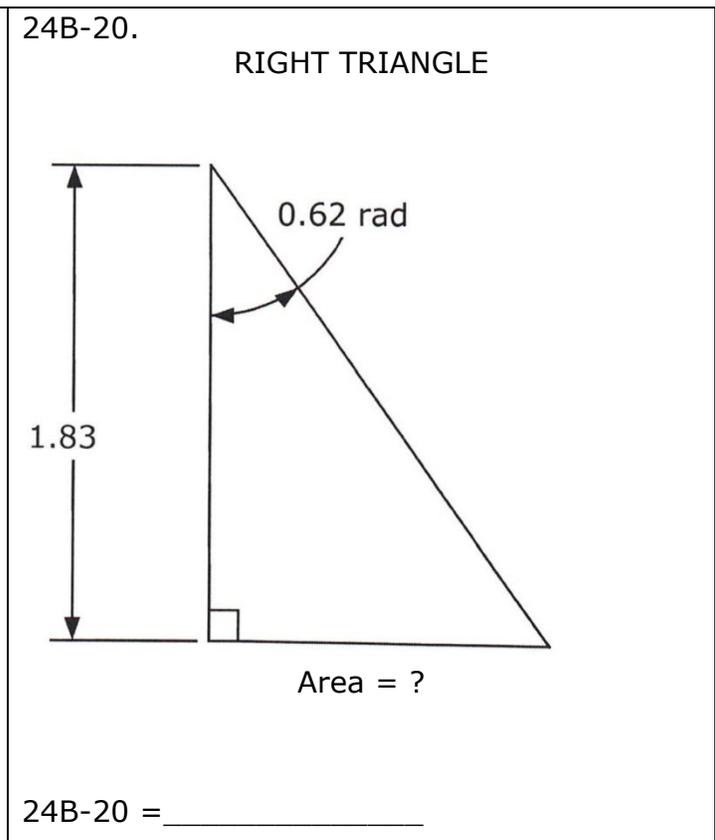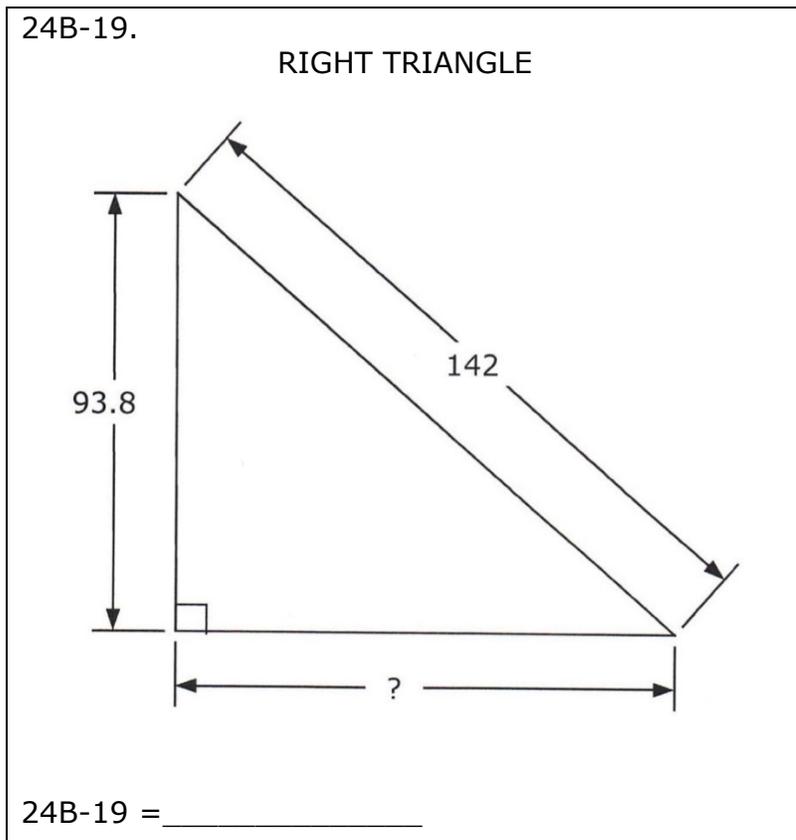
24B-21. $\dfrac{-0.0804 + 1/(\pi)}{1/(0.591) + 2.63} + \dfrac{1}{(-17)}$ --- 21=_____

24B-22. $\left[\dfrac{\sqrt{2.22 - 1.01}}{-3.15} + \dfrac{(-0.612)}{7.43}\right]^2$ -- 22=_____

24B-23. $\left[-21.4 + \sqrt{383}\right]^2 \times \left[984 + 1040\right]^2 \times \sqrt{\pi/2.11}$ -------------------- 23=_____

24B-24. $\dfrac{\sqrt{7.76 + 4.89 + (25.4)/(5.64)}}{-5.97 + 4.43}$ -- 24=_____

24B-25. $(-478)(-0.202) + \sqrt{(15700)/(6.82)} + \left[(0.955)(7.66)\right]^2$ ----------- 25=_____

24B-26. Monica has three printer ink cartridges. One is 0.5 full, one is 0.4 full, and the third is 0.8 full. If an unused ink cartridge can print 335 pages, how many pages can Monica print if she uses up all three cartridges? --- 26=_____ pages(SD)

24B-27. Emily lives 2.8 mi from school. Driving the speed limit, she gets to school in 4.8 min. If she's running late and drives 10 mph over the speed limit, how much time does she save driving to school? ----------------- 27=_____ s

24B-28. A school group bought 6 dozen Krispy Kreme donuts at $13/doz. They sold them at school for a fundraiser. They raised $50, even though they ate one donut in nine without paying for it. What was the percent increase in donut cost? --- 28=_____ %

24B-29.

CONE

36.7

?
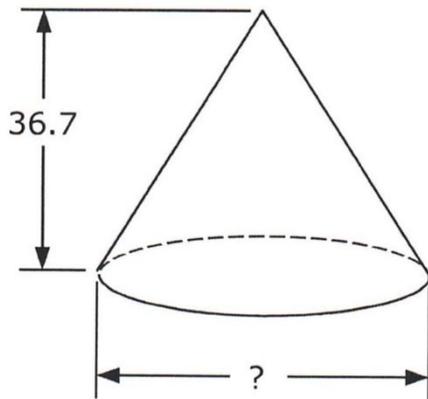
Volume = 20,900

24B-29 =_____

24B-30.

CYLINDER

0.93

1.21
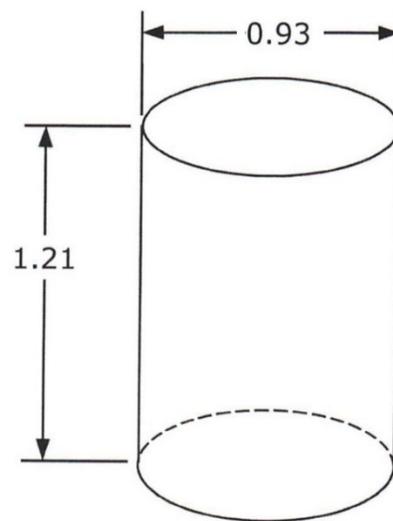
Lateral Surface Area = ?

24B-30 =_____

24B-31. $\left[\dfrac{-31.5}{65.5 + 25} + 0.466\right] \times \left\{33.8 + (-13.8)^2 - \sqrt{63800}\right\}$ ------------- 31=_____

24B-32. $\dfrac{1}{0.00375} + \dfrac{1}{\sqrt{9.75\text{x}10^{-6}}} + \dfrac{(3.8 + 10.3 - 1.43)^2}{\sqrt{1.49 - 0.956}}$ ------------------ 32=_____

24B-33. $\dfrac{(8.65)^2 + \sqrt{4200}}{\sqrt{(0.935)(-27.5)^2}} + \dfrac{\sqrt{\sqrt{(1.04\text{x}10^5)(0.215)}}}{0.554 + 2.86}$ ------------------ 33=_____

24B-34. $\dfrac{[(4.56 - 1.12)(0.96/0.591)]^{1/2}}{(0.232)^2 + (0.14 + 0.207)^2 + 0.111}$ -------------------------------- 34=_____

24B-35. $\dfrac{\left[\dfrac{\sqrt{0.00564 + 0.0136}}{(6820)(14100)+(9820)^2}\right]}{\sqrt{0.00223 + 0.00238} + (0.215 - 0.0378)^2}$ ------------------------- 35=_____

24B-36. A drone flies at 400 ft elevation and 95 mph. When it is directly overhead, Joe, on the ground, fires a rocket at an angle to intercept the drone. The rocket travels in a straight line at 230 mph. How far did the rocket travel to intercept the drone? -- 36=_____ ft

24B-37. What is the length of the line segment defined by the intersections of the line y = 2x+7 with the curve y = 5/x+2? ----------------- 37=_____

24B-38. How many minutes after 6:45 do the minute and hour hands of a clock line up? -- 38=_____ min

24B-39.
SCALENE TRIANGLE AND INSCRIBED CIRCLE

2240

r = ?

1310

1610
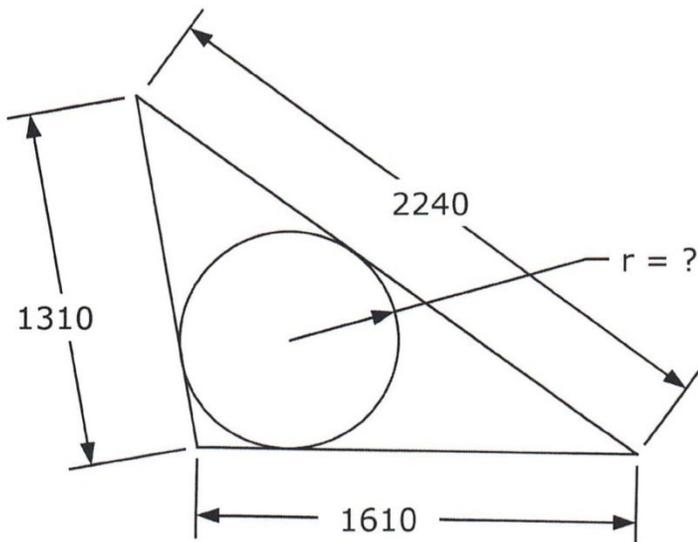
24B-39 =_____

24B-40.
SCALENE TRIANGLES

AB = ?

414

348

64.1°

B

306
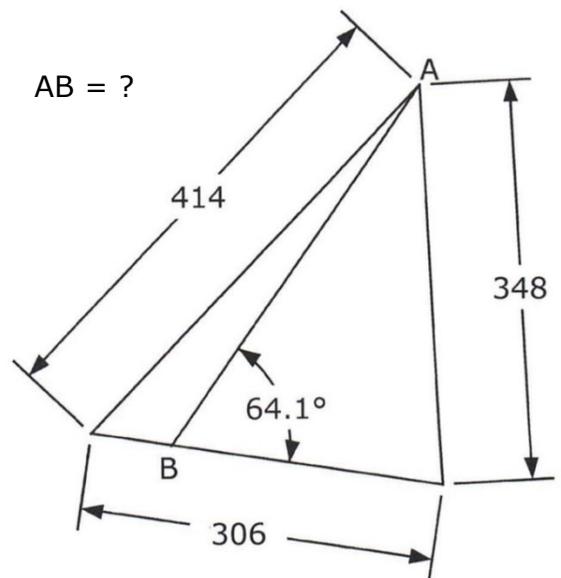
24B-40 =_____

24B-41. $10^{-\{(0.309 - 0.645)/(0.14 + 0.0963)\}}$ ---------------------------- 41=_____

24B-42. $-1190\, e^{0.424} + (-868)\, e^{-0.332}$ ----------------------------------- 42=_____

24B-43. $\dfrac{\text{Ln}(0.219 + 0.755 - 0.149)}{(-0.252)}$ --- 43=_____

24B-44. $(-7.09 \times 10^5 + 2.18 \times 10^6)^{-(0.299 + 0.856)}$ ------------------------- 44=_____

24B-45.(deg) $\{(-2810)\sin(-54.7°)\} \times \{(-5150)\cos(-130°)\}$ --------------- 45=_____

24B-46. Pizzas have the same thickness regardless of size. If a large 14-in
pizza feeds 3 people, what sized pizza is needed to feed 100 people? --------- 46=_____ in

24B-47. It is 2002 mi traveling from Texas to Massachusetts. Olivia's daily
driving distance the first 3 days of her trip were 310 mi, 250 mi and 300 mi.
Estimate the total number of days for the trip. ---------------------------------- 47=_____ dy integer

24B-48. Solve for n if $n^n = 235$. -- 48=_____

24B-49. CUBE WITH CYLINDRICAL CAVITY	24B-50. HALF CYLINDRICAL PRISM AND ISOSCELES TRIANGLE PRISM
0.0569 ? Total Surface Area = 0.0497	22.7 ? R = 7.24 $\dfrac{\text{Volume}}{\text{(Triangular Prism)}} = \dfrac{\text{Volume}}{\text{(Half Cylindrical Prism)}}$
24B-49 =_____	24B-50 =_____
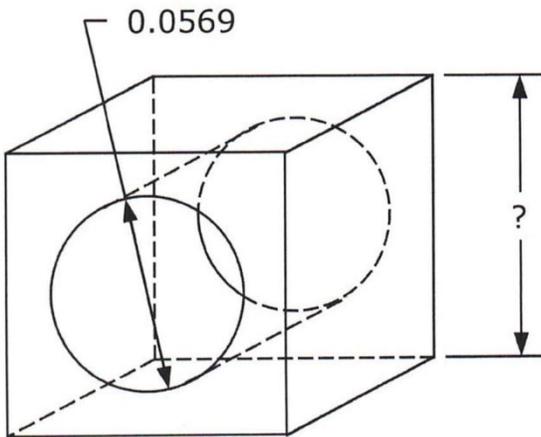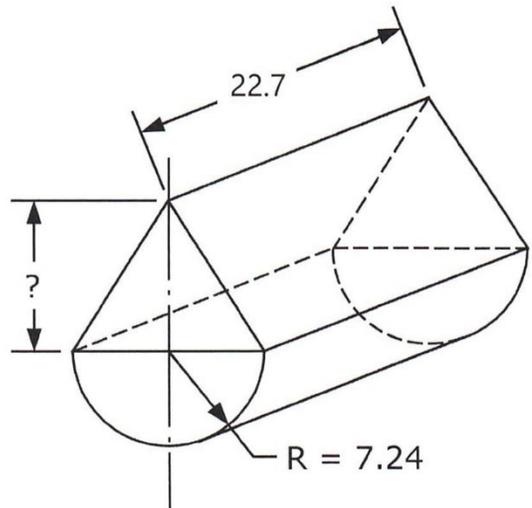
24B-51. $\dfrac{10^{(0.928)} \times 10^{-(0.751)} + 0.998}{10^{(1.58 + 0.855)}}$ ---------------------------------- 51=_____

24B-52. $\dfrac{1 + e^{+\{0.533 + (0.746)(3.2)\}}}{(-0.00645)(8.36 - e^{(-0.722)})}$ ---------------------------------- 52=_____

24B-53. $\dfrac{\text{Log}\{291 + (50.2)(33.2)\}}{\pi - \text{Log}\{(93.9)/(0.0286)\}}$ ---------------------------------- 53=_____

24B-54. $\dfrac{(0.659 + 0.862)^{-0.628}}{(0.527)^{-(0.149 + 0.11)}}$ ---------------------------------- 54=_____

'

24B-55.(rad) $\dfrac{\arctan\{12.5 + (6.62)(0.807)\}}{\arcsin\{(4.51 + 2.24)/20.3\}}$ ---------------------------------- 55=_____

24B-56. (rad) What is the slope of the curve $f(x) = 3x\sin(7x) + 2.5x + 5$ at
x = 8? --- 56=_____

24B-57. A 100-lb log decays proportional to the remaining mass of
undecayed wood. If 10 lb of the log decays in 150 dy, how much longer
would it take for a total of 90 lb of the log to be decayed? -------------------- 57=_____ yr

24B-58. Solve for positive g if the determinant of $\begin{bmatrix} 20 & 5g & -14 \\ 5g & 7 & 7 \\ -14 & 7 & 31 \end{bmatrix}$ equals 35. -- 58=_____

24B-59.	24B-60.
Radians	IDENTICAL CIRCLES
y = xsinx	
Hatched Area = ?	R = 6.74
	Hatched Area = 17.5
24B-59 =_____	24B-60 =_____
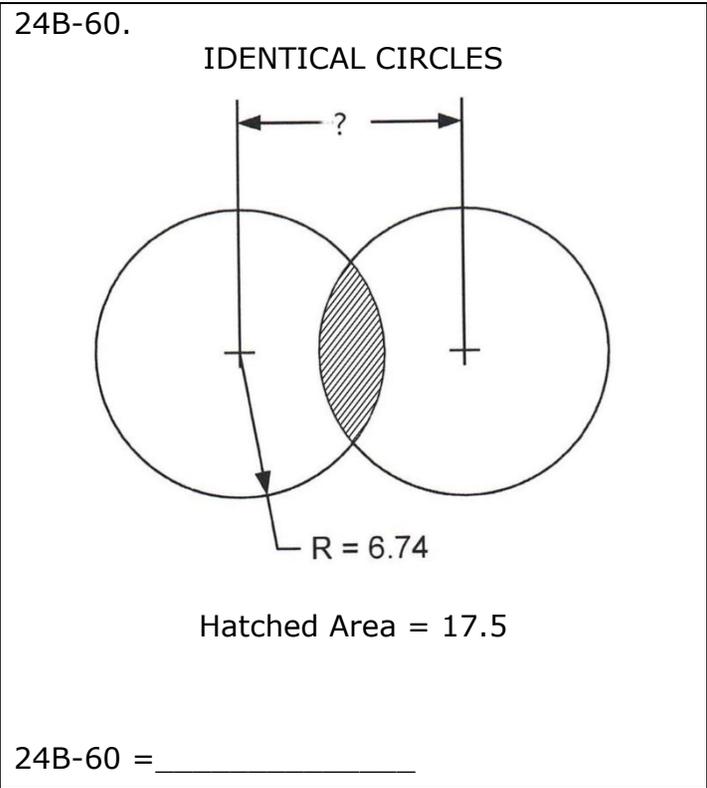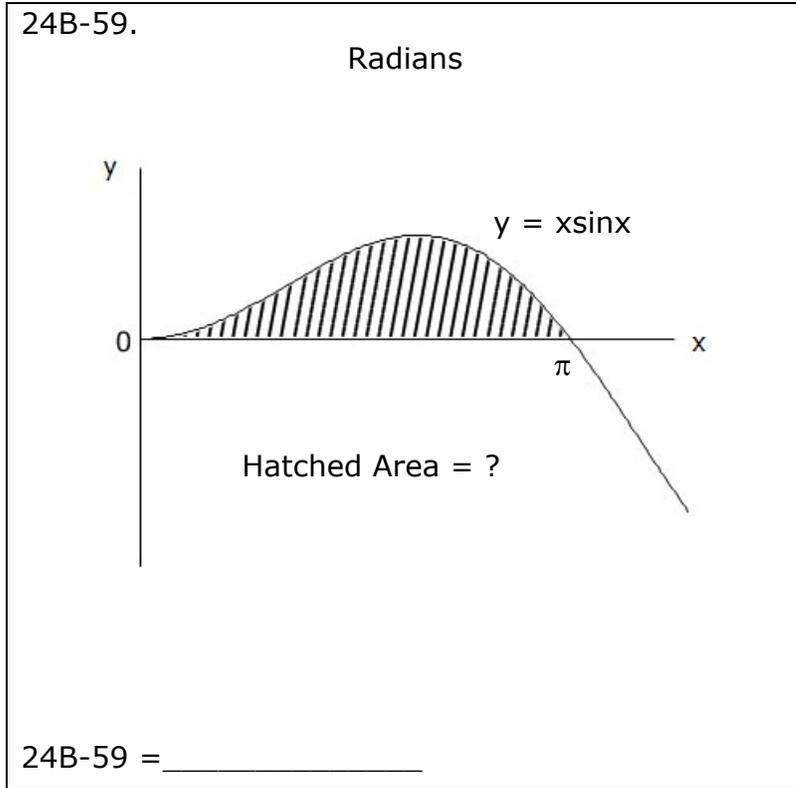
24B-61. The longest recorded hole-in-one was made by Mike Crean at Green Valley Ranch Golf Club in Denver in 2002, a distance of 517 yards. A golf cup is 4.25 in in diameter. What is the maximum angular dimension or wedge the ball must travel in? -- 61=_____ deg

24B-62. A zeptosecond is 10^{-21} sec. What is this number raised to the power 65,321? -- 62=_____

24B-63. Zelda stands 15 ft away from a 25-ft wall. She tosses a ball to Xavier who stands atop the wall. What should the release angle be (relative to the ground) if the ball has no vertical component of velocity when it is caught. -- 63=_____ deg

24B-64.

SQUARE
M = midpoints

Hatched Area = 538

24B-64 =_____

24B-65.

CIRCLE AND EQUILATERAL TRIANGLE

R = 0.876

Hatched Area = ?

24B-65 =_____

24B-66. $2\text{Log} \sqrt{\dfrac{(7.99)(9.83)(5.41)}{(2.34)^3(4.45)^3}}$ --- 66=_____

24B-67. (rad) $\dfrac{\sin(0.576)}{\cos(0.576)} \sqrt{1 - \{\sin(0.977 \times 9.15)\}^2}$ ------------------------- 67=_____

24B-68. (deg) $\sin(-41.5°)\cos(172°) + \cos(-41.5°)\sin(172°)$ ------------------ 68=_____

24B-69. $-\dfrac{1}{(3.9)} + \dfrac{1}{3(3.9)^3} - \dfrac{1}{5(3.9)^5} + \dfrac{1}{7(3.9)^7}$ -------------------------- 69=_____

24B-70. (rad) $e^{(7.08)} \left[\dfrac{(-0.108)\sin(5.21) - (-0.0255)\cos(-2.66)}{(0.834)\sqrt{(-0.108)^2 + (-0.0255)^2}} \right]$ ----------- 70=_____

24B-1   = 1.35
         = 1.35×10^0

24B-2   = −1430
         = -1.43×10^3

24B-3   = −0.763
         = -7.63×10^{-1}

24B-4   = 4.88×10^7

24B-5   = −0.105
         = -1.05×10^{-1}

24B-6   = 85.8
         = 8.58×10^1

24B-7   = 3.30
         = 3.30×10^0

24B-8   = 5.43
         = 5.43×10^0

24B-9   = 3.00
         = 3.00×10^0

24B-10   = 69.4
         = 6.94×10^1

24B-11   = 4450
         = 4.45×10^3

24B-12   = -4.24×10^{-7}

24B-13   = −0.000175
         = -1.75×10^{-4}

24B-14   = −208
         = -2.08×10^2

24B-15   = −49.2
         = -4.92×10^1

24B-16   = 13.7
         = 1.37×10^1

24B-17   = −6.92
         = -6.92×10^0

24B-18   = $309.18

24B-19   = 107
         = 1.07×10^2

24B-20   = 1.20
         = 1.20×10^0

24B-21   = −0.00378
         = -3.78×10^{-3}

24B-22   = 0.186
         = 1.86×10^{-1}

24B-23   = 1.67×10^7

24B-24   = −2.69
         = -2.69×10^0

24B-25   = 198
         = 1.98×10^2

24B-26   = 570
         = 5.7×10^2 (2SD)

24B-27   = 64.0
         = 6.40×10^1

24B-28   = 84.6
         = 8.46×10^1

24B-29   = 46.6
         = 4.66×10^1

24B-30   = 3.54
         = 3.54×10^0

24B-31 = -3.34
$= -3.34 \times 10^0$

24B-32 = 807
$= 8.07 \times 10^2$

24B-33 = 8.83
$= 8.83 \times 10^0$

24B-34 = 8.29
$= 8.29 \times 10^0$

24B-35 $= 7.25 \times 10^{-9}$

24B-36 = 439
$= 4.39 \times 10^2$

24B-37 = 9.01
$= 9.01 \times 10^0$

24B-38 = 53.2
$= 5.32 \times 10^1$

24B-39 = 403
$= 4.03 \times 10^2$

24B-40 = 379
$= 3.79 \times 10^2$

24B-41 = 26.4
$= 2.64 \times 10^1$

24B-42 = -2440
$= -2.44 \times 10^3$

24B-43 = 0.763
$= 7.63 \times 10^{-1}$

24B-44 $= 7.52 \times 10^{-8}$

24B-45 $= 7.59 \times 10^6$

24B-46 = 80.8
$= 8.08 \times 10^1$

24B-47 = 8   integer

24B-48 = 3.96
$= 3.96 \times 10^0$

24B-49 = 0.0818
$= 8.18 \times 10^{-2}$

24B-50 = 11.4
$= 1.14 \times 10^1$

24B-51 = 0.00919
$= 9.19 \times 10^{-3}$

24B-52 = -385
$= -3.85 \times 10^2$

24B-53 = -8.78
$= -8.78 \times 10^0$

24B-54 = 0.651
$= 6.51 \times 10^{-1}$

24B-55 = 4.47
$= 4.47 \times 10^0$

24B-56 = 144
$= 1.44 \times 10^2$

24B-57 = 8.56
$= 8.56 \times 10^0$

24B-58 = 1.08
$= 1.08 \times 10^0$

24B-59 = 3.14
$= 3.14 \times 10^0$

24B-60 = 10.5
$= 1.05 \times 10^1$

24B-61 = 0.0131
$= 1.31 \times 10^{-2}$

24B-62
$= 1.00 \times 10^{-1},371,741$

24B-63 = 73.3
$= 7.33 \times 10^1$

24B-64 = 37.9
$= 3.79 \times 10^1$

24B-65 = 1.41
$= 1.41 \times 10^0$

24B-66 = -0.424
$= -4.24 \times 10^{-1}$

24B-67 = 0.574
$= 5.74 \times 10^{-1}$

24B-68 = 0.760
$= 7.60 \times 10^{-1}$

24B-69 = -0.251
$= -2.51 \times 10^{-1}$

24B-70 = 928
$= 9.28 \times 10^2$